Speech disfluencies in simultaneous interpreting: a mirror on cognitive processes

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The present paper examines speech disfluencies in the target language output of simultaneous interpreters working from English into Hungarian. Based on models of speech production, the origin of speech disfluencies can be linked to certain stages of the speech production system. Based on Gósy's (2004, 2005) taxonomy a classification of disfluencies is carried out. The findings show that disfluencies are primarily connected to the problem of lexical access and the disharmony between lexical access and articulatory planning.

Keywords: speech disfluencies, simultaneous interpreting, lexical access, articulatory planning

1. Introduction

Simultaneous interpreting (SI) is a highly skilled act of communication involving a complex deployment of concomitant processing capacities (Gerver 1974, Moser 1978, Gile 1995). Simultaneous interpreters receive an input, need to listen, understand and process it, but also have to produce an output simultaneously, while still processing further output. During speech production simultaneous interpreters also have access to a monitoring function (Petite 2005). This mechanism allows them to edit their target language output and produce a self-modification, which result in disfluencies in the flow of speech. On the other hand, the phenomenon of self-modification is not the only reason for disfluencies in interpreters' output.

This paper is concerned with speech disfluencies occurring in the target language output of professional simultaneous interpreters and trainee interpreters working from English (B) into Hungarian (A). This paper provides a summary of the results of two research projects; the research questions of the projects were the following:

(1) What are the most frequently occurring disfluencies in the output of trainee and professional interpreters?
(2) What malfunction do these disfluencies signal in the speech production system?

Based on models of speech production, the origin of speech disfluencies can be linked to certain stages of the speech production system; an analysis of the disfluencies occurring in the output of simultaneous interpreters would help us to isolate stages of target language speech production that are most problematic during SI.

The study is divided into four main parts. The first part provides an overview of the psycholinguistic literature on speech production and speech disfluencies. A review of the literature on disfluencies occurring in the output of interpreters follows. The third part of the paper provides an analysis of disfluencies occurring in the output of trainee interpreters working from English into Hungarian. The fourth part of the paper offers an analysis of the disfluencies occurring in the target language output of professional interpreters.

2. Speech production and speech disfluencies

Scholars agree on the existence of different stages in speech production. However, there are considerable differences concerning the nature of the links between the levels of speech production.

Since the 1950s, speech errors and disfluencies produced by normal speakers have been studied as a window into the cognitive processes of speech planning (Bock, 1986; Bock & Levelt, 1994; Dell, 1986; Fromkin, 1971, 1973, 1980; Garrett, 1975; Goldman- Eisler, 1958; Levelt, 1989; MacKay, 1970, 1972, 1973; Maclay & Osgood, 1959; Nooteboom, 1969; Shattuck-Hufnagel, 1979, 1982; Shattuck-Hufnagel & Klatt, 1979). These studies provide systematic evidence of how conceptual, syntactic, and articulatory processes cope with increased processing load.

Dell (1986) emphasizes spreading activation as a link between the levels of the speech production system, while Levelt's modular model is based on the assumption that the speech production system is made up of separate modules, with only one-way connections between the levels (Levelt 1989). According to Levelt, the speech production system also includes the mental lexicon, knowledge of the outside world, and a syllabary (Levelt 1999). Self-monitoring is also a crucial part of the system (Postma 2000). Research on disfluencies is important to get a better understanding of speech production, as they

> provide a valuable glimpse into the workings of the fluent sentence production mechanism, since the constraints they follow are presumably imposed by characteristics of the process by which normal, error-free speech is produced (Shattuck-Hufnagel 1979: 295).

Speech disfluencies are defined „as phenomena that interrupt the flow of speech and do not add propositional content to an utterance" (Gósy 2007: 93). A possible taxonomy to deal with speech disfluencies is offered by Gósy (2004; 2005). The advantage of using her taxonomy is that it covers the widest possible range of disfluencies, and in this way helps to gain a better insight into the processes of speech production. She differentiates two major groups of speech disfluencies: (1) disfluencies rooted in uncertainty (UDs) and (2) errors or error-type disfluencies (ETDs). This taxonomy describes the major categories of uncertainty-related speech disfluencies as: hesitations, fillers, repetition, restarts, lengthening and pauses within the word. Error-type disfluencies include the following categories: Freudian slips, grammatical errors, contamination, false word activation, "tip of the tongue" (TOT), change, ordering problems and slips.

3. Disfluencies in SI

Speech disfluencies occurring in the output of simultaneous interpreters have not yet received much attention in the Interpreting Studies research community.

Pöchhacker examines slips and shifts occurring in the output of simultaneous interpreters (Pöchhacker 1995). Pöchhacker works with the categories of *corrected and uncorrected slips* and *structure shifts*. He expects that the output of the speakers would be characterized by less slips and shifts than that of the interpreters. The results show that, with the exception of uncorrected slips, more slips and shifts are found in the output of interpreters than in the

output of speakers. The proportion of false starts (belonging to the category of structure shifts) is also high, which Pöchhacker (1995) sees as a universal of speech production, and not as a single characteristic of simultaneous interpreting.

