# *STRUCTURAL ASYMMETRIES AND COGNITIVE LOAD IN SI BETWEEN ENGLISH AND SLAVIC LANGUAGES - A PILOT STUDY*

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**Abstract:** Much of the research in simultaneous interpretation ('SI'), from its inception to this day, has been inspired by a fierce debate between two schools. One claims that SI is not affected by the structural asymmetries of the two languages, since what is transferred is meaning and not structures. The other claims that language-specific differences lead to additional processing difficulties and a larger cognitive load in SI. Numerous experiments in support of the latter mostly involve a number of Germanic and Romance languages. This pilot study sets out to explore the impact of morpho-syntactic asymmetries between English – a Germanic language – and three Slavic languages – Montenegrin, Russian and Bosnian – on the overall cognitive load in SI. The asymmetries selected for this experiment have to do primarily with aspect, but also a number of additional problem triggers, such as composite nominal phrases, names and numbers, are addressed. Input speeches and output audio recordings made by professional interpreters are analysed using two-track recording in Audacity, a digital audio editor and recording software application. The insights are further refined by the authors' direct observation using audio recordings and their transcripts. The results point to a positive correlation between morpho-syntactic asymmetries and the cognitive load in SI between English and the three Slavic languages. The pilot offers ideas for future, more extensive studies and shares observations on the processing difficulties and control of attentional resources in SI, with the potential pedagogical implications.

**Keywords:** SI, cognitive load, morpho-syntactic asymmetries, Audacity, SI training

**1. Introduction**

Almost all English verbs are ambiguous in terms of aspect, i.e. they may yield both perfectivity and imperfectivity depending on a number of components outside the verbal lexeme. This means that the representation of an event can be finally specified[1] as perfective or imperfective only at the sentence level (Verkuyl 1972; Kabakčiev 2000; Bulatovic 2020, 2022). For example, although sentences 1 and 2 below have the same verb, 1 is perfective and 2 is imperfective. The non-verb elements in 1 and 2 that are critical to the final aspectual interpretation are the situation participants, the bounded *a project* and the unbounded *projects* in 1 and 2 respectively.

1. The team developed a project.
2. The team developed projects.

Conversely, in Slavic languages, all verbs, save for bi-aspectual verbs,[2] are morphologically specified for aspect, and they are either perfective or imperfective. By selecting a verb to use in everyday communication, one selects its semantic content and aspectual form at the same time and at the same place – on the verb.

This has implications for comprehension in cross-linguistic settings involving English and Slavic languages. When reading or listening to English as the source language (L1), a speaker of a Slavic language, just like any other speaker of English engaged in a communicative situation in English, receives through the eye or the ear various aspect-relevant components one by one as they are produced at the other end of the communicative channel, until aspect can finally be disambiguated. The recipient deverbalises these components one by one in her[3] mind before a proper interpretation of aspect is finally arrived at. Our primary concern in this study is not with English sentences like 1 and 2, where aspectual ambiguity is resolved immediately after the main verb, i.e. with the onset of *a project* and *projects*, respectively, but with situations

[1] This holds for most verbs, save for progressives, most states and phrases with *used to* and *would*.

[2] Bi-aspectual verbs are imported, unspecified for aspect and behave just like English verbs, i.e. their aspectual interpretation depends on the components outside of the verb.

[3] 'She/her' is used to avoid double forms and refers to interpreters of both genders throughout this text.

where the main verb and the last aspect-relevant component are further apart.

In this paper, we focus on structural asymmetries in a cross-linguistic setting such as SI, because its nature is such that it does not allow the recipient of L1 – the interpreter in this case – to wait until she has heard all the components that may play a role in the final aspectual specification of a sentence. After a relatively short lag, or ear-to-voice span ('EVS'), the interpreter must start her rendition in the target language (L2). Because English is an SVO language, the interpreter will hear an L1 verb soon after the beginning of an ongoing utterance and will have to produce an L2 equivalent to the aspectually ambiguous L1 verb. The question we explore in this study is the effect of such asymmetries on the overall cognitive load in SI. More specifically, we need to check whether the interpreter decides to repair the wrongly assigned aspect, thus risking losing some of the incoming content downstream, or to ignore the error to maintain smooth rendition.

