

# SPEECH ERRORS, SHADOWING AND SIMULTANEOUS INTERPRETATION <sup>1</sup>

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## Abstract

Shadowing without a competing message has traditionally been used as an experimental tool to study the perception and production of running speech. A series of experiments (Marslen-Wilson, 1973, 1975, 1985) has demonstrated that the simultaneous decoding and encoding of messages involves not only auditory, articulatory and phonological processes, but relies on syntax and meaning as well.

The present study intends to be a continuation of this line of experiments and focuses on the monitoring of incoming messages during shadowing performance. The experimental design consists in the shadowing of a text containing anomalous sentences, i.e. sentences with different types of speech errors (Fromkin, 1973). The aim of our experiment is to analyze the ability of subjects to detect and to restore phonological, morphological and lexical errors during the shadowing task. The results show that subjects tend to overhear phonological errors more than higher-order errors. Thus, it is possible to draw some conclusions on the monitoring of speech during a shadowing task and on the usefulness of this technique for developing specific skills.

## 1. Introduction

The most important studies introducing disrupted sentences and anomalous texts in order to test speech processing during the simultaneous analysis and synthesis of continuous prose were carried out by Marslen-Wilson in a series of experiments (Marslen-Wilson, 1973, 1975). The paradigm of disrupted speech was subsequently adopted by Cohen (1980) and Lackner (1980) who deliberately used speech errors in their shadowing experiments.

In his studies, Marslen-Wilson used the shadowing technique to investigate the general process of speech perception. Specifically, he demonstrated that

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1 Although the two authors have discussed and collaborated on the working of the article, Livia Tonelli is responsible for sections 1-2 and Alessandra Riccardi for sections 3-5.

restorations of mispronounced words, irrespective of subjects' individual shadowing latencies, are determined not only by auditory but also by semantic and syntactic analysis of the incoming message. Error restorations performed by close shadowers showed that their word production is determined exclusively by on-line perceptual analysis of the incoming message. These results provide strong evidence for the fact that speech perception does not only depend on superficial analysis. High speed and efficiency characterize both deep and surface structure processing, so that some individuals can simultaneously listen to and repeat the message within an ear-voice span of approximately one syllable.

Cohen based his study on the shadowing of texts containing phonological and lexical speech errors. He demonstrated that the word is the monitoring unit for the first kind of errors and that subjects tend to overhear phonological errors more readily than lexical ones.

Lackner devised an experimental design to investigate shadowing of speech material presented at three different speed rates and containing syntactic and semantic errors. His results provide support for the fact that "at high rates of stimulus presentation subjects correct deviant material without being aware that it is deviant".

Within interpretation studies, the shadowing paradigm has been compared to simultaneous and consecutive interpretation in order to test to what extent in these three complex tasks speech processing implies different degrees of cognitive load (Treisman, 1965; Gerver, 1974; Lambert, 1988). Moreover, shadowing has been recommended as a useful exercise for evaluating interpreting aptitude (Lambert, 1989; 1992; 1991; Schweda Nicholson, 1990). The validity of shadowing as a training technique for beginner courses has been favoured or questioned or confuted by different authors (for a review of the various positions see Kurz, 1992; Kalina, 1994).

This study on the one hand aims at applying the results of previous studies on the perception of running speech and on the other at providing greater insight into the controversial question about the usefulness of shadowing as a pedagogical instrument.

## 2. Method

### Subjects

Forty interpretation students (9 male and 31 female) at the SSLMIT took part in the experiment as volunteer non-paid subjects. All subjects were native speakers of Italian and had learned at least one second language before puberty. None of them suffered from any known speech or auditory impairment, 38 were right-handed and 2 left-handed. Of the forty subjects tested, 19 had enrolled in the first year and 21 in the second year. All students had received training in interpretation (sight translation, text summarizing in L1 and L2, paraphrasing); the first group had interpreted for at least one month and the second for six months. None had received systematic training with shadowing.

## Material

The material chosen for the experiment was a 570-word argumentative text passage (De Beaugrande & Dressler, 1981) made up of 18 propositional units, each of them comprising on average 32 words.

For the purpose of this experiment two versions of the same text were used: a correct version and a version containing errors similar to lapses which occur during speech production (Fromkin 1971, 1973, 1980; Magno & Tonelli 1993). Errors were of phonological (phoneme substitutions), morphological (substitutions of derivational morphemes), and lexical type (substitutions of content words). All selected errors were perceptually salient. Perceptual saliency for phonological errors was established in accordance with Cohen's results (Cohen, 1980). As to morphological errors, suffixes in transparent derived words were substituted. The error suffix was always more frequent than the original. Malapropisms, i.e. words with identical stress-pattern, number of syllables and onset phonemes (Fay & Cutler, 1977), were used as substitutes for content words.

The incorrect version of the text contained 15 errors, 5 for each type. The errors were uniformly distributed within the text.

