



Speech and scribal errors as a window into the mind.  
Evidence for mechanisms of speech (re)production and systems of mental representations

Teresa Proto\*

\* Université de Paris 8, 2 rue de la Liberté - 93526 Saint-Denis (France)  
tproto@univ-paris8.fr

### Introduction

Ever since Freud's suggestion that the mechanisms involved in slips of the tongue may lead us to a deeper understanding of the "probable laws" of the generation of speech, linguists have paid growing attention to lapses as a source of linguistic knowledge. Based on the idea that defects in spontaneous language activity are subject to the same discernible principles as smooth speech, lapses and similar anomalous utterances have been used as evidence of the "psychological reality" of phonological units and rules (Fromkin 1968, 1973; Shattuck-Hufnagel 1986) and for their implications in theories of sound change (Meringer 1908; Sturtevant 1947).

Psychologists and psycholinguists are interested in slips of the tongue because of what the lack of correspondence between what is thought (mental plan) and what is uttered (mechanism for speech production) may reveal about how language is produced. In speaking we have a mental plan for what we are going to say; sometimes, however, this plan is disrupted, as the mechanism for speech production does not cooperate with the cognitive one. Indeed, the study of slips of the tongue appears to reinforce the idea that the language of thought (or "mentalese" to use Pinker's term) is not the same thing as the language through which we express our thoughts. Such speech errors as indirectly reflect the actual operation of the speech production process are particularly valuable in constructing models of linguistic processing.

Slips of the pen have a great deal in common with slips of the tongue. A close look at the data from manuscript sources (ancient and modern) reveals that a specific set of scribal errors, with regard to languages using an alphabetic writing system, could be included in the same typology established for speech errors.<sup>1</sup>

In this paper, it will be argued that such commonalities point to the possibility that speech and scribal errors share a common cognitive mechanism, and that some aspects of the writing process, as a derivative of the normal speaking process, may be included in a (psycho)linguistic model of talking.

### 1. Types of speech errors

A speech error has been defined as an "unintentional linguistic innovation" (Sturtevant 1947: 38) or "unintentional deviation from wellformedness" (Bierwisch 1982: 44) that occurs during

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<sup>1</sup> This view was shared by Kainz (1956: 416): "Die Fehlhandlungen des Sprechens sind ergiebige Quellen für Psychologen und Linguisten; die des Schreibens sind das auch, außerdem aber noch für den Philologen, dem sie manche textkritischen Erklärungskategorien liefern."

spontaneous speech.<sup>2</sup> On the phonological level, units of varying size, from segments to syllables to words, can be involved; on the morpho-syntactic level, morphemes and words are more likely to be involved than higher-order constituents.

Several attempts have been made to reduce the huge variety of speech errors to a few classes. In the remaining part of this section, I will review some of the accounts relevant to a discussion of error types. The following two sections will be devoted to a critical survey of how speech error data have been used to validate hypotheses regarding both language production and linguistic change.

According to Hockett (1967), the basic mechanisms of *blending*, *analogy*, and *editing* are enough to explain not only the generation of slips, but of speech itself.

In blending, competing expressions of the same intended message collide in a new construction, as exemplified in (1), where the slip *yawn* results from the blending of the two competing expressions *yard* and *lawn*:

(1) YARD, LAWN yielding *yawn*

What blends suggest is that conceptualization can occur without linguistic form: the message is encoded in some non-linguistic shape, prior to being translated into linguistic form (Hill 1972, cited in Fromkin 1973). However, the phonological system of a language imposes a variety of constraints on what speakers may say, whether in smooth speech or lapses. Some of the constraints are universal, while others are language-specific.

In the case of (1), among all possibilities of blending, the more probable variants are *yawn* and *lard*, because these best match the structure of English monosyllables.<sup>3</sup>

*Counterblends* involve pairs of words linked to each other by the semantic relationship of antonymy:

(2) We weren't sure we could *avord* – *affoid* it

In (2) the degree of similarity between the competing words *afford* and *avoid* is much greater than between *lawn* and *yard*; the former two expressions not only belong to the same semantic field, but are also similar in sound. As we will see below, the similarity effect plays a central role in facilitating slips of the tongue.

Under the rubric of blending, Hockett also includes the phenomenon of *metathesis*, i.e. a switch of two or more segments. The most common type of metathesis is *distant metathesis*, colloquially known as spoonerism. In spoonerisms, that which is actually uttered differs from what is “intended” by an exchange of two nonadjacent parts, as shown in the examples below:

(3)

a. intended: *half-formed wish* → spoken: half-warmed fish (Hockett 1967: 922)

b. intended: *I feel so foolish* → spoken: I fool so feelish

While (3a) is an example of *single-blend* metathesis, the utterance in (3b) is an instance of *double-blend* metathesis, whereby a blend is followed by a compensating counterblend: the original

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<sup>2</sup> Speech errors produced intentionally, such as witticisms or ironic spoonerisms, will not be considered here; nor will lexical errors due to idiolectal divergence or malapropisms.

<sup>3</sup> Hockett points to evidence from rhyming monosyllables (*June, moon, spoon, croon*); alliterative assonance in various proverbs and riddles (*Let us flee, said the fly; let us fly, said the flea; so they flew through a flaw in the flue*); and the functioning of the “secret language” of Pig Latin, wherein monosyllables are broken between initial consonantism and remainder for coding: /awt+shey/ for *shout*, and /el+yey/ for *yell*.

*anticipatory blend* ('fool') is followed by a compensating *retrogressive blend* ('feelish'). It is interesting to note that, despite the switch in linear ordering, all the phonemic material *consciously* planned for the intended phrase is preserved and produced.

In the case of a double-blend metathesis involving not the exchange of sublexical units, but the interchange of whole words, the constituent words are not superficially distorted, as seen in the examples in (6).

