

SLIPS OF THE TONGUE, SLIPS OF THE PEN - SLIPS OF THE BRAIN?

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The student of speech errors - slips of the tongue and of the pen - is certainly entering a borderland in the search for evidence of speech and language organisation in the brain. Since the turn of the century there has been a growing interest in this field where students of clinical and experimental psychology, linguistics, neurology and speech pathology meet to put questions and hopefully have them answered.

The best known slip - but hardly the most frequent one - is an error with a transposition of elements. This kind of error is also referred to as "spoonerism", named after William Spooner, a warden of New College at Oxford, who was said to have a special talent for making this kind of slip. Many spoonerisms have now become classical like "my queer old dean" instead of "my dear old queen" and "work is the curse of the drinking classes" for "drink is the curse of the working classes". Whether William Spooner actually uttered these lapses or they were constructed by his students is a different matter.

Other kinds of errors are those with one segment anticipated, perseverated or only substituted. (Fig.1.)

Although speech lapses have been used for humorous reasons in the literature for a long time, a more serious study began in the last century. In 1895 a collection of about 9000 speech errors was published by Meringer who carefully classified the lapses and also provided plenty of information about the speakers. Meringer's way of interviewing the speakers about themselves and their lapses is said to have made him the most unpopular person at the university of Vienna. With this in mind

**METATHESIS**

pan cakes — can pakes

**ANTICIPATION**

cup of coffee — cuf of coffee

**PERSEVERATION**

he took the pen — he took the ten

**SUBSTITUTION**

transformation — transpormation

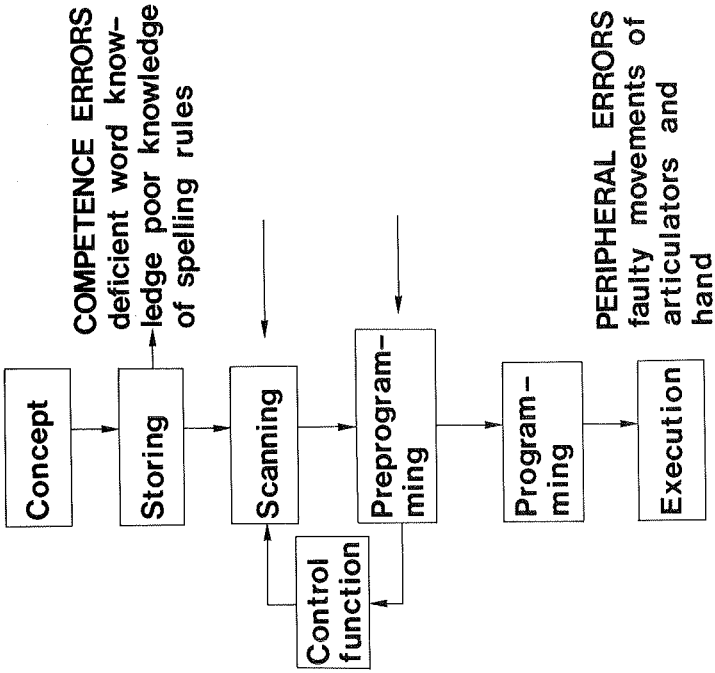


Fig. 1. Types of errors

Fig. 2. Model for error generation

modern scholars have used more moderate methods in collecting their data.

Meringer's extensive collection has provided data for many researchers with an interest in speech errors. Freud studied Meringer's corpus to gain insight into psychological repressions. MacKay has made a statistical analysis of Meringer's data, only to mention a few names.

Many studies of errors have aimed at classification only. Others have been carried out with the purpose of shedding light on linguistic performance and speech production. Fromkin's name is wellknown in the field. Recently, the interest seems to have changed from naturalistic studies to laboratory experiments, e.g. instead of collecting errors occurring in spontaneous speech, errors are elicited in highly controlled contexts.

The number of studies of written lapses is sparse. In Meringer's enormous collection of speech errors, a small amount of writing errors is included. About two decades later, Stoll reported a classification of errors in handwriting made by subjects who were copying texts. After that very few investigations have, to the best of our knowledge, been carried out in this field.

MacNeillage studied typing errors as clues to serial ordering mechanisms, which he found sensitive to certain structures such as word boundary, length of word, position in word etc. No phonetic phenomena were apparent among these errors. Lecours classified all errors found in the diary of one male subject with developmental dysgraphia.

