Relativity of Time in Interpreting: Simultaneity in the Consecutive Mode

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Abstract

Time is a key factor in interpreting. Heavy time pressure is generally associated especially with simultaneous interpreting, in which the interpreter has to parallelly carry out a number of cognitive and linguistic operations in a short time. Simultaneously with the reception of the speaker's speech, the interpreter produces the target-language text, regulates and coordinates processes in the working memory and monitors his own output. It might therefore seem that consecutive interpreting does not impose such strict time constraints on the interpreter since the production of the target-language discourse takes place only after the reception of all or part of the source-language discourse.

The aim of this paper is to demonstrate that time and simultaneity are important aspects also in consecutive interpreting and this fact must be taken into account in the practical training of future interpreters. Simultaneity, which can be understood as effective regulation of limited cognitive resources, is applied both in the receptive and productive phase of consecutive interpreting. It represents a specific cognitive skill that can be gradually automatized, and therefore improved by training.

1. Introduction

Consecutive interpreting (CI) has been used for millennia in a variety of communication situations. It is currently considered to be one of the techniques of conference interpreting, but it is also applied in negotiation interpreting, dialogue interpreting or public service interpreting. The consecutive technique includes a wide conceptual range of forms from sentence-by-sentence interpreting to classic consecutive interpreting using note-taking. In contrast to simultaneous interpreting (SI), which is of particular interest for its procedural specifics, research on consecutive interpreting in interactive discourses focuses more on the dynamics and intercultural aspects of mediated communication (Pöchhacker 2012). Nevertheless, it is a highly complex linguo-cognitive process and its better understanding can help us (among other things) to enhance specific skills of future interpreters more effectively. However, recent studies (e.g. Englund Dimitrova & Tiselius 2016) show the potential of experimental

approaches and novel methods in the research of consecutive interpreting e.g. in dialogue mode or community setting.

Thus, we speak of consecutive interpreting (CI) when the speaker presents a discourse in sections and the interpreter, who generally stands next to him in order to maintain eye contact, interprets every time the speaker interrupts his speech. The length of the sections depends on the speaker and ranges from half a sentence to a few-minute-long monologues (Fleischmann, Kutz & Schmitt 1997). The interpreter should be able to interpret a speech of any length, using various techniques and strategies he or she should adopt (Jones 1998). These also include note-taking, which facilitates the work of interpreter's memory processes.

2. Procedural and cognitive characteristics of consecutive interpreting

Both basic interpreting techniques (CI and SI) present a number of parallels mainly due to the nature of translational activity, but they are also characterized by specific distinguishing characteristics. The differences between simultaneous and consecutive interpreting manifest themselves especially in the following areas:

- Demands on inhibition of the source language (SL) influence:

In the SI process, two languages are processed simultaneously in the working memory, which requires focusing attention on inhibiting the influence of the source language on the target-language discourse production in order to avoid interference. In CI, the attention demands in this area are lower or non-existent, depending on the language in which the note-taking is taking place. Even if note-taking takes place in the target-language language, it consists of keywords rather than sentence structures, which makes the interference less likely) (Gile 2001).

- *Output monitoring:* As part of demands on speech production, in CI, the interpreter can devote more attention to monitoring his/her own output than in SI (Gile 2001).
- *Time pressure:* In SI, the production of the target-language text occurs under heavier time pressure, which is significant especially in the discourse's segments with high information saturation. In CI, this problem becomes apparent only in the note production phase (Gile 2001).
- *Note-taking:* A specific feature of CI is note-taking, which requires certain attention of the interpreter (focusing attention on the selection of the discourse's main information and on information unidentifiable from the communication situation, and techniques of note-taking) (Gile 2001).
- Demands on working (short-term) memory: CI presents increased demands on working memory due to the slow pace of writing, increasing the delay with regard to the source-language discourse,

which does not occur in SI (except language pairs requiring significant changes in word order; in this case, cognitive demands may be comparable to CI). Coping with these demands requires specific strategies and know-how (Gile 2001). According to Dörte (2002), in CI, a continuous delay with regard to the speaker of more than 7 seconds causes a loss in understanding of the source-language discourse or note-taking.