To address the above question, an experiment was conducted to analyse the interpretation of three short speeches between English and three Slavic languages by a group of professional interpreters. We hope the findings will enrich the long debate concerning the impact of structural differences on the cognitive load and performance in SI. Our main motive, however, is for the experiment to give us some insights that can be applied in SI training. To our knowledge, there has been no research of this type involving English and Slavic languages.

We proceed as follows. Section 2 is a short overview of the relevant theoretical background on aspect and SI. Section 3 describes the experiment. Section 4 presents the results and our analysis, while section 5 discusses the results, followed by section 6 with the main conclusions.

## 2. Literature review

In what follows under this section, we focus on a limited number of considerations under the subsections on aspectual asymmetries and cognitive load in SI that we find especially relevant to this research.

### 2.1. Aspectual asymmetries in English and Slavic language pairs

Aspect in Germanic and Slavic languages is in an inverse relationship (Kabakčiev 2019; 2000). In Germanic languages, articles compensate for the loss of aspectual verbal morphology that has occurred over centuries of linguistic development (Abraham 1997). Slavic languages have maintained their aspectual verbal morphology

and function well without articles as bounding devices. Articles in English, alongside other determiners, quantifiers and adverbials, have a key role to play in the signalling of aspect, with the indefinite and definite article having a bounding effect and the zero article having an unbounding effect on situation participants in a sentence. In sentence 2 below, which we repeat here for easier reference, it is not the plural of *projects* but the presence of the zero article that makes 2 imperfective. This is easily proven by 2a, which yields perfectivity.

2. The team developed projects.
2a. The team developed the projects.

The work of Verkuyl (1972), the founder of compositional aspect ('CA'), draws on Vendler's classification of situation types (1957). The key feature of Vendler's classification is whether the situation develops towards a logically implied endpoint, or *telos*, or not. Verkuyl later developed schemata to show how the initial lexical potential of the verbal phrases denoting the situation is modified under the impact of other components in the sentence (Verkuyl 1989). The word *potential* must be emphasised here because the four situation types represent only the stereotypical or default interpretations.

In 1, for example, which we repeat here for easier reference, the default interpretation of *developed a project* is perfective and remains unchanged because both situation participants (i.e. both *the team* and *a project*) are bounded.

1. The team developed a project.

With the addition of new components in 1, the sentence-level aspectual interpretation can be confirmed or annulled. For example, in 1a, 1b and 3 below, "the recognition of aspect by the hearer will, as a rule, take place as late as after clarifying the temporal status of the last situation-participant NP in a sentence/clause" (Kabakčiev and Dimitrova 2023: 19). These utterances seem to be developing towards final perfectivity, until they are made imperfective by the addition of *for foreign partners* and *for two* years in 1a and 1b respectively, and *every few years* in 3.

1a. The team developed a project for foreign partners.

1b. The team developed a project for a foreign partner for two years.

3. The team announced a project for a foreign partner every few years.

Note also that there is no aspectual ambiguity in situations where an unbounding element is placed at the very beginning of the sentence.

Neither is there aspectual ambiguity in situations that are imperfective by default. The imperfectivity of sentence 2, for example, can only be confirmed, as in 2b, and never annulled, as shown in 2c.

2. The team developed projects.

2b. The team developed projects for two years.

2c. *The team developed projects in two years.