Metathesis, probably of the single-blend type, often occurs within phrases of the form *X and Y*. For example, I have had occasion to utter the phrase *Trieste e Trento*<sup>4</sup> as *Triento e Tr---* or as *Triesto e Tr-----*, without being able to complete the initiated utterance, as if the retrogressive blend was somehow blocked. In such cases, overt editing is the only way out.<sup>5</sup>

For the class of speech errors exemplified below, an explanation in terms of *analogy* is offered by Hockett:

(4)

a. It's three hot here!

b. Daddy, you're interrung ùp (after having been told "Don't interrup(t)")

The two utterances – produced by two children – are created by analogy with preexisting sentences familiar to the speaker as whole units (i.e., *It's too (two) hot here!* and *Don't wake up the baby.*)

Based on the observation that the units involved are most often individual phonemic segments, morphemes, and words, Boomer and Laver (1968) group lapses into classes of segmental, morphemic, and lexical slips, arguing that all slips of the tongue may be accounted for in terms of "*misordering of units in the string, omission of a unit, or replacement of a unit*" (Boomer and Laver 1968: 5).

Their classification was subsequently improved by Dell (1986), who further distinguishes between sound errors, morpheme errors, and word errors, but additionally claims that at these three levels, lapses may take the form of *anticipations, perseverations, and deletions*, as exemplified below:

(5)

a. reading list → *leading list*

b. waking rabbits → *waking wabbits*

c. same state → *same sate*

The examples in (5) are all sound errors. (5a) is an anticipation error, resulting from the substitution of the sound /r/ in 'reading' in anticipation of the sound /l/, which belongs to a later output item, thus yielding 'leading'. In (5b), perseveration of the element /w/ belonging to the early output item 'waking' results in the corruption of the later output item 'rabbits', yielding 'wabbits.' In (5c), deletion of the output element /t/ in 'state' occurs.<sup>6</sup> Instances of morpheme and word errors are illustrated in (6):

(6)

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<sup>4</sup> Trieste and Trento are two Italian cities that are usually cited together in historical accounts of the Second World War, such that their names are often paired in place and street names.

<sup>5</sup> In a sense, overt editing can constitute a "metalapse," since it plays an essential part in providing additional information, including information not consciously intended for transmission.

<sup>6</sup> (5c) could well be regarded as an instance of perseveration of the onset /s/ into the next output item.

- a. the truck was parked → *the park was trucked*
- b. Er hat in Berlin drei Tage in der Woche gearbeitet → *Er hat in Berlin drei Wochen im Tag gearbeitet*<sup>7</sup>
- c. forgot to add the roof to the list → *forgot to add the list to the roof*
- d. You have too many irons in the fire → *You have too many irons in the smoke*
- \* You have too many irons in the fire → *You have too many irons in the coat*

In (6a), an anticipatory movement error involves elements of the stem-affix construction (*stranding exchange*); in (6b) and (6c), two elements of the same grammatical class (noun) are involved in the exchange; (6d) shows that meaning-based errors only involve words that are semantically-related (*fire : smoke*; but not *coat*). This error can be explained due to the fact that in the lexicon, words are stored such that similar semantic classes belong together (Fromkin (1980).

The slip in (6b) shows not only that word exchange concerns words of the same syntactic category, but that the exchange occurs prior to the specification of the morphological surface feature (indeed, the plural morpheme *-en* is correctly attached to *Woch-*). This observation bears some important theoretical consequences for a model of language production, as will be argued in section 3.

While morpheme and word ordering errors arise from a disruption in the mechanism of linear organisation, another class of lapses can be accounted for with reference to the mechanism of selection (Bierwisch 1982: 35-43). This category includes selection errors, as well as blends:

(7) Selection errors

Ist das das **verpachtete** Rad? → Ist das das **verpfändete** Rad?

In errors of this type, the phonemic representation of the intruding lexical item is selected. The intended item (*verpachtete*, 'hired') is displaced by another, which is in some way phonemically or semantically related (*verpfändete*, 'pawned'); this phenomenon shows that replacement is not arbitrary, and that it occurs at an early stage in the derivation (insertion of the lexical item), before any particular grammatical rule applies. As for word exchange errors, here the semantic structure of the sentence is not affected.

While ordering errors of the type (6a) show an interaction between two parts of an utterance, selection errors and blends are non-interaction errors (Shattuck-Hufnagel 1986), since the change does not appear to stem from any identifiable element in the utterance.

It has been claimed that segmental slips are the most common type of speech error, accounting for about 60% of all errors (Boomer and Laver 1968). This claim is supported by Fromkin, who states that "by far the largest percentage of speech errors of all kinds show substitution, transposition (*metathesis*), omission, or addition of segments of the size of a phone, both within words and across word boundaries" (Fromkin 1973: 218).

Most of the examples from within Fromkin's collection of slips of the tongue involve *singleton* elements, i.e., occurring between single consonant or vowel positions. Exchanges that involve whole syllables or heterosyllabic sequences are very rare.

Segmental errors are explained with reference to four basic mechanisms (anticipation, perseveration, metathesis, and omission) as illustrated in (8):

(8)

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<sup>7</sup> He worked three days a week in Berlin → *He worked three weeks a day in Berlin.*

(a) anticipation

cup of coffee → *cuff*...

(b) perseveration

Chomsky and Halle → *Chomsky and Challe*

(c) metathesis

the zipper is narrow → *the nipper is zarrow*

Wang's bibliography → *Wing's babliography*

(d) omission

two hundred drugs → *two hundred [dʌgz]*

In a number of cases, however, errors are ambiguous and not easily classified. Consider the following example:

(9)

a. Spanish speaking people → *speaping people*

As a matter of fact, singleton exchange errors may actually involve *subsegmental* features rather than individual segments, as exemplified by the blend in (10):<sup>8</sup>

(10)

BUBBLES, TOUGH yielding /bəvɪls/

Here the voicing of the /v/ is from the medial /b/ of *bubbles*, while its degree of aperture is from the final /f/ of *tough*. The above blend yields a pronunciation with a phoneme that is not present in either of the contributing forms; however, it results from the selection of the same phonetic features as the contributing forms. It may thus be regarded as an example of voicing anticipation.