- Demands on long-term memory: The amount of information stored and structured in long-term memory interferes with the identification processes of the discourse equally in SI and CI. However, the difference consists in the speed of this interference and the length of the analysed segment (Nováková 2007). In addition, CI provides more room for inference (adding necessary, probable, or possible information to the discourse).

3. Efforts in interpreting

One of the most renowned researchers in the field of empirical study of the interpreting process is Daniel Gile (1993, 1995, 1998, 1999), who focuses on mental processes taking place during interpreting. He is the author of the so-called effort model (*modèle d'efforts*). In the interpreting process, he distinguishes several types of efforts: the listening and analysis effort, the memory effort and the production effort. The effort in any of these areas must not decrease below a certain level, otherwise the performance of the interpreter deteriorates.

A specific problem or a challenge that interpreters have to deal with in the interpreting process is coping with many efforts, including the cognitive ones. In this regard, it is important to note that mistakes or failures at certain stages of interpreting can be observed not only with beginning interpreters or students of interpreting, but also with professional, experienced interpreters, and not only when interpreting complex, highly specialized and terminologically saturated discourses, but also in case of clearly structured speeches, presented at an appropriate pace and devoted to general topics.

The reason of these failures, according to Gile (1993, 1995), are the increased cognitive efforts of the interpreter. In the interpreting process, the interpreter has at his/her disposal a certain type of "mental energy" (*processing capacity*); however, its amount is limited in capacity and interpreting requires almost all this energy, in some cases more than is available. In this case, the interpreting performance deteriorates.

According to Gile's model, interpreting is an activity that is strongly focused on memory processes, therefore, the course of interpreting can be described as follows:

Decoding of information from the source language + storing of information + retrieval of (previously stored) information + encoding of information into the target language

The findings of cognitive psychology on the properties of attention and the so-called automatic and non-automatic mental operations greatly contributed to the issue of effort models. *Non-automatic operations* (Richard, 1980, In: Gile 1995) are mental processes which (unlike automatic operations) require attention, and therefore, a certain amount of mental energy. This energy is taken from limited supplies and if the mental energy needed for a certain partial activity is insufficient, the interpreting performance deteriorates. The non-automatic operations used in interpreting include for instance detection of a sudden, unexpected stimulus, identification of an unknown stimulus, or a known stimulus presented under adverse conditions, retention of information in memory for later use, etc. Automatic operations are for instance decoding a known stimulus under non-degraded conditions, triggering an automated response, etc.

Setton (2002) distinguishes between *automatic, automatized and controlled/strategic processes*, while complex tasks involve components of all three. The number of operations that a person performs without the need to focus his/her attention increases with experience. The limitations of such progressive automation probably consist of the general abilities of the individual and, partly, of the changing environments. Interpreters always interpret different discourses and despite the fact that they expand their vocabulary during their practice, including speech platitudes with more or less universal use, many processes remain resistant to automation. In light of the above, Setton (2002) distinguishes two basic processes in interpreting – translation and simultaneity. He approaches simultaneity as a perceptual and coordinating ability, which is fully automatized. According to him, translation includes linguo-conceptual cognitive components that require activated attention. Nevertheless, it is not possible to separate the individual processes, as this would lead to the loss of the cognitive-linguistic coordination component (comparison of patterns, integration of knowledge, inference), which seems to be crucial in the interpreting process.

In his model, Gile (1993, 1995) identifies three basic efforts in the interpreting process:

- Listening and analysis effort
- Speech production effort
- Memory effort

The formulation of the three basic types of efforts is built on the following assumptions:

A) Each of the efforts contains non-automatic components and therefore all require attention:

- The production of speech in interpreting would constitute automatic operations only if we dealt with a mechanical replacement of the source-language discourse elements by the target-language discourse elements word for word, which is obviously not the case.
- Memory effort represents non-automatic operations since it involves the storage and retrieval of information that is constantly changing.

B) The above-mentioned efforts partially compete with each other, which means that despite the fact that they share the supplies of mental energy, their parallel implementation increases the demands on the interpreter's mental capacity.