A conclusion that is relevant to our analysis is that it is easier to understand and process imperfective utterances whose imperfectivity is specified early, i.e. as close to the main verb as possible (as in 2), than those that initially signal perfectivity but are then coerced into imperfectivity (as in 1b). Indeed, there is research which measured processing cost based on pupillary movement, suggesting that sentences with a change in aspectual nature take longer to process (Parczynski et al. 2014). Our key question remains whether this longer time required will eventually disrupt the deverbalisation process, which the proponents of the universalist approach to SI claim is automatic.

**2.2. Cognitive load in SI**

Proponents of the *interpretive*, or *universalist*, approach to SI maintain that structural asymmetries between the source and target language have no effect on SI performance because interpreters interpret the overall meaning of the source input irrespective of the linguistic structures used to express it (Lederer 1981; Seleskovitch 1984). By contrast, proponents of the *information processing*, or *effort*, approach (Gile 2009) are of the view that structural asymmetries pose an additional challenge to SI, which Gile compares to walking on a tight rope (Gile 1999). Gile's effort models (1985; 1995; 2009; 2017) view SI as a process comprising a series of concurrent efforts (*listening and analysis effort*, *production effort*, *memory effort*, and *coordination effort*) that place a lot of burden on the interpreter's limited resources and that even a short attentional lapse or tending to what may seem like a minor issue may negatively impact the rendition of the new incoming

segments of the input, thus causing *exported load* (Gile 2008; see also Mazza 2001 and Meyer 2008). This is illustrated well by Gile's experiment with professional interpreters who interpreted the same input twice, both times with multiple, often different, errors and omissions (Gile 1999). Research has identified a number of universal SI challenges, or *problem triggers* as referred to by Gile (2009; 2015), such as numbers and proper names (Mazza 2001; Plevoets and Defrancq 2016; Meyer 2008), as well as composite noun phrases (Shlesinger 2000). These triggers are treated only as potential triggers because whether they will lead to cognitive saturation and failures in the rendition depends on a number of factors, such as delivery rate, information density and sound quality, among others (Gile 1995).

Various authors have focused on the effects of structural asymmetries on SI and measured the cognitive load taxed by such additional challenges. By measuring pupillary response to interpretation tasks, Seeber and Kerzel (2011) found that the cognitive load during the interpretation of verb-final German structures into English was higher than the load resulting from interpretation of symmetrical verb-initial structures. Seeber and Kerzel (2011: 238) hold that their results corroborate Gile's hypothesis that load increases towards the end of sentences, but found no evidence in support of Gile's tightrope hypothesis (Gile 2008). More precisely, they feel that cognitive load is not close to saturation levels throughout the SI but only at certain points, and that cognitive resources can be reallocated.

In an experimental study analysing the effect of word order asymmetries between German and Dutch as L1 and Italian as L2, Bevilacqua (2009) found that this language pair requires more extensive anticipation efforts and longer ear-voice-span (EVS). Another study, also concerning word order differences, with interpretation this time from French into SOV target languages, German and Dutch, also revealed that the asymmetries required special strategies to reduce the memory effort (Collard et al. 2018). Riccardi and Snelling (1996) identified anticipation as an important strategy to cope with morpho-syntactic incongruencies between German and Italian (see also Riccardi 1999 on general and specific interpretation strategies). Kim (2005) analysed SI between Korean and Chinese and Korean and Japanese and found that the interpreter's guessing and choosing the right EVS is crucial to overcoming the incongruent language features of these languages.

A significant share of literature on SI addresses *disfluencies*, which Tissi (2000: 115) views as a signal of "comprehension or reformulation

difficulties" in SI. The same author highlights the communicative and strategic use of some non-fluencies, especially in relation to corrections (Tissi 2000: 121). Setton (1999: 50) argues that the insertion of short pauses, or the use of *waiting*, as he calls it, is a useful strategy to cope with complex or temporarily undetermined syntactical structures. Mead (2000), among others, distinguishes between silent and filled pauses, and claims that silent pauses do not always signal difficulties, while filled pauses do (for disfluencies, see also Plevoets and Defrancq 2018 and Bartlomiejczyk and Gumul 2024).