The independence of distinctive features has been defended by some authors (Hockett 1967, Fromkin 1973) and dismissed by others (Nooteboom 1967). It has been maintained that, at least for consonant interaction errors, features of the place of articulation are more likely to change with respect to manner and voicing (Shattuck-Hufnagel 1986). As will be made clear in the following sections, the "reality" and independence of distinctive features must be assumed if we are to explain a number of speech errors and sound-change phenomena wherein feature similarity or distinction plays a central role.<sup>9</sup>

### 1.1 Speech errors and phonological theory

It is the task of linguists to explain how spontaneously produced speech errors are constrained by linguistic organization. The study of speech errors has provided external evidence for phonological sequential constraints, phonological rules, and underlying representations, as well as for the psychological reality of phonetic, syntactic, and semantic features (Fromkin 1973, 1980).

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<sup>8</sup> Cited from Hockett 1967.

<sup>9</sup> According to Fromkin (1973: 227), some of the features or properties that constitute a segment, such as nasality, voicing, and place of articulation, act independently in the production of errors. This suggests that at least a certain set of phonological features are part of the lexical storage.

For example, exchanges affecting consonant clusters, a vocalic complex (i.e., a vowel combined with a liquid or glide), and the rhyme of a complex syllable, have been used to support theories of syllabic structure. Consider the examples in (11):

(11)

- a. two hundred drugs → *two hundred* [dʌgz]
- b. brake fluid → *blake fruid*
- c. green grape → *grain greep*
- d. no strings attached → *no strings attrached*
- e. pay a flat fee → *play a fat fee*
- f. stress and pitch → *piss and stretch*
- g. pussy cat → *cassy put*

Despite the semi-continuous nature of the speech signal, it seems clear that at some level of performance there exist discrete units capable of being substituted, omitted, transposed, or added (Fromkin 1973: 15). That at least on some level individual segments are units is suggested by the fact that in slips involving consonant clusters, only one segment of the cluster is omitted (two hundred drugs → *two hundred dʌgz*), metathesized (brake fluid → *blake fruid*), or interpolated by perseveration (no strings attached → *no strings attrached*).

In some cases, however, distinctive features can be independently extracted as performance units, provided that segmental errors are analysed as feature errors: the metathesis of 'brake fluid → *blake fruid*' might be described as involving a transposition of the feature [lateral] or [anterior] rather than the transposition of the two segments (Fromkin 1973: 225).

Errors such as *play a fat fee* (for *pay a flat fee*), where only the liquid segment in the group *pl-* is anticipated in the onset of the word *pay*, show that clusters are not unitary units of speech production (Fromkin 1973: 221). On the other hand, errors of the type *grain greep* suggest that diphthongs are not interpreted as a succession of V + y, or V + w etc., but as single performance units; this same assumption appears to hold for sequences of a vowel followed by /r/. In final consonant errors, in fact, a postvocalic liquid is never grouped with the following consonant as an error unit (Shattuck-Hufnagel 1986: 129). Then again, while errors in single final consonants are found in English, errors involving final -CC clusters, like \*'dalt sork' for 'dark salt,' i.e., sequences that are thought to form a complex syllabic nucleus under certain conditions (Selkirk 1982), apparently are not.

Based on the observation that slips exhibiting peak-coda cohesiveness (*stress and pitch* → *piss and stretch*) far outnumber those exhibiting onset-peak cohesiveness (*pussy cat* → *cassy put*), Fudge (1987) claims that this data should be regarded as strong evidence of the existence of the rhyme node in the syllable structure.

The fact that only some aspects of the syllabic structure are included in the phonological representation at the point where sublexical errors occur suggests that the syllable is not a single, indissoluble unit of performance. However, this does not mean that the phonological structure of this type of error is not to some extent predictable. It has been proposed that four general constraints apply in the case of segmental errors: 1) *phonotactic regularity effect*: the encoding of illegal sequences is proscribed; 2) *consonant-vowel category effect*: exchanging segments belong to the same phonological category (either vowel or consonant), with no cross-category slip allowed to occur; 3) *syllabic constituent effect*: when a sequence of adjacent vowel and consonant is involved in a slip, the sequence is more likely to be VC than CV; 4) *initialness*

*effect*: initial or onset consonants are more likely to slip than noninitial ones; and in fact, final consonant errors are rare compared to initial ones (Dell et al. 1993).

On the prosodic level, some evidence has been provided that speech errors are constrained by stress. Errors in sequential order appear to be constrained by the rhythmic organization of the utterance and the stress pattern underlying it. According to Bierwisch (1982: 62-66), a peculiar property of disturbances of linearization is the persistence of the rhythmical pattern of the intended utterance in the utterance actually produced (*accent invariance principle*). Concomitant with this principle, the misordering of lexical items is actually accompanied by a change in stress pattern only when it involves the displacement of one item, not the exchange of two items (see below, examples 12a and 12b, respectively). The same independence has been claimed for intonational contours, which are not affected by the misordering of words in lapses (Boomer and Laver 1968).

(12)

a. Ich versuch es sicher auch weiter hin → *Ich versuche es sicherhin auch weiter*

b. die erstrebte Entspannung → *die entstrebte Erspannung*<sup>10</sup>

Further support for the role and independence of lexical stress in the production of slips is provided by vowel interaction errors. It has been shown that when two vowels interact in an error, stress does not move with the error segment, but remains behind, appearing in the intruding vowel; this leads to the assumption that “the stress level is not attached to the vowels themselves but rather to the larger structural framework that guides their processing” (Shattuck-Hufnagel 1986: 136).