C) Most of the time, interpreters work almost at the limit of cognitive capacity saturation.

Listening and analysis (Gile 1993, 1995) represent the input of interpreting and include all operations related to comprehension (from the analysis of sound waves that reach the ear through the identification of words to the identification of the sense of the heard), while speech recognition in interpreting is understood as a non-automatic process. *Attention*, the ability to split it (or switch it) and concentration play an important role, which is underlined by the fact that the interpreter has to focus on everything the speaker says; unlike the listener, who has the possibility to choose only the information that he is interested in. In addition, the interpreter often does not have the relevant extralinguistic knowledge, which can also hinder his understanding and increase the demands on the management of cognitive processes.

Speech production (Gile 1993, 1995), the output of interpreting, involves various operations with regard to the form of interpreting. In SI, speech production involves the following mental operations: mental representation of meaning, planning of speech and realisation of this plan, i.e. speech production in the target language. In CI, we distinguish two types of production. In the first phase, it is the production of notes, following listening, and in the second phase, the production of speech in the target language.

The production of speech itself can be understood as a certain problem-solving or decision-making process, during which interpreters look for appropriate lexical units to express the meaning of the statement, decide on the syntactic form of the sentence, etc. One of the reasons why speech production in the context of interpreting can constitute an effort is that the interpreter does not express his own ideas, but must "follow the path" chosen by the speaker, and many times, speech production mediated by an interpreter takes place in a thematic field that he/she is not familiar with. For these reasons, speech production in interpreting constitutes a non-automatic operation.

Memory operations (Gile 1993, 1995) of up to a few seconds take place constantly in interpreting. Some are conditioned by the delay between the presentation and the detection of the sound stimulus (the interpreter has to keep phonetic segments in memory until the word can be identified), others are related to the time it takes to produce speech (information or thought is present in memory until it is pronounced), others may be associated with specific characteristics of speech in the source language (e.g. if the speech is illogically structured, information-saturated, if it contains unusual linguistic structures or sub-standard forms of the language, or is difficult to understand due to speaker's accent; the interpreter prefers to wait before he/she starts interpreting (SI) or uses notes (CI) to get a wider context and more time to understand the speech). Memory processes are therefore non-automatic.

3.1 Effort model in consecutive interpreting

Although the effort model was originally designed for simultaneous interpreting, Gile later developed a model for consecutive interpreting on the same basis.

CI takes place in two phases: 1. phase - listening and note-taking and 2. phase - production of the target-language discourse.

Gile (1995) represents the first phase using the following equation:

Interpreting = L + N + M + C

L Listening and Analysis
N Note-taking
M Short-term Memory operations
C Coordination

In the first phase of CI, the analysis and listening are performed in the same way and memory operations are similar to those in SI. However, in CI, memory processes are associated with the time between hearing and noting down information or between hearing information and the moment when the interpreter decides not to note it down or between hearing the information and its disintegration. These processes represent the first phase of the effort model. In the second phase, the interpreter retrieves information from memory and encodes it into the target language. The performance of speech production in the first phase of CI is associated with the production of notes.

The second phase can be represented as follows:

Interpreting = Rem + Read + P

Rem Remembering
Read Note-reading
P Production

In contrast to short-term memory operations in the first phase, in the second phase, parts of the source-language speech are gradually retrieved from long-term memory. High-quality note-taking can reduce the memory effort of the interpreter. However, in his model, Gile (1999) predicts a negative effect of note-taking in case of inexperienced/untrained interpreters. In this phase (in contrast to the first phase and in contrast to SI), the interpreter can determine the pace of carrying out individual tasks himself and does not have to distribute cognitive capacity near its saturation. It is therefore not necessary to include the coordination component (C) in the second phase of CI.

4. Specific cognitive skills in interpreting

A careful examination of the structure and function of cognitive processes such as attention or memory also helps to bring us closer to finding the answer to the key question of interpreting didactics: which abilities and skills are largely innate and which can be developed and enhanced through effective training and practice.

Research in this area suggests that practice helps to improve specific cognitive abilities rather than general cognitive skills (e.g. memory span).