There is another relevant study using pupillary dilation and movement as indicators, which shows that, for the reason of multiple difficulties, interpretation generally induces more cognitive load than other language-processing tasks, such as listening, speech shadowing and repeating (see Tommola and Niemi 1986; Tommola and Hyönä 1990; and Hyönä, Tommola and Alaja 1995*),* which indicates that deverbalisation in SI may not run as smoothly as seems to be the case in other language processing.

As for research to date concerning SI where a Slavic language is L1 or L2, this mostly addressed the directionality issue, explicitation and repairs (Pavlović 2007; Gumul 2017; Bartlomiejczyk and Gumul 2024). It is our intention, therefore, to use this pilot experimental study to gain some initial insight into the effect of structural asymmetries between English and the three Slavic languages on the cognitive load in SI. We hypothesise as follows:

Hypothesis 1: Cognitive load in SI is higher than that in the linguistic processing activity of (near-) shadow interpreting.

Hypothesis 2: Cognitive load, including exported load, is higher in the interpretation of structural asymmetries than of structural symmetries.

Hypothesis 3: Multiple structural asymmetries in a single utterance or in adjoining utterances result in the highest exported load in SI.

**3. Experiment**

*Design.* For the experiment, three short speeches were compiled from passages of a longer speech on EU enlargement[4] and were slightly adapted. Two speeches were modified to include the asymmetrical structures and problem triggers (Gile 2009; 2015). Speech 1 served as the baseline, as it included no problem triggers. Speech 2 included

[4] https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_13_908.

sentences where aspect disambiguation components were placed at the very end of an utterance, as in sentence 4.

4. This legal team issued a large number of detailed reports regularly to support judicial reforms [...]

The default perfective reading of *issued a large number of detailed reports* in 4 is coerced into imperfectivity by the adverbial *regularly*

Speech 3 included elements similar to those in Speech 2, but were then followed by additional problem triggers in the form of composite noun phrases, names and numbers, as in sentence 5.

5. The Commission made an *ad hoc* report for ministries quite often, 1126 pages in total over this period, whenever they required [...]

Sentence 5 contains a double problem trigger: an aspectual incongruence similar to that in 4, and a complex number immediately following. Speech 3's target structures were designed so that we could conclude whether the exported load occurs only in the presence of multiple problem triggers in a single utterance.

The three speeches were read out by a native speaker of English and interpreted into Montenegrin, Bosnian and Russian by three interpreters with over 15 years of active service.

The translations of those three speeches were then read out by a native speaker of Montenegrin and interpreted back into Bosnian, Russian and English by three experienced interpreters different to those for the English L1 SI.

Table 1 presents some key information about the three speeches to show that, save for the target structural elements, they were of comparable complexity and rate of delivery.

Table 1: Basic metrics for the three speeches

| | Speech 1 | Speech 2 | Speech 3 |
|---|---|---|---|
| Problem triggers | No | Aspect only | Aspect + triggers |
| Number of words | 306 | 307 | 301 |
| Length in minutes | 2:24 | 2:30 | 2:46 |
| Delivery in WPM | 127 | 122 | 109 |

| | | | |
|---|---|---|---|
| Readability score (Flesch-Kincaid)[5] | 13.6 | 11.8 | 12.6 |

*Participants.* The two native speakers and the six interpreters were all informed about the purpose of the recordings but were not given information on the target structures or the objectives of the experiment pursued. All they knew was that the speeches had to do with the EU enlargement process. They consented to their recordings being stored and processed. To make the individual recordings of interpretation in the three Slavic languages anonymous, the recordings were marked as Slavic L2 1, Slavic L2 2 and Slavic L2 3, and represented in the tables in a different order than that in the remaining text every time. All but one of the eight participants were the authors' colleagues, and they all refused remuneration for their participation.