MacKay (1970) has noted that speech errors typically involve segments from the same position in adjacent feet, i.e. syllable-initial segments in stressed syllables usually exchange with (or anticipate or perseverate) syllable-initial segments in adjacent stressed syllables, etc. As a matter of fact, a difference between consonant and vowel errors must be emphasized here. Unlike consonants, which show a strong preference for errors located in word-onset position, vowels are more strongly influenced by primary lexical stress than by position. In fact, vowel interactions tend to occur between two segments associated with the main lexical stress.<sup>11</sup>

In light of these data, we can conclude that both word structure and lexical stress are part of the grammatical representation at the point where errors occur, but while shared position is the most significant factor for consonant errors, shared lexical stress is the most powerful constraint in the case of vowels. Perhaps the main implication of these findings is that if speech errors occur primarily at the lower levels of the prosodic hierarchy, in languages like Hindi, which display a lesser salience of these levels, such errors may not be produced (Ohala and Ohala 1988).

In conclusion, the fact that grammatical factors (e.g., distinctive features, syllable structure, and lexical stress) act independently in speech error patterns appears to corroborate the theoretical claim that phonological information about segmental identity, syllabic structure, and stress is represented separately, on distinct levels.

As we shall see in section 3, grammatical representations share some parallels with processing representations employed in the planning of speech production.

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<sup>10</sup> (12a): *I'll certainly try it further on*; (12b): *the detente strived for*.

<sup>11</sup> This generalization applies at least for slips of the tongue in English.

## 1.2 Speech errors in a theory of sound change

By the time of Hermann Paul<sup>12</sup>, it had become clear that an examination of speech error data might reveal a natural cause of certain types of linguistic change. According to Hockett (1967: 936), the mechanisms of the generation of speech are also the mechanisms of sound change. Meringer (1908) and Sturtevant (1947) advanced the hypothesis that linguistic change might be a permanent, generalised variation originating in momentary, idiolectal variation. In the historical development of languages, a phoneme may change its phonetic character or even split into two distinct allophones that are subsequently phonemicized.

It has been claimed that subphonemic lapses may be involved in this process: subphonemic assimilation, for example, has been considered one of the main sources of linguistic change (Sturtevant 1947; Anttila 1970). In synchrony as well as diachrony, assimilation may take place along three axes: it can be partial/total, regressive/progressive, in contact/at a distance. Sounds adapt their place or manner of articulation under pressure of the conditioning environment, assimilating either to sounds that follow (*anticipation*) or precede (*lag* or *postposition*).

Assimilation by anticipation occurs when one or more, or even all, features of a following segment (whether in contact or at a distance) are anticipated in the production of a given sound. It has been maintained that distant anticipation is involved in the diachronic development of the English and German numerals *four, five* / *vier, fünf* (Sturtevant 1947). In place of the contrasting initials of the Indo-European *\*kwetwóres* / *\*pénkwe*, Pre-Germanic appears to have changed *\*hweđwōr* (< *\*kwetwóres*) to *\*feđwōr* by anticipation of the inherited /f/ of the next numeral in the sequence. *I-umlaut* in Proto-Germanic has similarly been described as an anticipation in the stem vowel /a/ of the high front position of the tongue in the vowel of the plural ending of such words as Old High German (henceforth OHG) *lambir* (< *\*lambiz*) and Old English (henceforth OE) *men* (< *\*manniz*).

In the converse process of assimilation by lag, some or all features (partial/total assimilation) of a segment persevere into the next (adjacent or nonadjacent) segment. Diachronically, an instance of lagging assimilation is OE compensatory lengthening, whereby a medial segment is completely lost, but its place is taken by (the bundle of features of) the preceding vowel, which is spread over the now empty position: thus in Pre-English *\*fimf*, the nasal consonant is lost before a voiceless spirant, giving its place over to the preceding vowel, and thus yielding OE *fif* (Anttila 1972: 73).

Another familiar phenomenon observed in the history of various languages is sound loss. While it is well known that loss can be partial or total, depending on the class of linguistic units (features, phonemes, syllables, morphemes, etc.) assumed to be involved, the basic mechanisms responsible for the omission may be difficult to identify. *Haplology*, for example, may be seen as a peculiarly drastic kind of anticipation involving the loss of one or two identical phonemes or groups of phonemes and all that should stand between them: cf. Lat. *nutritrix* > *nutrix*. Alternatively, haplology has been regarded as a subtype of *dissimilation*, whereby “the repetition of the same (or similar) sequence of sounds is reduced to one occurrence only” (Anttila 1972: 75).

Common to dissimilation and haplology, with respect to such other types of sound loss as *apocope* and *syncope*, is the fact that they usually occur in a sequence of identical/similar articulations or (groups of) phonemes, as illustrated by the examples in (13):

(13)

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<sup>12</sup> Reported by Meringer (1895).



- a. Lat. *latrōnicinium* > *latrōcinium*
- b. Lat. *proprius* > Spanish/some Italian dialects *propio*
- c. Prehist. *\*thithēmi* > Greek *tithēmi*
- d. Lat. *peregrīnus* > Vulgar Latin *pelegrinus*

In (13a), the recurring group /-ni-/ is lost as a whole; in (13b) only one element (/r/) of the recurring consonant cluster /-pr-/ is lost. At the subphonemic level, dissimilation may result in the recurring phoneme being changed into a close phoneme in one of its occurrences: in (13c), the sequence of two aspirate stops within the root *\*thithē-mi* became systematically dissimilated in Greek *tithē-mi* ('I place') via lost aspiration in the first occurrence; in (13d), the recurring phoneme /r/ is dissimilated into a phoneme belonging to the same class (/l/). As noted above regarding the speech error (11b), the dissimilation (13c-d) may be analyzed in terms of a change in the feature composition of the recurring segments, change that is perhaps promoted by contextual similarity.