Benedetta Tissi (2000) provides a descriptive analysis of silent pauses and disfluencies in SI. She analyses whether and to what extent the presence of pauses, hesitations and interruptions in the source text influences the interpreter's comprehension and delivery. She uses a taxonomy based on the categorisation by Magno Caldognetto, De Zordi and Corrà (1982 cited in Tissi 2000), in which non-fluencies are divided into two main categories, namely silent pauses and disfluencies. Disfluencies are broken down into filled pauses and interruptions. She finds that vowel and consonant lengthenings are much more numerous in the interpreted texts and false starts are present only in target texts. She finds large variations among the interpreters concerning filled pauses and restructuring, and concludes that no clear trends can be pointed out because of these marked differences.

Cecot (2001) analyses non-fluency occurrence in simultaneous interpreting in case there is a change in speaker's speech rate. Her subjects are eleven professional interpreters who translate two texts from English into Italian. Her analysis is based on two major categories to describe non-fluencies: disfluencies (filled pauses, repeats, restructuring, false starts, vowel and consonant lengthening) and unfilled pauses (segmentation, rhetorical and hesitation pauses). Non-fluency occurrence in STs and TTs is compared to detect any correspondence between the two, to understand why interpreters hesitate or pause. She finds that disfluencies outnumber unfilled pauses in both texts. In the second TTs, there is an average increase in the number of filled pauses, corrections, and vowel and consonant lengthening.

4. Methods, materials and subjects

Project 1 examined disfluencies in the output of seven trainee interpreters (6 female, 1 male). They were invited to interpret a 5-minute-long English text into Hungarian. The text was read out in English and was part of one of their interpretation classes. The trainees saw the speaker delivering the source language speech. The target language output of the trainees was recorded, resulting in seven 5-minute target language texts. The target language texts were transcribed and the disfluencies categorized on the basis of Gósy's taxonomy (2004).

In Project 2 the text from project 1 was played to seven practicing interpreters (5 females, 2 males). The interpreters participating in the project had been working as freelance conference interpreters for several years; their A language is Hungarian, their B language is English. The output of the interpreters was recorded, resulting in seven 5-minute target language texts. The target language texts were transcribed, and the disfluencies were categorized on the basis of Gósy's taxonomy (2004).

In both cases the target language output was recorded by Philips Digital Congress Network equipment and digitalized by MP3 Direct Cut v2.10 software.

In the case of both projects, deviations from standard practice should be noted. First, the interpreting task was decontextualized. The interpretations were recorded in a laboratory, with no audience present. The interpreters worked on their own, so they could not rely on the help of their boothmates in case of any problems. The interpreters were not paid for the interpretation service. These factors would inevitably contribute to the quality of interpretation.

5. Results

5.1. Disfluencies in the output of trainee interpreters

Table 1 illustrates the distribution of disfluencies in the output of trainee interpreters (Project 1). The most frequently occurring disfluency was restarts (34%), followed by prolongation (14%), and false word activation (13%) ranks third.

Project 1 (Trainee interpreters)

Type of ETD	**Distribution of ETD (%)**	**Type of UD**	**Distribution of UD (%)**
Freudian slips	0	***Prolongation***	***14***
Grammatical errors	7	Repetition	10
Contamination	0	Pause within the word	6
False word activation	***13***		
TOT	0		
Lexical change	8		
Restart	***34***		
Perseveration	0		
Anticipation	2		
Metathesis	0		
Simple slips	4		

Table 1 Distribution of disfluencies in the output of trainee interpreters

Restarts signal co-ordination problems between lexical access and articulatory planning. This was the most frequently occurring disfluency in the output of trainee interpreters. Within restarts, distinct subgroups could be identified based on the size of the units involved in the slip.
In one subgroup, the activated words were restarted after the first phoneme of the word was uttered:

*(1) az **e_első** pillér az európai élelmiszerbiztonsági jogszabályok teljes köre*
the first pillar the European food safety regulations full range(GEN)
'the first pillar is the full range of food safety legislation'

In other cases, the restart occurs after the first syllable of the activated word is uttered:

*(2) számos fontos **ja_javaslat** áll jelenleg a törvényhozási folyamatban*
several important proposal stand(IT) currently the legislative process(IN)
'a number of important proposals are currently passing through the legislative process'

A further category is illustrated in (3), where the beginning (phoneme or the first syllable) of the word is uttered, then an extra word is inserted, and the original word is restarted.

(3) az új rendszer ***le_egyik legfontosabb*** *pontja*
the new system one the most important point(GEN)
'the cornerstone of the new system'

Similar to false word activations prolongations also signal difficulties connected to the activation of the mental lexicon. In the output of trainee interpreters the prolongation of vowels as well as consonants occurred. The most frequently occurring prolongation is connected to the definite article *a/az*.