*Procedure and methods of analysis.* The recordings of L1 speeches were played on a computer and the interpreters recorded their renditions using the *Voice Recorder* application on their mobile phones. The produced m4a files were converted to mp3 files using the freely accessible online conversion service *cloudconvert*,[6] and transcripts of them were then made using *TurboScribe*.[7]

The pairs of mp3 audio files, i.e. the L1 input speech and respective L2 output recordings, were then processed and analysed using two-track recording in Audacity, a digital audio editor and recording application software. Because the focus of our experiment is exported load, we took great care to set the time parameters correctly. The L1 speech was always placed at 0 on the time bar in the upper track, and the L2 rendition was set to start at the initial EVS in the lower track. The EVS, or the ear-to-voice span, is the time which lapses between the onset of an L1 unit and the onset of that unit in L2 interpretation. In our experiment, we measured the EVS at all sentence-to-sentence transitions in a recording to identify any deviations from the average EVS. Note that our focus was on the EVS immediately following the sentence containing a problem trigger, not the EVS before that

[5] Flesch-Kincaid Grade Level is a readibility formula that assesses the approximate reading grade level of a text, based on average sentence length and word complexity. The scores largely correspond to US grade levels. A score of 12–15 for our three speeches is college-level. https://goodcalculators.com/flesch-kincaid-calculator/.

[6] https://cloudconvert.com.

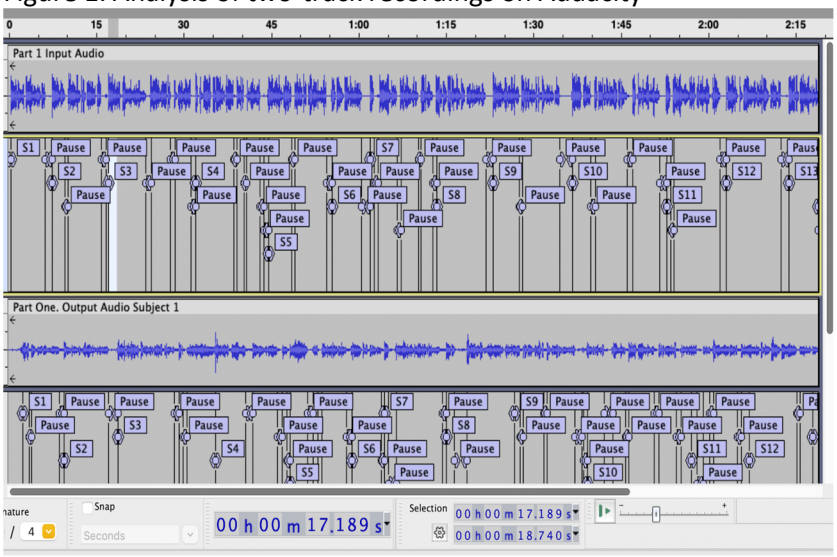
[7] https://turboscribe.ai.

sentence, because the exported load can only be measured downstream (and is marked in grey throughout the tables).

Another parameter processed on Audacity was the sum of inter- and intra-sentence pauses. Our definition of a pause was a silence between two sounds longer than 500 milliseconds at −30db. Note, however, that pauses in this experiment were not analysed as an effect of directionality in SI (Mead 2000). Instead, they were compared across the L1 and L2 recordings to get an impression of any disfluencies and hesitations (Tissi 2000; Plevoets and Defrancq 2018; Setton 1999).

The temporal parameters discussed in the previous two paragraphs are illustrated in Figure 1 below.

Figure 1. Analysis of two-track recordings on Audacity




The spectrograms in a waveform were used for visualisation of the recordings, and the labels S – for individual sentences – and Pause – for intra- and inter-sentence pauses – were used to mark those critical points. Note that the two-track system allowed us to measure the distance between sentence initial points in L1 and L2, or the sentence-to-sentence EVS (see the white stripe in the upper track after the label S3).