Another source of regular sound change is *metathesis*, i.e., the reversal of a sequence of sounds. Although more frequent in slips of the tongue, metathesis can also determine a particular sequence throughout the phonotactics of a language both synchronically and diachronically (Anttila 1972: 75). Consider the following examples<sup>13</sup>:

(14)

- a. OE *be(o)rht* > PDE *bright*
- b. *\*gordŭ* > Old Church Slavonic *gradŭ* 'city'

(14a) is representative of a well-known phenomenon in the history of the Germanic languages (cf. Old Norse *bjartr*, OHG *beraht*); (14b) illustrates the result of the Slavic metathesis, whereby in the environment of a preceding vowel and a following consonant, the liquid (/r/, /l/) is metathesized with the vocalic segment.

Moving now from the sublexical to the lexical level, we find phenomena of *contamination* and *blending* as factors of linguistic change. Two words within the same semantic field are usually involved; they may just as easily be semantically opposite as similar, as illustrated by the examples below<sup>14</sup>:

(15)

- a. OF synonyms *cite-ain* & *denz-ein* > AN *citizein* & *denizien* > PDE *citizen* & *denizen*
- b. French *femelle* > PDE *female* (opposite *male*)

According to Sturtevant (1947), it is not unlikely that lagging assimilation has often occurred in the English phrase *male and female*, and that repeated lag eventually resulted in the actual vocalism of the second syllable of *female*. In much the same way, the Latin *rūsticānus* for *rūsticus* likely originated in some such phrase as *rūsticī et urbanī*. In such cases, it is very difficult to establish whether we are dealing with the result of assimilation within a phrase, or rather with contamination of competing expressions (non-interaction speech error). As a matter of fact, contaminations can leave a permanent trace upon a language only if the inherent probability of the fusion of rival responses and the chance of repetition are sufficiently great.

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<sup>13</sup> PDE = Present Day English.

<sup>14</sup> OF = Old French; AN = Anglo-Norman.

Blends of this type show that morphology, syntax, and semantics may be relevant to a discussion of sound change, despite the claim that the regularity of the latter is based precisely on the independence of phonology from other grammatical components.

## 2. Textual variants: Intentional vs. unintentional variations

Scribal errors in ancient and medieval handwriting create variants in the textual tradition.

The main source of scribal errors was the copy process itself. The copyist used to proceed as follows: he first read a short text passage (*pericope*) in the exemplar and tried to memorize it. The passage was usually read aloud several times before being written down. The same procedure was followed when the text was dictated by another person.

During recall and transcription of the sounds and words stored in the short-term memory, a number of intentional variations and unintentional errors would take place.

Corruptions that were due to changes in spelling and pronunciation<sup>15</sup>, or to the assimilation of sounds within and across words, may be explained in terms of orthographic or dialectal interference. These types of deviant spellings are thus referred to as “intentional variants” (Penzl 1967).

Another class of scribal errors must be understood as involuntary, mechanical changes occurring during the copy process. Unintentional textual variants may concern sublexical and lexical units, as well as minor graphic symbols (i.e. diacritics, vowel pointings, misinterpreted abbreviations etc.) and large portions of the text (as in *parablepsis* and *homoeoteleuton*). The two latter types are specific to the writing mode in general or the copy process in particular; a great number of unintentional variants, however, can be accounted for in the same terms as speech errors. Both types will be the subject of separate sections.

### 2.1 Unintentional variants specific to the writing mode

Examples of misspellings involving (groups of) graphic symbols and diacritics (*Umlaut*, capital letters, geminates) are given in (16):

(16)

a. Karmeliterklöster → *Kärmeliterklöster*

b. in den Elementen → *in Den Elementen*

c. Gesellschaft → *Gesselschaft*

The misuse of the *umlaut* in (16a) and of capital letters in (16b) points to the pressure of purely visual models on the textual output, independent of the underlying sound. The anticipated gemination in the misspelling *Gesselschaft* for ‘Gesellschaft’ (16c) might be explained as a consequence of a motoric impulse originating in the writer/copyist’s peripheral nervous system (Kainz 1956: 435).

Visual difficulty during the copy process appears to be the culprit of a number of manuscript corruptions. The lack of division between words in ancient and medieval manuscripts led to errors of fusion and fission. *Fusion* is an incorrect word division, resulting in two words being joined as one, as in (17a)<sup>16</sup>; an example of *fission*, i.e., a single word incorrectly split into two, is given in (17b).<sup>17</sup>

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<sup>15</sup> An example well known to scholars of Ancient Greek is “iotacism.”

<sup>16</sup> Drawn from MS. London, BL, Cotton Cleopatra B xiii, f. 49v (cf. Luiselli Fadda 2007).

<sup>17</sup> Drawn from the *Saxon Genesis* (f. 2v, l. 308).

(17)

a. OE *ge geangum ge ealdum* → *ge geangum gealdum*

b. OS *siðodun* → *siðo ðun*

The close similarity of certain letters in a script sometimes resulted in their being confused, a phenomenon referred to as *permutation*: letters which look alike, or which are not written carefully in the manuscript being copied, are read as representing a different word or combination of words. An instance of error presumably due to misreading is illustrated in (18)<sup>18</sup>, where the close resemblance of the palaeographic letters *c* and *t* leads to a misspelling:

(18)

OHG *scein* → *stein*

Omissions of large portions of texts are also typical of the scribal practice. *Parablepsis* ('looking from the side') refers to errors that occur when the scribe, encountering the same word (or group of words) twice within a short space, copies the text as far as its first occurrence, but then, looking back at the exemplar, inadvertently allows his eye to alight on the second occurrence of the word(s) just copied, and proceeds from that point, skipping over the intervening line or lines. The error of *parablepsis* may be caused by either *homoeoteleuton* (similar ending) or *homoioarkton* (similar beginning). Omissions by *homoeoteleuton* (or *saut du même au même*) occur when a scribe's eye falls on a word or line whose ending is similar (or identical) to the ending of the word or line he has just copied; *homoioarkton* refers to the omission of any text in the middle of two phrases that begin similarly.