Errors in the motor program for handwriting have been analysed by van Nes. His interpretation of the errors applies to the form of the letters only, and the similarity of the shaping movements is regarded as the triggering factor. The aforementioned investigations have looked upon writing errors from a pure temporo-spatial motor programming point of view. No linguistic factors have been described except for in the study of typing errors by MacNeillage.

When deviant linguistic performance is investigated (e.g. error

analysis of second language learning) the aim is to obtain better understanding of the normal way of performing. As is well known, investigations of aphasic speech have increased the insight into the nature of normal speech.

The present study describes and compares Swedish lapses of three kinds namely

- slips of the pen
- slips of the tongue and
- aphasic speech errors.

Although slips are normal phenomena in both speech and writing they must be regarded as abnormal in the sense of being deviations from the intention of the speaker or writer (and probably from the expectations of the listener and the reader too).

Whether aphasic errors are deviations from the speaker's intention is still an open question.

The similarities between aphasic errors and slips of the tongue are stressed by many scholars. Our clinical impression, however, is that the errors are similar in many respects but that there are also great differences. Therefore, a comparison between the normal and the pathological samples is carried out.

By investigating slips of the tongue and slips of the pen it will be possible to compare the two types and draw conclusions as to the processes common to linguistic behaviour irrespective of mode of expression. A deeper understanding of the rules underlying normal and deviant performance will

1. Contribute to better therapeutic work among aphasic patients and
2. Facilitate the work of reading teachers by increasing the knowledge of writing behaviour

It has already become apparent that we regard a slip, whether spoken or written, much in the sense of Boomer and Laver, i.e. as an involuntary deviation from what the speaker or writer has in mind. By this definition no competence errors are included, i.e. errors resulting from deficient word knowledge and, in writing, from poor knowledge of spelling rules. We also exclude

errors due to faulty movements of the articulators (slurring) and of the hand (scrawling).

In our preliminary model (Fig.2) units are fed forward into the scanning box. After scanning the units go on to the next box for preprogramming. Before the program continues, a control function is activated. Errors treated in this study emanate from the scanning and the preprogramming boxes. Only phonemic errors are discussed.

The slips of the tongue made by normal adult speakers were collected over a period of some years. They all occurred in spontaneous speech. No reading errors were included and no errors made by persons who have Swedish as their second language. The errors were immediately written down and if possible confirmed by other listeners and the speaker.

The pathological speech sample was collected in therapy sessions, in naming tasks and in free conversation with adult aphasic patients. The errors were written down immediately and often recorded on tape. The patients were all examined by a team of medical doctors and speech pathologists. No restrictions were made in choice of patients based on the etiology of the brain lesion. Thus, patients with aphasia due to cerebrovascular accidents (CVA) and tumours are represented in the material. The mental state of the patients was normal. No attempts were made in this study to differentiate between different sites of brain lesions as it can be assumed that phonological errors are characteristic of aphasic speech as such, regardless of type of aphasia. This assumption is supported by the work done by Blumstein in Boston.

Articulatory difficulties of patients with aphasia might superficially look very similar. Nevertheless there are several varieties with totally different origins. A sharp distinction between the different kinds is sometimes very difficult to make, especially in those cases where they coexist. It is however of utmost importance for the rehabilitation programs that the disturbances are carefully diagnosed and that the articulatory difficulties are characterized as dysarthric, apraxic or phone-

mic disorders.

Dysarthria represents a defect in the *execution* of speech movements. Apraxia represents a defect in the *encoding* of articulatory gestures. Dysarthric speech is slurred and imprecise. Apraxic speech is usually very laborious. Dysarthric and apraxic errors were not included in this study. Only phonemic disorder, so called literal paraphasias were studied. The patients with paraphasias have no motor difficulties but limited access to the correct sensory representation. The speech is usually fairly fluent but the awareness of the errors is low.

The slips of the pen were collected together with other errors found in 150 essays written by Swedish students aged 18-19 years. In addition, a similar corpus from younger students was collected twice at an interval of two years in order to compare the influence and interaction of different linguistic rules in speech and writing at different levels of education. All errors were divided into three categories

1. Spelling errors, caused by deficient knowledge of spelling rules
2. Lexical errors, emanating from incorrect interpretation of the meaning or the origin of a morpheme, and
3. Slips of the pen.