**4. Results and analysis**

In our pilot experiment, the temporal parameters of 24 audio recordings were analysed and their transcripts reviewed for a better insight into the quality of individual renditions. In this section, we first present the results for English L1–Slavic L2 interpretation for the three different speeches ranked from the least to the most complex one, and then offer our interpretation.

The measurements were expressed in minutes, seconds and milliseconds, and the calculations were done using a freely accessible time calculator.[8]

Table 2. Baseline (no problem triggers)

| S | English L1 Onset/S | Slavic L2 1 EVS | Slavic L2 2 EVS | Slavic L2 3 EVS |
|---|---|---|---|---|
| 1 | 0:00.00 | 02.404 | 03.785 | 03.136 |
| 2 | 0:12.153 | 02.875 | 04.693 | 03.187 |
| 3 | 0:19.293 | 01.275 | 04.479 | 06.984 |
| 4 | 0:26.933 | 01.247 | 03.973 | 06.922 |
| 5 | 0:40.973 | 01.275 | 02.693 | 07.114 |
| 6 | 0:58.163 | 01.521 | 03.143 | 03.149 |
| 7 | 1:15.643 | 01.912 | 03.223 | 02.15 |
| 8 | 1:26.703 | 01.691 | 03.173 | 05.547 |
| 9 | 1:37.123 | 01.943 | 02.563 | 00.626 |
| 10 | 1:43.613 | 03.111 | 06.242 | 05.221 |
| 11 | 1:52.463 | 01.740 | 04.592 | 05.237 |
| 12 | 2:17.613 | 01.630 | 04.082 | 01.981 |
| EVS ave. | | 1.83 | 3.83 | 4.25 |
| Pauses | 0:26.837 | 0:14.265 | 0:29.603 | 0:02.600 |

In the case of the baseline speech, all three interpreters provided accurate and smooth interpretations, with occasional disfluencies and hesitations heard in the Slavic L2 1 and Slavic L2 3 renditions. Those were identified at sentence transition points, where the interpreters were obviously trying to speed up and reduce the delay so that they could follow the incoming sections better. There is a notable difference in the overall pauses in Slavic L2 3. The audio was reviewed again, and the conclusion is that most pauses were filled with “um” sounds (fillers) and were thus not labelled as actual pauses by Audacity. The pauses in Slavic L2 2 were closest to those of the original, which indicates that the interpreter maintained an even pace throughout the SI.

The EVS was measured in seconds and milliseconds. The differences across the three L2 renditions seem to reflect the

[8] https://datetimecalculator.net/time-calculator.

interpreters' individual styles, since the average is close to the initial EVS in all three cases. As for the EVS in general, it must be carefully analysed in correlation with the quality of rendition, because a longer EVS is sometimes a matter of individual style and sometimes the effect of exported load. That is why in all instances of significant deviations from the initial and average EVS, we reviewed the recordings again. This helped us identify problems in the Slavic L2 3 rendition of sentences 2, 3 and 4, for example, as signalled by the immediately following longer EVS. Indeed, it was found that the interpreter had problems putting the message across in these sentences, maybe because these sentences were very close to the opening of the speech, which is generally seen as a particularly challenging section.

Table 3. Level 1 (three problem triggers, one per critical point)