The types of errors described above all take place at an optic-visual and motoric level, and are thus specific to the writing mode. Another set of slips of the pen, involving an inner, acoustic-articulatory stage and having direct equivalents in speech errors, will be discussed in the next section.

## 2.2 Slips of the pen: Errors of omission, addition, and transposition

It is well known that Dr. Spooner made slips of the pen as well as oral spoonerisms. Inadvertent errors, comparable to speech errors involving lexical and sublexical units, also occur in spontaneous as well as non-spontaneous writing activity. Consider the examples listed in (19):

(19)

a. Lateranische Konzil → *Lanteranische Konzil*

b. Propaganda → *Propoganda*

c. Natureingang → *Nautreingang*

d. Beilage → *Beil()ge*

e. parallele → *paral()le*

f. Denn **hätte** das Indogermanische nur ... gehabt **hätte**

g. unterbricht → *unterbringt (Klang)*

(19a) is an error of anticipation that has an equivalent in speech errors resulting from nasality anticipation; (19b) is an example of a lagging assimilation; in (19c), an anticipation results in metathesis; (19d) and (19e) are examples of omission (see *haplography* below); the syntactic repetition highlighted in (19f) is the result of contamination between the two competing

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<sup>18</sup> Drawn from OHG *Prayer of Wessobrunn*, 1.4.

German constructions 'hätte das Indogermanische gehabt' and 'wenn das Indogermanische ... gehabt hätte'; the blend in (19g) is due to oral interference, since the writer produced this form while someone else uttered the word *Klang*.

All of the above examples are collected from spontaneous writing (Kainz 1956: 426-427), but it is not surprising to find the same types of errors occurring also in non-spontaneous writing (copying, dictation, etc.), and in books about textual criticism. In particular, errors involving omission, addition, and transposition of singleton elements also occurred in scribal practice.

As opposed to haplogy, which refers to the deletion of a group of similar segments, *haplography* ('leaving out a letter or word') is commonly used to refer to the omission of a few letters generating a misspelling, as shown in (20)<sup>19</sup>:

(20)

- a. OHG naht → *nah*
- b. OHG stuont → *stuon*
- c. OHG thaz thid → *thaz tid*

It has been suggested that the omission of single letters, particularly in medial position (20c), may be accounted for in terms of dissimilatory loss (see the discussion of sound change above).<sup>20</sup> Instances of dissimilatory loss have also been reported with reference to modern, spontaneous writing activity: Tragen der Trauer → *Tragen der Tauer* (Kainz 1956: 426).

Statistically, the close occurrence of words with the same beginning or ending, or of letters that look alike, seems to encourage this type of misspelling, as shown below<sup>21</sup>:

(21)

- a. LAT canonica → *conica*
- b. LAT animas → *anmas*
- c. LAT nobiliter → *noliter*
- d. OE gangdagas → *gangdas*

Within the class of errors of addition, the simplest form is represented by *dittography*; the more substantial is a *gloss*.<sup>22</sup> Dittography occurs when a letter or word that only appears once in the exemplar has been written twice by the scribe, as exemplified in (22)<sup>23</sup>:

(22)

- a. OE manna → man**man**na
- b. OE twegen → tw**g**egen
- c. OE eadig → eadig**ig**
- d. OE on his → on his **on his**

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<sup>19</sup> Examples (20a) and (20b) are drawn from the OHG *Tatian* (148.3 and 19.4, respectively), while (20c) is taken from *De Heinrico* (26).

<sup>20</sup> Cf. Penzl 1967.

<sup>21</sup> Examples from *Moore Bede* and MS. London, British Library, Cotton Cleopatra B xiii, f. 47r. Cf. Luiselli Fadda 2007: 157.

<sup>22</sup> A gloss is the addition to the text of explanatory phrases or illustrative material. It can be interlinear or added in the margin.

<sup>23</sup> Examples come from the *Regula Sancti Benedicti* (London, British Library, Cotton Claudius D iii) and the *Vita Sancti Aegidii* (Cambridge, Corpus Christi College 303). See Luiselli Fadda 2007: 159-160.

Distant, nonadjacent dittographies involving single letters are better explained in terms of anticipation or postposition (lag), as postulated for slips of the tongue. Evidence from OHG sources is reported in (23)<sup>24</sup>:

(23)

anticipation

a. OHG *gotes* → *getes*

b. OHG *rehten* → *rehtten*

c. OHG *hungrita* → *hrungrita*

lag

d. OHG *lebin* → *lebint* (*wanint* preceding)

e. OHG *birenkite* → *birenkite*

Another class of unintentional errors shows reversal in the order of two letters or words. It can happen that the transposition of letters or syllables within the same word has the effect of producing a new word with a completely different meaning, or a non-word, as in the form *colsed* for the English 'closed':

(24)

a. OE *smile* → *simle*

b. OE *werulde* → *weurldē*

c. OHG *missasprah* → *missasparh*

As noted above with regard to speech errors and sound change phenomena, when transposition occurs at the segmental level, the result is metathesis (24a-c)<sup>25</sup>; when it occurs at the syntactic level, the result is variation in the sequence, or *praeposteratio* (25).<sup>26</sup> Unlike metathesis, fission, or fusion, which can be ascribed to both visual and mnemonic factors, *praeposteratio* is generally referable to memory lapse. Indeed, from the moment a scribe read or heard the passage he was to copy to the moment he finished writing it out, there existed the danger that what he held in memory could be in some way distorted; one way seems to have been reversing the word order.