Pinter (1969, In: Kurz 1996) found that the ability to solve complex cognitive tasks, which is one of the prerequisites for successful interpreting, is improved through practice. In her medium-term research, Moser-Mercer (2002) found that there was not a great difference between experienced interpreters and beginners, as far as various partial skills are concerned, such as parallel reception and production of a text, verbal fluency or short-term memory span. However, speech production processes of interpreters with many years of experience were less likely to contain interference. Similarly, Köpke & Nespoulous (2006) did not find a significant difference between experienced interpreters, beginning interpreters, students of interpreting and bilingual individuals in carrying out cognitive tasks focused on short-term memorization or selective attention. However, groups of interpreters performed better in a memory task with articulatory suppression, in which a more significant role is played by the working memory executive processes. However, the authors themselves admitted the occurrence of intervening variables that could have affected the results. The research results of Liu, Schallert & Carroll (2004) showed that interpreting performances of participants with similar general cognitive skills, but different specific skills, presented differences. Professional interpreters with comparable short-term memory capacity performed better in interpreting. The authors attributed this difference to specific cognitive skills, e.g. the ability to regulate limited cognitive resources.

We can therefore assume that executive processes (in the sense of central executive or activated memory) play a crucial role in the interpreting process (Gile 1995; Mizuno 2005; Moser-Mercer 2005). Similarly, the

findings of research studies confirm that it is not the span of memory storehouse, but the ability to regulate cognitive resources which plays a key role in interpreting (Conway et al. 2005; Engle 2002; Engle & Kane 2004; Feldman Barrett et al. 2004, Timarová, 2014).

Therefore, the concept of working memory, in this understanding, does not see the working memory capacity as a memory span, but perceives it as the ability to use attention to keep information in memory or to attenuate it. In this regard, Engle also states that a good working memory does not only imply a storage function, but primarily the ability to keep information in memory active and accessible (Engle 2002).

5. Research on the effect of specific cognitive skills on consecutive interpreting

In 2009, we carried out empirical research on students of interpreting in order to verify the findings of previous research, i.e. interpreting performance is not determined by general cognitive skills, but by specific regulatory and executive processes[1]. We examined the effect of individuals' general and specific cognitive skills on their performance in CI. We investigated the relationships between individual cognitive skills and interpreting, especially by comparing the performance of a given participant in individual tasks, not by comparing different groups. In this way, it was possible to identify direct correlations between variables without the adverse effect of uncontrolled variables, e.g. age and experience (Hodáková 2009).

The research sample consisted of 60 students of translation and interpreting at the Faculty of Arts, Constantine the Philosopher University in Nitra, Slovakia, whose average age was 21.85 years. Out of these 60 participants, there were 28 students in the 3rd year of their bachelor's degree studies and 32 students in the 1st year of their master's degree studies.

5.1 Research methods

In addition to the questionnaire aimed at collecting factual data about students, we used the following performance tests as methodologies:

- standardized methodology *The d2 test of attention*
- *Cognitive processes regulation test* (CPRT – a combination of the addition test and a modified auditory version of the Reading Span Task – *Listening Span Task*)
- *Consecutive interpreting*

[1] For a detailed description of research design, methods and statistical data analysis, see Hodáková 2009.

To test the general cognitive ability, we chose *the test of attention*. Attention is a function of the working memory central executive. Moreover, it is a working memory's function, which is used in interpreting probably to a greater extent than e.g. memory storage function. The d2 test of attention is a time-limited selective attention test. It assumes concentrated performance in the field of external visual stimuli. Successful concentration, in turn, presupposes adequate functioning of motivation and management. In this test, this will be reflected in three performance components:

1. speed or amount of work performed, i.e. number of stimuli processed in a certain period of time (it concerns the motivation)
2. quality of work performed, i.e. degree of accuracy, which stands in opposition to the number of errors (attention management area)
3. ratio of speed and accuracy of work performed, which allows to draw conclusions about the characteristics of work performance, e.g. degree of activity, stability and coherence of performance, fatigue, level of attention and attenuation of disturbances.