The classification of the errors is a delicate task, since the different types are easily confused. For instance, a slip of the pen may happen to look exactly like a spelling error or a lexical error.

Furthermore, a fourth group has to be recognized and separated from the others, e.g. the graphic errors. They arise in the motor program as an interaction of letters of similar shape, resulting for instance in an upstroke instead of a downstroke.

No rules for categorizing a certain error can be given in advance. The whole writing sample of the student must be considered. An error might be regarded as a slip of the pen in the production of one student but as a lexical or a spelling error in the production of another, depending on what the rest of the errors

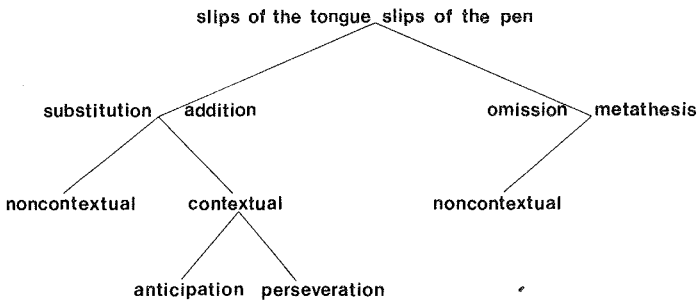


Fig.3. Classification

look like. A *p* written instead of a *b* is not likely to be a graphic error if the same student also writes *k* instead of *g* or *f* instead of *v*.

In this paper the only errors to be discussed are the slips of the pen from the corpus of the older students. Since the essays in question were part of an important examination task they have no doubt been rigorously gone through by their authours. Thus, the remaining slips are the only ones not noticed and corrected in proofreading.

Although slips of the pen occur at different levels, only phonemic errors will be considered here.

The total amount of errors in speech and writing together is around 400. There are several possibilities for describing and classifying spoken and written slips. One way is to compare the slip with the target and describe the difference as either a substitution, an addition, an omission or a metathesis (Fig.3). Instead of a bare

description it might be more interesting to look for the triggering factor of the error and make a classification on the basis of contextual and non-contextual triggers. The contextually or syntagmatically conditioned slips can be either anticipations, i.e. a segment is uttered or written earlier than intended, or perseverations, i.e. uttered or written later than intended.

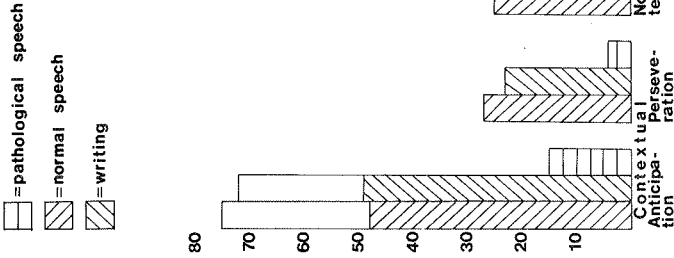
The first graph shows the classification of the errors into the four categories, substitutions, additions, omissions and meta-theses, from our three different samples. It is obvious that the categories are far from equally distributed in the three samples. Substitutions make the main category in speech, covering 59% of normal and 92% of pathological speech. In writing, substitutions amount to 22% only. The main category in writing consists of omissions, constituting 61% of the slips of the pen, compared with 4% in pathological and 1% in normal speech.

Another clear difference to be seen is the category of meta-thesis which amounts to 1/4 of the errors in normal speech but only a negligible part of pathological speech and writing.