(25)

*Deos vitam et salutem roga* → *vitam roga et salutem // salutem et vitam roga*

A number of slips of the pen appear to be promoted by the graphemic context. Omissions of the type exemplified in (21) and dittographies like (22a) show a preference for contexts where the groups of letters to be copied are very similar. Assimilation of wording appears in the context of two or more close words. A typical case is the substitution of singleton elements due to the influence of the graphic or phonetic environment (adjacent syllables) as exemplified in (26a-b).<sup>27</sup>

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<sup>24</sup> OHG sources: *Tatian*, 190.3 (23a); *Ezzo's Song* 1.16 (23b); *Monsee Fragments* (23c); *Memento mori*, 1.41 (23d); *2nd Merseburg Charm*, 2 (23e). Penzl (1967) has categorized (23b) and (23c) as intrusive anticipations, (23e) as intrusive lag.

<sup>25</sup> OE examples drawn from the *Soliloquia*, f. 39v. (cf. Luiselli Fadda 2007); OHG errors are taken from the *First Bavarian Confession*, 1.2 (Penzl 1967).

<sup>26</sup> Example drawn from Seneca, *Epist.* 117.24 (cited in Reynolds and Wilson 1974: 208).

<sup>27</sup> Drawn from the *Saxon Genesis* (f. 2r) and *Beowulf* (f. 160r, l. 1362), respectively.

Moreover, inflectional (unstressed) morphemes may graphically assimilate under the influence of the ending of a preceding word (26c).<sup>28</sup>

(26)

- a. OS *driþun* → *ðriþun*
- b. OE *standed* → *standeð*
- c. OE *on hæalgum bocum gewriten* → *on hæalgum bocum gewritum*
- d. *ckindo* (preceded by *kind* and followed by *cind*)

The influence of context is also observable in the class of scribal errors called *contaminations*: the wrong outputs *ckindo* (26d) and *lebint* (23d) seem to result from the influence of related or unrelated forms from other parts of the visual field, i.e., *kind/cind* for the former, *wanint* for the latter.<sup>29</sup>

Context plays an important part in the occurrence of scribal errors; in fact, in most cases the interfering (graphic or graphemic) element is included within the same paragraph, line, phrase, or word. Consider the anticipation error (27a): *suebon* can be regarded as a misspelling (of the word *sebon*, 'mind,' acc. sg.) due to anticipation of the <b> in the next syllable. (As a matter of fact, in the Old Saxon *Heliand* both <u> and <b> were used to represent the same grapheme medially.) Regarding the (intrusive) lag *hegan* for *egan* ('own'), (27b) is explained by virtue of a dittography or postposition of <h> from the preceding word *hem* ('home').<sup>30</sup>

(27)

- a. OS *sebon* → *suebon*
- b. OS *egan* → *hegan*

In addition to context, the occurrence of slips of the pen in scribal practice was influenced by several factors: depending on whether the scribe was copying from exemplars, writing from memory, or transcribing under dictation, some variants were more likely to arise than others.

For example, if the scribe was taking down someone's dictation, slips of the ear, i.e., misperceptions of the dictated text, were likely to occur. A peculiar type of error caused by faulty hearing are lexical substitutions of the kind based on *lectio facillior*, that is, the scribe hears a word or expression unfamiliar to him that he inadvertently "translates" into a familiar one.

In cases of copying from an exemplar, the scribe, in the process of reading a passage and beginning to write it on the copy, could make mistakes either in reading the text (error by sight) or memorizing it (memory lapse).

It has already been argued that the characteristics of sublexical reading errors closely resemble slips made in spontaneous speech (Hockett 1967; Shattuck-Hufnagel 1986). Among the commonest reading errors are omissions, whereby a bit of what the eyes have scanned may be omitted from delivery. It has been observed that omissions of this type are particularly frequent when the lost unit(s) and the next part in the text begin or end phonemically alike.

(28a)

(printed) Listened to Dorothy's story with attention

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<sup>28</sup> Drawn from the *Soliloquia* of St. Augustine (Cotton Vitellius A. xv). Cf. Luiselli Fadda 2007: 160.

<sup>29</sup> Example taken from OHG *Tatian*, scribe  $\gamma$ , 85.4 (cf. Penzl 1967).

<sup>30</sup> All examples are from MS. M of the *Heliand* (cf. Odwarka 1990).

(read) Listened to *Dory* -

(28b)

(printed) looked at one another in wonder

(read) looked at *wonder* -

(28c)

printed) they will soon crush you and devour your bodies

(read) .... devour your *bardies*

What presumably takes place in (28a-b) is that the eyes are just scanning the second occurrence of the recurrent phonemic shape (-y in 'Dorothy/story,' -er in 'another/wonder') as the speech organs are delivering the first occurrence (Hockett 1967). Once again, contextual similarity appears to be a conditioning factor. In (28c) the word *bodies* receives an intrusive postvocalic /r/ from *devour*, thus yielding *bardies* (/bardiyz/). This type of perseveration error typically happens when the reader mentally checks whether a word already scanned and read aloud was properly delivered, and during the check, some segments of the word due for delivery find themselves blended with the word being checked.

### 3. Speech and scribal errors in models of linguistic processing

Speech errors and slips of the pen differ from one another in certain respects. One of the main differences is that the latter include omissions of large portions of text (from a few words to several lines) which must be explained with reference to the mechanism of the copy process (errors by sight, *saut du même au même*, etc.). Such omissions never occur in spontaneous speech; it has been observed that speech errors do not involve strings larger than seven syllables (Nootboom 1973: 148) or longer than seven words (Fromkin 1973: 41). These findings are in keeping with what we know about human short-term memory, which may contain approximately seven units (verbal, visual, auditory, etc. items) at a time (cf. Miller 1962).