The two versions of the text as well as a practice passage were read by a male reader at a rate of 3.40 words per second and were recorded with a Sony HX PRO TC-RX77 tape recorder. The practice passage contained no errors, was of similar complexity and half as long (200 words). In reading the erroneous version, special attention was paid to maintaining word stress-pattern and sentence accent pattern of the original.

## 3. Procedure

Two groups of 18 subjects were formed, one with students of the first year and the other one with students of the second year. The groups were divided into three subgroups of 6. The first subgroup received the instruction to repeat exactly what was heard. The second was informed of possible errors in the text and was instructed to correct them, the third was similarly informed about possible errors in the text but was invited not to correct any of them. To four students (control group), the correct version of the text was presented.

All subjects were invited to shadow the text at the distance most comfortable for them. The material was presented at a volume level of  $75 \pm 5$  db.

#### 4. Results And Discussion

An analysis of the protocols of the shadowing results showed that both I and II year students performed the task correctly. The number of restorations under the three different experimental conditions are reported in Table 1.

YEAR	Instructions								
	No Instructions			Correct			Do not correct		
	PHON	MORPH	LEX	PHON	MORPH	LEX	PHON	MORPH	LEX
I	86,6	50,0	50,0	90,0	55,5	66,6	36,6	22,2	33,3
II	90,0	38,8	50,0	80,0	94,4	66,6	66,6	38,8	16,6

TABLE 1: Percentage of restorations produced by beginners and advanced students in a shadowing task with three different types of instructions.  
Phon = phonological errors, morph = morphological errors, lex = lexical errors.

An analysis of variance (ANOVA) with one between-subject factor (year) and one within-subject factor (type of instruction) was carried out for all data. The analysis of variance yielded no significant differences between beginners and advanced students ( $F = 2.19$ ;  $df = 1,30$ ;  $p.n.s.$ ). The different types of instructions had a significant effect on the number of errors correctly restored ( $F = 21.9$ ;  $df = 2,30$ ;  $p < .01$ ). The interaction between year and instruction type was not significant ( $F = 1.82$ ;  $df = 2,30$ ;  $p. ns.$ ).

As the results have shown, the year of interpretation study bore no influence on the number of error restorations. The following analysis was therefore effected on all data available both for the first and second year. Figs. A, B and C show the number of errors restored versus errors preserved under the three different instruction types.

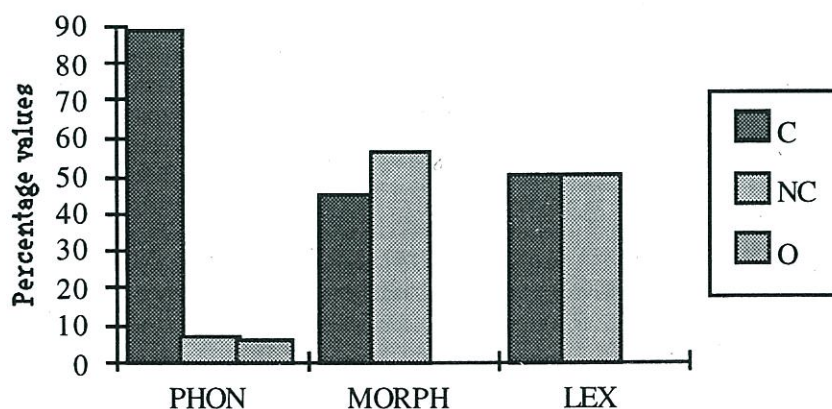


Fig. A: Percentage of errors restored (C), not restored (NC) and omitted error words (O) when no instruction was given.

Scrutiny of Fig. A shows that when no instruction was given to the students the tendency was to restore phonological errors (88.3%) more readily than morphological (44.5%) or lexical ones (50%).

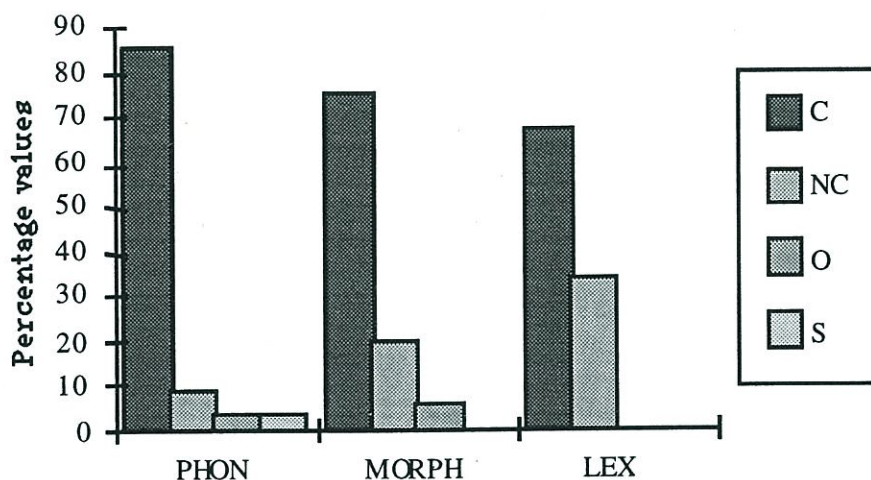


Fig. B: Percentage of errors restored (C), not restored (NC), omitted error words (O) and substituted error words (S) when the instruction given was to correct.

