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page 53 line 4: "good spellers do not write phonologically"

read: "good spellers do not write phonetically"

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SPOKEN AND WRITTEN LANGUAGE - RELATIONSHIPS BETWEEN TWO LINGUISTIC MEANS OF EXPRESSION

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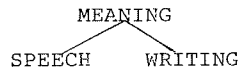
For some time, my research has concerned the relation between spoken and written language on the phonological level. More specifically, I am interested in how written language is handled by both skilled and unskilled users and how their performance is related to linguistic competence. This interest was evoked by the complexity of the system that connects spoken and written Swedish, a system which has been analysed and described by Allén (1969), Teleman (1972) and Hellberg (1974).

Writing is secondary to speech in many respects. It is a late invention in man's history, and even today there are human languages without a writing system. Children generally master written language several years after spoken language, and while speech is acquired without any formal teaching, reading and writing are skills that have to be taught. These and similar facts have led many researches to the conclusion that written language only reflects speech - in other words, written language is nothing but speech written down. This view can be formalized as in model 1.

Model 1

Model 1 implies that the meaning of written language can only be conveyed via phonetic coding (you see the word, you read it out and get access to its lexical meaning, or, having its meaning already, you articulate the word before writing it down).

Other scholars, however, maintain a different opinion. They deny that phonetic transcoding is necessary and advocate direct lexical access from visual input, as shown in model 2. One argument for this stand is that the high speed of a skilled reader hardly permits any phonetic "detour". In their opinion, the skilled reader handles an alphabetic text in much the same way as a reader of an ideographic writing system, e.g. Japanese kanji. They see speech and writing as two independent means of expression.



Model 2

In the literature on acquired linguistic dysfunctions, the hierarchical view of speech and writing dominates (Model 1). It is generally assumed that the deficient writing of an aphasic patient reflects his deficient speech (cf Huber et al 1975). An aphasic patient who writes better than he speaks is regarded as suffering from apraxia. There are, however, cases reported by e.g. Hier & Mohr (1977) and Ulatowska et al (1979) that contradict a hierarchical view.

In this presentation I will examine data from three investigations to find if there is support for either the two models, or if a third solution provides a better description of a skilled person's writing performance.

The first data to look at is an investigation by Nauclér (1981) of spoken and written errors made by some adults with acquired aphasia. The purpose was to investigate the occurrence of selective impairments in aphasic patients, a phenomenon described by scholars such as Weigl (1974, 1975), Marshall & Newcombe (1973), Shallice & Warrington (1975) and others. The selective impairment implies that the acquired linguistic disturbance of a patient does not necessarily hit his speech and writing abilities to the same degree. In the paper reported here, subjects repeated, copied, read aloud and wrote to dictation a set of ten words or phrases, i.e. the same ten words or phrases were given both auditorily, to be repeated

and written down, and visually, to be copied and read aloud. (Some subjects also named pictures, both orally and orthographically, corresponding to the same ten words or phrases given auditorily and visually.) The different tasks are shown in fig 1.

TASK	Repetition	Dictation	Copying	Reading	Naming
INPUT	Auditory		Visual (text)		Visual (picture)
OUTPUT	Oral	Graphic		Oral	Graphic

Fig 1 Oral and graphic tasks performed by some aphasic subjects

A subject's scores from the different task were only used intraindividually, i.e. not compared with those of other subjects. Some of the subjects were better at oral tasks, i.e. repetition and reading aloud, and some at written tasks, i.e. copying and writing to dictation, and some subjects were better when input was visual and others when input was auditory. But, none of the subjects repeated errors in both spoken and written responses.

If written language were nothing but speech written down, according to Model 1, the oral errors made by an aphasic subject should have been found in his written answers as well, and no writing errors should have occurred if the oral answers were correct. Since this was not the case in these results, Model 1 is not supported.

The second investigation (part of Nauclér, 1980), deals with spelling errors made by students from three different grades, the youngest being 10 years old, and the oldest around 17. It is concluded that the various types of errors made by both skilled and unskilled subjects are mainly phonetic. The phonetic analysis carried out by the subjects is usually correct, but the orthographic result is not. This is a fairly trivial conclusion, since it is only to be expected from an alphabetic writing system based not on phonetic but on phonological principles. But, interestingly enough, only the younger subjects

misspell because they cannot tell what phonetic facts are phonologically relevant. For example, when vowel quantity in Swedish is distinctive, i.e. when short and long vowels are different phonemes, the short vowel is marked orthographically by doubling the following consonant as in

kalla ['kala] vs kala ['ka:la] ("cold" vs "barren")

When the vowel quantity is redundant (non-distinctive), there is no orthographic marking, as in the following examples

kalas [ka'la:s] or kalv [kalv] ("party" vs "calf")

In unstressed syllables (first syllable of kalas) and when more than one C follows the short vowel (kalv), the vowel quantity is non-distinctive (neutralized). These are the cases that the younger subjects misspell, and they do it by assigning an orthographical mark (i.e. doubling the following C) to all phonetically short vowels, regardless of their phonological value (e.g. *kallas, *kallv).