By evaluating the d2 test, it is possible to obtain the following types of scores:

- Total number (TN) – corresponds to the sum of all items that the participant passed in the test; it is the degree of the attention paid (selective and permanent), speed of work, amount of work performed as well as motivation.
- Errors (E) - represent the sum of all erroneous performances (errors of omission and confusion); the percentage of errors is a variable that measures the qualitative side of performance.
- Overall performance (OP) - is the total number of processed items minus the total number of all errors; it expresses the degree of attentional and attenuation control and the relationship of the performance speed to its accuracy.
- Fluctuation range (FR) - expresses the evenness of performance during the test, it is also an indicator of endurance at work.

The cognitive processes regulation test represents our own methodology developed for the purposes of current research. It combines a modification of the auditory version of the reading span task– *listening span task* and *the addition test of attention*. We assume that the cognitive processes regulation test does not focus only on one isolated cognitive characteristic, but on the contrary, represents a task in which participants must use several components of their working memory at the same time:

- procedural aspect (deciding on logicality/illogicality or correctness/incorrectness of the heard sentences - comparison of patterns),
- storage aspect (saving the last words) and

- executive aspect - selective attention (addition test, listening), splitting or switching attention (between the addition test and comprehension of the heard text) and at the same time regulation of all processes (supervision)

The cognitive processes regulation test (CPRT) therefore focuses on determining a specific ability - regulation of cognitive processes or capacity stocks available to the individual. According to many authors, the ability to regulate cognitive processes is a basic prerequisite for interpreting being successful.

The listening span task (LST) is the auditory version of the *reading span task* (Daneman & Carpenter 1980), which was designed in light of the finding that speech comprehension depends on the characteristics of working attention. Individuals differ in the speed and accuracy of language comprehension. The authors found that these individual differences in reading comprehension correlated with the verbal working memory capacity. The reading span test was designed to identify both procedural and storage components of working memory. The authors of the test draw on the argument that text comprehension processes use up less capacity stocks in individuals with higher reading span. Such individuals are subsequently able to keep a higher number of the last words in memory.

Since interpreting is primarily based on processing information that is presented in an auditory manner, in our research, we used a modified version of the listening span task which consisted of three series of auditorily presented sentences (on recordings).

At the same time, participants performed *the addition test* in parallel with the presentation of the sentences. They interrupted the addition every time after a set of sentences ended, marked the last words or a cross in the given set, and resumed the addition. The addition test belongs to the serial tests of attention and consists in the addition of two adjacent one-digit numbers distributed on the template. Through the addition test, it is possible to identify the speed and quality (accuracy) of attention performance. The total score in the cognitive processes regulation test was obtained by adding up the percentage performances in both tests (LST and addition test).

The task of the participants in CI was to interpret the heard discourse from German into Slovak. The source-language text was a thank you speech consisting of 612 words. The presentation of the source-language text took 5 minutes and 14 seconds. During the presentation, the participants were taking notes and, after the presentation, they consecutively interpreted the heard text. Their performance in CI was assessed by two evaluators (experienced interpreters).

5.2 Research findings

When analysing the relationship between general cognitive skills and CI (using statistical analysis of the data), we found a correlation r = **0.342** between the overall performance in the d2 test of attention and CI performance. However, this correlation was not statistically significant, i.e. for an individual, there is no direct significant relationship between the overall performance of attention and CI performance. The overall performance of attention (selective attention), as a general cognitive skill, does not significantly affect performance of the individual in CI. A negative correlation r = -**0,513*** was observed between the fluctuation range detected in the d2 test of attention and CI. This correlation was statistically significant (significance level of -0.05), i.e. there is a negative, moderately strong relationship between the fluctuation of the individual's attention and his/her CI performance. Increased fluctuation in attention significantly effects CI performance in a negative way.