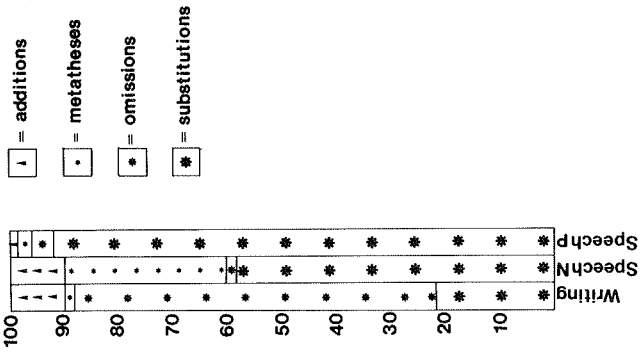
As was mentioned earlier, errors can be triggered either contextually or non-contextually. With a trigger in the context, errors can be regarded as either anticipations or perseverations. The division of substitutions and additions into contextually and non-contextually triggered errors can be seen in Graph 2. The difference between pathological speech on one side and normal speech and writing on the other is obvious. As many as 85% of the errors of aphasics are non-contextual, while those of the normal speakers and writers are contextual in about 70-75%. The anticipation-to-perseveration ratio is about 2:1 for both normal speech and writing. The number of contextual slips from the pathological sample is too small to permit any calculations as to this ratio. The predominance of anticipations suggests a common tendency of "planning ahead" in normal speech and writing.

Consonants are more often involved in errors than vowels and more often than should be expected from frequency of occurrence in Swedish. It can be seen from Graph 3 that consonants consti-

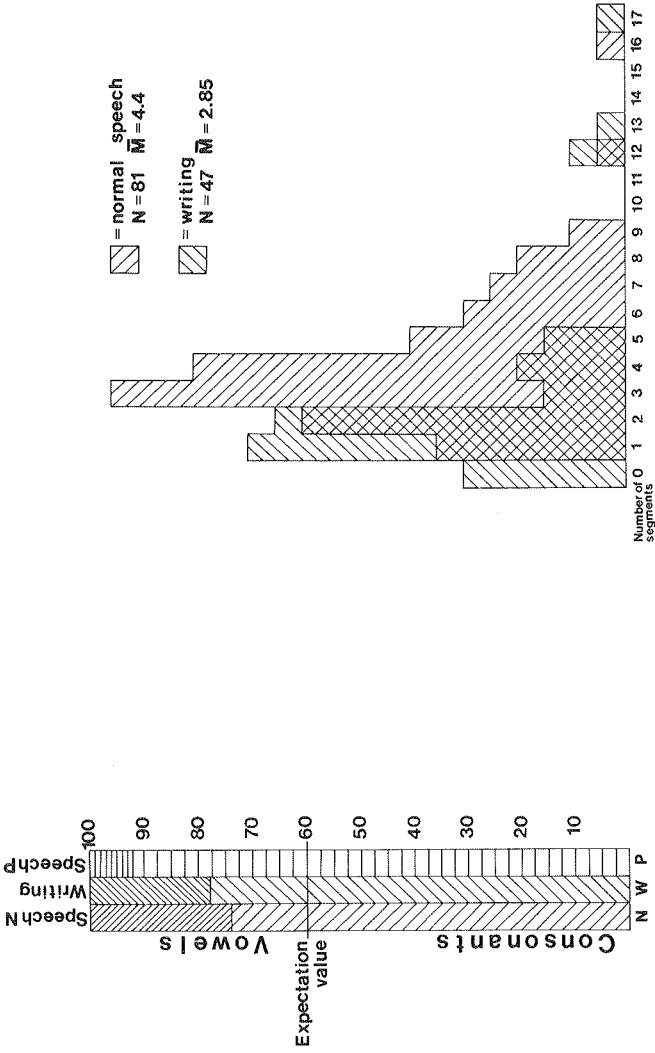




Graph 2. Contextual and non-contextual errors in speech and writing.

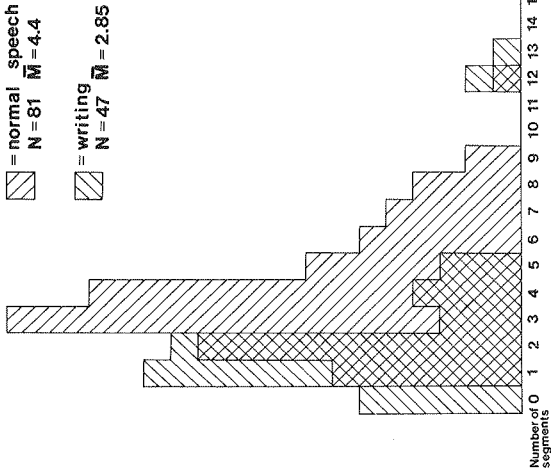


Graph 1. Distribution of categories in speech and writing.



Graph 3. Distribution of consonants and vowels.