(4) a második fontos pillér ***aaz*** *európai élelmiszerbiztonsági hatóság*
the second pillar the European food safety authority
'the second pillar is (336 ms) the European food safety authority'

The occurrence of consonant prolongations in the output of trainee interpreters is not as frequent as that of vowel prolongations. Example (5) shows the prolongation of the initial consonant in the conjunction *but (viszont* in Hungarian*).*

(5) ***vviszont*** *egy kis visszatekintés hasznos lehet*
but a little perspective useful can
'but a little perspective is a useful thing'

False word activation ranked third among the disfluencies in the target texts of trainee interpreters. False word activations signal problems at the stage of lexical access in speech production (Gósy 2005).

(6) ha leginkább a jelenlegi ***fejlő_helyzetre*** *koncentrálok*
if mainly the current deve[lopment] situation concentrate(I)
'if I focus on_focus more on current developments'

5.2. Disfluencies in the output of professional interpreters

Project 2 analyzed disfluencies occurring in the output of professional interpreters. Table 2 illustrates the distribution of ETDs in the target language output of professional interpreters.

Project 2 (Professional interpreters)

Type of ETD	**Distribution of ETD (%)**	**Type of UD**	**Distribution of UD (%)**
Freudian slips	0	***Prolongation***	***26***
Grammatical errors	13	Repetition	5
Contamination	0	Pause within the word	12
False word activation	***14***		
TOT	0		
Lexical change	6		
Restart	***17***		
Perseveration	1		
Anticipation	1		
Metathesis	1		

Table 2 Distribution of disfluencies in the output of professional interpreters

In the output of professional interpreters the most frequently occurring disfluencies are prolongations (26%), restarts (17%), and false word activation (14%).
The most frequently occurring disfluency in the target language output of professional interpreters is prolongations. The same pattern can be observed in the corpus of professional interpreters as in the one of trainees. The most frequently occurring prolongation is connected to the definite article *a/az*.

(7) ***aaz*** *európai élelmiszerbiztonsági hatóság az EFSA*
the European food safety authority the EFSA
'the European food safety authority the EFSA'

The same is valid for restarts, they follow similar patterns as in the output of professional interpreters. Example (8) shows a restart following the utterance of the first phoneme of the target word:

(8) az európai ***é_élelmiszerbiztonság*** *témakörében*
the European food safety subject(IN)
'on the subject of food safety in Europe'

False word activation ranked third among the disfluencies in the target texts of trainee interpreters as well. In example (9) the lexeme *phase (fázis* in Hungarian*)* seems to be activated first, however, the interpreter is not satisfied with the lexeme activated and restarts with the word *szakasz* (a synonym for *phase*).

(9) ennek a ***f_szakasznak*** *a lezárulása most már látható közelségbe került*
this the phase the completion(GEN) now already closeness(INTO) got
'the completion of this draws ever closer'

6. Discussion

The results of the two projects carried out in interpreting into Hungarian seem to support the findings in the previous literature on speech disfluencies and slips in SI. The high incidence of false word activation / false starts was also noted by Pöchhacker, who sees it as a universal of speech production, and not as a sole characteristic of SI (Pöchhacker 1995).

The relatively high occurrence of restarts could be explained by the circumstances of SI, that is, the interpreters work and listen at the same time. In other words, interpreters work in noise. Psycholinguistic research into speech production and speech disfluencies in noise has shown that under noisy conditions, restarts and repetitions account for most speech disfluencies (Gósy 2007).

The suspected reason behind these similarities could be the need to divide attention in both SI and in noisy environments. Research has indicated that in noisy environments the

frequency of the following disfluencies increases in the output of speakers: restarts, lengthenings, and repeats.

When contrasted with disfluencies occurring in spontaneous Hungarian speech, it seems that the most frequently occurring categories are the same in spontaneous speech as in SI. However, precise comparisons are difficult to make, as each study uses a slightly different classification, sometimes including pauses or hesitations under the heading ETDs. This makes comparison of the results difficult; however, some tendencies can be observed. Gósy examines a corpus of 15 000 words from 18 speakers. In the corpus, the most frequent ETDs are lengthenings (25%), grammatical errors (21%), restarts (21%), and false starts (10%) (Gósy 2005: 109).

7. Conclusion

Findings from the analysis of speech disfluencies allow us insights into the 'black box' of the cognitive processes of interpreting. The analysis of our material showed that the disfluencies of the three highest distributions are connected to the problem of lexical access in the form of false word activations, and the disharmony between lexical access and articulatory planning in the form of prolongations, and restarts.

Similar tendencies can be traced in spontaneous Hungarian speech, but there are difficulties in comparing the data of the present paper with the data presented in other studies on spontaneous Hungarian speech. However, it seems that restarts and lengthenings are occurring frequently in spontaneous speech as well, while the incidence of restarts in SI is more characteristic. A possible explanation of restarts and lengthenings occurring in the output of simultaneous interpreters might be explained through the environment in which interpreters work, and the mental energy available for the task (Gile 1995) and the length of the EVS (ear voice span).

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