By analysing the relationship between specific cognitive skills and CI, we found a positive correlation r = **0.595**** between the total score in the cognitive processes regulation test and CI performance. It was statistically significant (significance level of 0.01), which represents a positive, moderately strong relationship. Participants who scored better in the CPRT also achieved better performance in CI. When analysing the relationship between CI and performances in partial tasks of the cognitive processes regulation test, a positive correlation r= **0,448*** was observed between the memory span (listening span) and CI performance. This correlation was statistically significant (significance level of 0.05), i.e. there is a positive, moderately strong relationship between the memory span and the individual's performance in CI. A positive correlation r = **0.400** was also observed between the addition test in the cognitive processes regulation test and CI, which, however, was not statistically significant. Therefore, there is no direct significant relationship between the addition test and CI performance. The individual correlations are briefly summarized in Table 1.

	d2OP	d2FR	CPRT	Listening Span	Addition test
Number of participants	60	60	60	60	60
Performance in CI	0,342	-0,513*	0,595**	0,448*	0,400

*significance level of 0,05
**significance level of 0,01

Table. 1 Correlations between CI performance and performance in cognitive tasks

6. Discussion and conclusion

In the research we conducted, we did not find a significant direct relationship between the overall performance of attention and CI. Similarly, we did not find a significant relationship between CI performance and attention accuracy determined by the percentage of errors in the d2 test of attention. Therefore, the overall performance of attention and its accuracy did not represent a factor that significantly impacted the quality of students' interpreting. Attention as a function of the working memory central executive is a general cognitive skill that is, beyond any doubt, applied in the interpreting process. However, it is not one of the decisive factors that would distinguish poor quality interpreting from good quality interpreting or a "good" interpreter from a "bad" one. Attention as such is only one of the prerequisites for the functioning of other, more complex cognitive processes that have a significant impact on interpreting performance. However, we found a significant negative relationship between the participants' performance in CI and their fluctuation range in the d2 test of attention. Stability or fluctuations in the individual's attention over time significantly affect the quality of students' target-language discourse in CI. Due to CI specifics, fluctuations in attention are more likely to occur in CI than in SI.

In the CI process, the interpreting itself is preceded by the phase of discourse reception and note production, which may provide more room for fluctuations or attention worsening. During note-taking, the interpreter is more active in certain stages (e.g. in case of information-saturated segments), other times he is waiting for a broader context or a key word. Due to the slower pace of writing, these possible fluctuations in attention can also cause a loss of information, leading to a deterioration of interpreting performance. Mistakes resulting from the fact that due to fluctuations in attention, the interpreter creates an incorrect scheme or information scene from the source-language discourse, may also contribute to worsened CI performance. Applying the wrong scene can lead to serious shifts in the meaning of the source-language statement, which subsequently often affect even larger segments of the target-language discourse. In this case, although in the consecutive mode, the interpreter is more of a "master of his time" compared to SI (especially in the production phase), at the same time, due to this fact, he/she may miss some key information.

We further assumed that specific cognitive skills significantly affect the quality of CI. This assumption was partially confirmed in individual working hypotheses. In our case, the specific cognitive skill used in interpreting was the ability to regulate cognitive processes in complex tasks. We found a positive significant relationship between performance in the cognitive processes regulation test and performance in CI. CI performance, which imposes capacity demands on the interpreter simultaneously in different areas (listening, note production, memory and

coordination in the first phase and retrieval of information from memory, reading the notes and speech production in the second phase) is significantly related to the individual's ability to regulate cognitive processes in such complex tasks. Individuals who demonstrated higher performance in a given task in which they had to perform several activities simultaneously, generally also performed better in CI. We also found a significant relationship between memory span (partial task in CPRT) and CI performance. The authors of the listening span task methodology (Just & Carpenter, 1992) speak about the correlation between memory span and comprehension of more difficult texts. We believe that understanding such texts requires, among other things, the ability of abstraction, the ability to understand more complex contexts which is related to the working memory characteristics, and the ability to organize and structure information in long-term memory and their efficient retrieval. These abilities provide a great advantage when producing effective notes and are therefore likely to affect CI performance.

The ability to effectively regulate limited cognitive resources in complex tasks which involve solving multiple linguo-cognitive tasks at the same time is therefore likely to be crucial also in CI. Although in the consecutive technique, the interpreter is not pressed for time as in the simultaneous mode, time management is extremely important for the overall success of interpreting.

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