Comparison of fig. A with fig. B shows to what extent the invitation to correct the errors affected the results. While the percentage of phonological restorations (85%) did not change substantially, the incidence of morphological and lexical corrections was much higher (75% and 66.6% respectively) than under the previous condition.

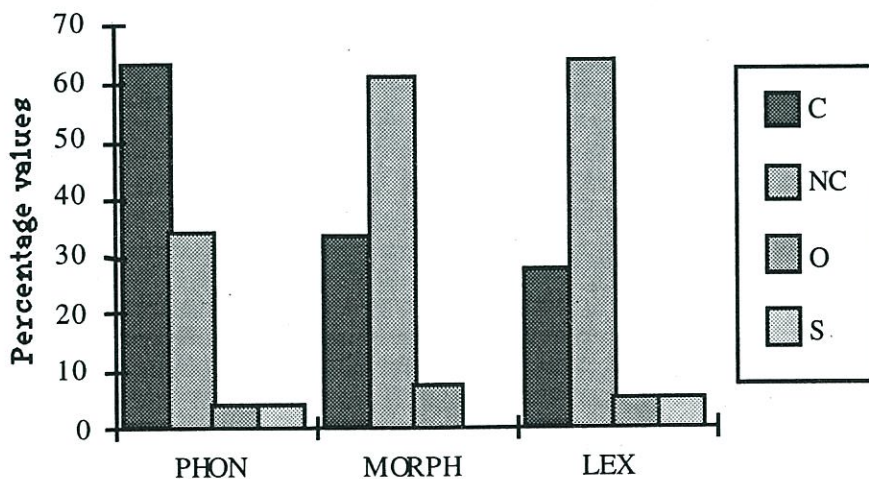


Fig. C: Percentage of errors restored (C), not restored (NC), omitted error words (O) and substituted error words (S) when the instruction given was not to correct.

Fig. C requires further comment. First of all, it is interesting to note that the percentage of phonological errors restored against expectation (62.7%) is congruent with the results obtained by Cohen (1980) on a corpus of Dutch errors (60%). Strong similarities also emerge when comparing our lexical restorations (27.2%) with those reported by Cohen (15%) and with the semantic restorations obtained by Lackner (1980) for English (13.6%). The comparison of Lackner's grammatical restorations (28.4%) with our morphological restorations (33.3%) also results in similar percentage values.

Moreover, the data shown in fig. C are the result of an error detection task. Subjects were explicitly invited to repeat the errors as they heard them and, therefore, the corrections made against expectation reflect their on-line error awareness better than the number of restorations during the shadowing task. The percentage of phonological errors correctly detected was 33.6%, of morphological errors 60.6% and of lexical errors 63.6%, so that inferences can be made about the monitoring of incoming message at different linguistic levels.

## 5. Concluding Remarks

The overall results of this study show that subjects in a shadowing task detect phonological errors less readily than morphological and lexical ones. This suggests that during the simultaneous decoding and encoding of the message subjects are more aware of errors at deeper linguistic levels while showing less awareness of mispronunciations at the more superficial phonemic level.

In shadowing, the sharing of attention between the auditory decoding and the articulatory encoding of speech interferes with the perceptual analysis of input signal, so that the acoustic-phonetic cues are not matched with the corresponding phonemic image, but with the expected phonemic representation. Perceptual expectation at phonemic level is influenced from top-down analysis of the message which in turn has a bearing on the monitoring of incoming speech.

Though no definitive conclusions may be drawn on the usefulness of shadowing as a training tool for interpretation students, nevertheless, some tentative suggestions may be formulated.

As has been claimed in literature, shadowing is a technique which can be variously targeted to enhance different subskills: shadowing in a foreign language can improve competence in decoding new acoustic patterns and producing unusual articulatory sequences; shadowing combined with recall tasks helps the abstraction of ideas and message retention; shadowing of speech presented at different rates speeds up auditory decoding and articulatory encoding.

To enhance phonological attention, shadowing exercises may be devised consisting, for example, of elements with low or no referential meaning: lists of terms pertaining to a specific semantic field, lists of unordered numbers, connected prose frequently interspersed with numbers and lists of nonsensical

but phonotactically plausible words. The training of phonological attention is suitable, of course, for advanced students as the exercises described above reflect, to a certain extent, the reality of technical conferences where simultaneous interpreters must often rely much more than usual on their capacity to perform rapid phonemic analysis and synthesis rather than processing speech at deeper semantic levels.

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