The older subjects on the other hand misspell because their lexical knowledge (i.e. their knowledge about the origin of morphemes) is insufficient and misleads them. Their errors mainly turn up when they fail to observe what morpheme is hidden behind an accidental homonym (accidental as a result of inflection),

bygd ("district") vs byggd (i.e. bygg+d from bygga ("built, build")

sats ("sentence") vs satts (i.e. satt+s from sätta ("was put, put")

Many other orthographic sequences, although not homonyms, are superficially contradictory if the underlying morpheme is not observed, and may also mislead a writer into misspellings

filt ("blanket") vs fyllt (i.e. fyll+t from fylla) ("filled, fill")

smälta ("melt") vs smällda (i.e. smäll+da from smälla) ("exploded, explode")

The good speller, thus, is the one who recognizes morphemes and observes morpheme boundaries and who is not misled by phonetic details.

From the data presented so far, the first model can be ruled out for two reasons:

- even a correct phonetic analysis leads to misspellings
- good spellers do not write phonologically

The fact that good adult spellers make most of their errors as a result of insufficient lexical awareness points to model 2 as an appropriate description of normal adult performance, i.e. adults use a direct route between lexicon and spelling.

In order to examine this suggestion more closely, we will continue to the third investigation that can provide useful data. Nauclér & Söderpalm (1981) made a comparison between slips of the tongue, collected by Söderpalm (1979) and slips of the pen (from Nauclér, 1980). A slip of the tongue was defined by Boomer and Laver (1968) as "an involuntary deviation in performance from the speaker's current phonological, grammatical or lexical intention". From this follows that slips (or lapses) are performance errors, not competence error (e.g. many speech errors made by speakers of a foreign language are, or many spellings errors). A performance error can be detected and corrected, a competence error cannot.

The comparison between slips of the tongue and slips of the pen was based on the following parameters:

- error categories (fig 2)
- position of the error in the word
- distance between the error and its trigger

substitutions	a cup of coffee	→ a cuff of coffee
additions	statistically	→ stastistically
omissions	speech error	→ _peach error
metatheses	pancakes	→ canpakes

Fig 2 Classification of slips of the tongue and slips of the pen

From the comparison it was obvious that slips of the tongue and slips of the pen differed in several ways: The distribution of the error categories did not show the same pattern at all, the main category of errors in speech being substitutions and in writing omissions. The position of errors in the words differed, since the errors in speech occurred in initial position and the errors in writing in final position. And finally, the distance between the error and its trigger did not coincide either, as the distance was found to be three or four segments in speech and only one or two segments in writing.

At first glance these differences between slips of the tongue and slips of the pen could be seen as a support of model 2, implying that there is no connection between the ways a skilled subject speaks and writes. In other words, speech and writing are completely independent activities.

However, the disagreement between spoken and written lapses can easily be explained with reference to the different properties of the two output channels. Since speech is faster than writing, it is only to be expected that the distance between an error and its trigger is longer in speech than in writing. As writing is permanent and speech is not, writing can more easily be subject to corrections, errors are more likely to be discovered in initial position than in final position, and substitutions are easier to detect than omissions. Thus, the dissimilarities found between the spoken and written lapses do not entirely support the second model. In addition, there were similarities between the spoken and written errors that disfavoured model 2 in certain respects:

- in both speech and writing, disproportionately more consonants than vowels were involved in errors (even when the higher frequency of consonants in language was taken into account);
- in both speech and writing consonants were never substituted for vowels and vowels were never substituted for consonants;
- in both speech and writing, phonologically similar segments were substituted for the intended ones, i.e. the intended phoneme or grapheme and the segment actually produced (the error) differed by one (in a few cases by two) phonological features only.

This means than not only slips of the tongue but also slips of the pen can be described by means of phonological features.

If you slip and say for instance "A cuff of coffee" instead of "A cup of coffee" (cf fig 2), the feature separating the intended /p/ from the spoken /f/ is (in the terminology of Chomsky & Halle (1968) CONTINUANT, all other features relevant for the two phonemes being identical (ANTERIOR, VOICELESS, OBSTRUENT). Many of the written substitutions can be described in exactly the same manner:

folkhopen	→	folkhofen	p → f	[-CONT]	→	[+CONT]
ganska	→	kanska	g → k	[+VOICE]	→	[-VOICE]
följande	→	förjande	l → r	[+LAT]	→	[-LAT]

As further support for the phonological nature of writing, it was found that also errors written by the aphasic subjects could be described by means of phonological features:

arbete	→	albete	r → l	[-LAT]	→	[+LAT]
löv [lø:v]	→	lev	ö → e	[+ROUND]	→	[-ROUND]
snaps	→	stams	n → t p → m	[∝NASAL]	→	[-∝NASAL]

So, rather than being exclusively graphic in nature, which one could expect written lapses to be, they turn out to be dependent on rather abstract phonological features.

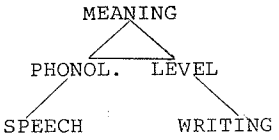
Summary

The following conclusions are drawn from the data from three different investigations:

(1) Written language is not speech written down. This was indicated by the selectivity of the aphasic errors and confirmed by the spelling errors made by skilled non-aphasic subjects. These facts disfavour model 1 and lead to model 2.

(2) Written language is not totally independent of spoken language, as was shown by the similarities between slips of the tongue and slips of the pen. Thus, model 2 is ruled out.

(3) Written language was shown to be related to speech on an abstract phonological level by the fact that not only speech errors but also slips of the pen and aphasic written errors can be described in terms of phonological features. We end up with model 3 as a more appropriate description of the relationship between spoken and written language.



Model 3

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