Graph 4. Distances between trigger and error in normal speech and writing



tute 74% of the errors in normal speech, 79% in writing and 92% in pathological speech. The proportion of consonants in continuous speech and writing in Swedish is around 60%. Cohen (1966) and Nooteboom (1969) reported 67% and 69% respectively of consonants involved in slips of the tongue in Dutch.

The distance between trigger and error is supposed to provide a clue as to the size and amount of units programmed at the same time. We have measured the distance by counting the number of intermediate segments -phonemes- for both speech and writing. The mean distance between slip and trigger is 4.4 segments in normal speech (N=61), 2.85 segments in writing (N=47) and 2.4 segments in pathological speech (N=10), where the number of items is too small to be considered further. The difference between mean values of normal speech and writing is statistically significant at the 95% confidence level, measured by two sample t-test.

The frequency of intermediate segments is shown in Graph 4 for normal speech and writing. It is evident from the graph that the most frequent number of intermediate segments is 1 and 2 in writing and 3 and 4 in speech. The majority of the substituted segments differ from the intended ones by one single feature. The features most frequently substituted are place and voice. Very few substituted segments differ from the intended one by more than two features. This is true for both speech and writing. This finding is in accordance with results from studies of other languages (Fromkin 1971).

Some of the results obtained in this study are similar for speech and writing, some are different and some of them indicate separate behaviour in normal speech and writing on the one hand and pathological speech on the other. We believe that the variations in distribution of categories, i.e. the different frequencies of substitutions, additions, omissions and metatheses can be explained with reference to mode of expression, while the similarities can be seen as evidence of a common linguistic planning function for speech and writing.

The majority of the errors made by the pathological speakers reflect poor access to linguistic units. The errors are non-contextual, e.g. paradigmatic mistakes prevail. The speaker's efforts to find the appropriate units are so time consuming that his possibilities for planning bigger chunks are strictly limited. Therefore, few errors are contextual and few are sequential e.g. there are few metatheses and the distance between error and trigger is short. Also in writing the distance is shorter than in normal speech. We regard this as an indication of the writer's adaptation of the processing speed, due to his slower mode of expression. Writing also differs from normal speech in permitting the author to control his writing over and over again and discover an error before it is discovered by the reader. This extra opportunity for correction is likely to reduce the number of slips of the pen, but at the same time the listener is much more generous than the reader by disregarding many omissions. What is regarded as an error in writing might well be overlooked or even permitted in speech. This is a possible explanation for the great difference between speech and writing as to the number of omissions. The opportunity for proofreading might explain the small number of substitutions in writing. It is not contradictory to what is known about the strategy of fluent readers that incomplete information is more easily overlooked than faulty information. Thus, substitutions are often corrected, while omissions often remain undiscovered even in proofreading, perhaps partly due to the fact that omissions occur in positions where the redundancy is high. The hypothesis put forward in the title of this paper suggesting a common linguistic planning function for speech and writing is supported by the similarities found between slips of the tongue and slips of the pen. The high proportion of errors containing phonetically similar units is strong evidence of the linguistic origin of errors in speech and writing. This resemblance quite excludes a graphic explanation of slips of the pen. The common tendency in speech and writing to substitute a single phonological feature is another evidence of the linguistic rather than the peripheral nature of slips of the tongue. The tendency to plan ahead is the same

in both speech and writing, with a higher proportion of anticipations than of perseverations.

This paper has emphasized similarities between lapses in writing and lapses in speaking that cannot be satisfactorially explained if the lapses are looked upon as peripheral, e.g. as real slips of the tongue and real slips of the hand. The similarities are evidence of linguistic mistakes occurring higher up in the programming chain - in the brain - and manifesting themselves in both writing and speaking.

However superficially similar, the differences between on the one hand lapses originating high up in the brain and on the other hand errors that are peripheral and channel-specific should be kept in mind, not only by speech pathologists but also by reading teachers as a means of developing more systematic methods of helping students with spelling problems. Since no writing rules can keep a student (or anyone else) from making slips, the teacher should rather concentrate his pedagogical efforts on spelling rules and vocabulary. Knowledge about what slips look like and in what contexts they most frequently occur will, however, enable the teacher to show his students how and where to proofread their writings more closely in order to discover their slips of the pen.

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