It is also true that some generalizations that are valid for speech errors do not seem to hold for slips of the pen; this is the case, for instance, with cohesiveness in complex vowel groups, which tend to be neither split nor metathesized in fluent speech, but often are in writing/scribal practice. Exchanges are actually rather frequent in digraphs. Consider the OHG diphthong /uo/ in the following example<sup>31</sup>:

(29)

OHG skuof → *skouf*

At the sublexical level, however, slips of the tongue, pen, and eye display common error types. Although scribal errors have never been made the subject of a statistical study, and it is therefore not possible to establish with any degree of precision the relative frequency of the various types (Reynolds and Wilson 1974: 200), it has been claimed that most of the errors found in Greek and Latin manuscripts, as well as in modern handwritten and typed documents, are due to a process of regressive assimilation resulting in anticipation (Timpanaro 2002: 80). Similarly, according to Kainz, the commonest error type in both speech and writing is anticipation, a fact he explains via the dynamics of the motoric process (Kainz 1956: 417).

On the other hand, based on experiments on perceptual confusions (as reported in Cutler 1982: 12-22), it appears that some slips are more detectable than others; therefore the relative

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<sup>31</sup> Drawn from *Merigarto* 1.54.

frequency of speech error types collected from everyday speech may simply reflect their different degree of detectability.

Regarding slips of the pen, detectability and reliability issues are typically determined by difficulties in linguistic and textual reconstruction, and by a lack of information regarding context, rather than by perception. While in a number of speech situations, it is overt correction by the speaker that makes the lapse perceptible to the hearer, in scribal errors, unintentional variants become available to the reader even without – indeed, all the more so without – overt editing.

At the sublexical level, however, slips of the tongue, pen, and eye display several commonalities. We have seen that contextual similarity appears to play a role in speech errors as well as in slips of the pen and reading errors. This suggests that a common underlying mechanism must be at work in the generation of this class of slips.

Experiments eliciting serial recall errors (Ellis 1980; Page et al. 2007) have shown that phonemic slips produced in spontaneous speech are similar in character to errors underlying the *phonological similarity effect* in the immediate serial recall of verbal material.<sup>32</sup>

In fact, a number of findings regarding serial recall errors also apply to segmental slips. Namely, in serial recall tasks 1) consonants exchange more often than either vowels or whole syllables; 2) phonemic errors tend to preserve within-syllable position, just like speech errors, whereby a syllable-position constraint ensures that the exchanging elements occupy corresponding positions in their respective syllables; 3) consonant swaps are more frequent between syllables that share a vowel (*contextual similarity effect*); and 4) consonants tend to exchange when they are more featurally similar (*feature-similarity effect*) (Ellis 1980).

However, confusability-based misordering of segmental units seems to occur with greater frequency in memory tasks than in spontaneous speech. This might be due to the fact that, unlike in spontaneous speech, where output order is determined by an endogenous intention (constrained by semantic and syntactic content) that can be maintained throughout recall, in serial recall tasks the intended order is determined exogenously by the presentation list, with this order information thus potentially subject to interference or decay (Page et al. 2007: 58).

In the context of speech reproduction, in fact, there is no “high-level plan” driving the utterance: the order information relating to the verbal string largely depends on the phonological store. On another level, this argument regarding the lack of endogenous intention may well apply to a number of types of slips of the pen that occur during the copy process (see above).

At this point, a question arises regarding the nature of the processing representations used in planning for speech production. In modern theories of language production, it is assumed that planning a sentence involves the construction of successive levels of representation, whereby a semantic or conceptual representation is constructed first, followed by two linguistic representations involving syntactic and phonological information, respectively. The phonological representation is then “translated” into a motor program to produce speech. The patterns and constraints observed in speech errors have been variously employed to demonstrate the validity of phonological units as processing units. For example, the fact that single segment errors are the most common among sublexical errors has been interpreted as evidence that individual segments correspond to planning units. On the other hand, it has been claimed that the particular error patterns observed in speech production require that upcoming words are partially activated during the planning of the current word (Dell et al. 1997), and that

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<sup>32</sup>The *phonological similarity effect* is characterized by increased errors in the immediate serial recall of lists containing words that sound similar (Page et al. 2007: 49).



the speaker has in mind ahead of time the surface syntactic form of a clause-like sequence (Garrett 1976). This would suggest that the clause (or some form of it) is a basic unit of production.

It has been argued that in blends, the disruption must occur at an early stage of the generation of the sentence, since no particular grammatical rule is violated. This assumption is supported by selection errors of the type illustrated in (30), where two competing expressions of the same intended message (*vergrößern* and *erweitern*)<sup>33</sup> are simultaneously derived from abstract underlying representations at the stage when the pre-verbal message is converted into the semantic structure to be lexicalized.

(30)

- a. Ich muss meine Liste noch *verweitern*
- b. Ich muss meine Liste noch *vergrößern*
- c. Ich muss meine Liste noch *erweitern*

Morpheme and word ordering errors (cf. 6b) also show that any order shift must take place prior to the specification of morphological properties. On the other hand, syntax errors that occur in multi-clause sentences, as exemplified in (19f), may indicate how local set clause frames interact with the limits of short-term memory capacity.

In conclusion, parallels in serial recall, speech, writing, and reading error data seem to suggest that language use implies the interaction of linguistic structure with cognitive factors such as short-term storage. Scribal errors in particular evince various degrees of phonemic-phonetic, kinetic, and graphic-visual motivation. As remarked by Kainz (1956: 417), a study of the psychological mechanisms underlying slips of the pen could bear important implications for new approaches to textual criticism, potentially lending support to conjectures and hypotheses formulated during philological work. Moreover, the information collected in critical apparatuses, when correctly interpreted, may represent a useful complement of experimental data for linguists and cognitive scientists.

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<sup>33</sup> Both mean extend.

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