| S | English L1 Onset/S | Slavic L2 1 EVS | Slavic L2 2 EVS | Slavic L2 3 EVS |
|---|---|---|---|---|
| 1 | 0:00.000 | 01.713 | 02.415 | 01.687 |
| 2 | 0:07.522 | 00.893 | 01.988 | 01.139 |
| 3 | 0:17.189 | 01.36 | 01.551 | 02.770 |
| 4 | 0:32.172 | 02.966 | 03.285 | 06.230 |
| 5 | 0:44.632 | 02.81 | 03.698 | 03.552 |
| 6 | 0:55.512 | 01.05 | 03.378 | 01.113 |
| 7 | 1:02.052 | 00.561 | 02.488 | 0.969 |
| 8 | 1:13.442 | 02.263 | 01.698 | / |
| 9 | 1:23.182 | 01.229 | 03.690 | / |
| 10 | 1:36.742 | 01.145 | 02.568 | / |
| 11 | 1:52.912 | 02.183 | 04.321 | / |
| 12 | 2:03.182 | 04.305 | 03.917 | / |
| 13 | 2:13.932 | 01.898 | 04.117 | / |
| EVS ave. | | 1.67 | 2.8 | 3.0 (to S5) |
| EVS asym. | | 2.16 | 3.66 | 1.11 (S6) |
| Pauses | 0:21.843 | 0:10.238 | 0:25.338 | 0:01.875 |

The longer-than-average EVSs immediately following the sentences with structural asymmetry point to the exported load in Slavic L2 1 and L2 2, whereas Slavic L2 3 lost control after the first sentence, which included an asymmetry. The interpreter tried to make up for lost time but the EVS was getting longer and longer and the interpreter only managed to include some of the key parts of the incoming messages. Analysis of Slavic L2 1 and L2 2 showed a longer-than-average EVS immediately after the asymmetries (2.16 to 1.67 and 3.66 to 2.8, respectively), but also that the former decided not to go back and repair

the initially wrongly assigned aspect, and the latter correctly assigned the aspect in two cases and corrected it later in the third. No post-experiment interviews were conducted to get the interpreters' insights and so we do not know, for example, whether the Slavic L2 1 interpreter was aware of the aspectual asymmetry or whether she just decided not to repair the verb for the sake of maintaining a smooth pace in SI. The more correct interpretation of the verbal phrases by Slavic L2 2 may be due to the longer initial EVS, which allowed her to hear many more of the components relevant to aspectual interpretation.

Table 4. Level 2 (six problem triggers, two per critical point)

| S | Original onset | Slavic L2 1 EVS | Slavic L2 2 EVS | Slavic L2 3 EVS |
|---|---|---|---|---|
| 1 | 0:00.00 | 02.440 | 03.111 | 02.620 |
| 2 | 0:11.874 | 03.736 | 04.112 | 07.928 |
| 3 | 0:27.954 | 01.346 | 03.125 | 05.523 |
| 4 | 0:39.114 | 01.596 | 02.887 | 07.963 |
| 5 | 0:46.986 | 02.350 | 03.70 | 08.12 |
| 6 | 1:03.724 | 00.824 | 04.57 | 04.276 |
| 7 | 1:16.534 | 02.772 | 03.127 | 03.422 |
| 8 | 1:26.934 | 04.980 | 03.849 | 09.88 |
| 9 | 1:32.534 | 04.148 | 03.570 | 16.789 |
| 10 | 1:42.144 | 02.404 | 02.701 | 15.623 |
| 11 | 1:44.814 | 03.313 | 03.97 | 14.821 |
| 12 | 1:59.924 | 01.305 | 03.277 | 03.747 |
| 13 | 2:22.644 | 02.853 | 02.918 | 07.106 |
| 14 | 2:28.514 | 01.243 | 02.90 | / |
| 15 | 2:35.674 | 01.28 | 03.975 | 0:04.14 |
| 16 | 2:39.584 | 02.906 | 03.841 | 0:03.990 |
| EVS ave. | | 2.16 | 3.25 | 5.2 (to S7) |
| EVS asym. | | 3.25 | 3.5 | 6.75 (to S2) |
| Pauses | 0:30.470 | 0:27.103 | 0:27.506 | 0:01.870 |

This speech included three very complex sections, each with one aspectual asymmetry, followed by a composite nominal phrase, a personal name and a four-digit number. The last three are generally considered as problem triggers in SI (see Gile 2009; 2015; Mazza 2001; Meyer 2008; Plevoets and Defrancq 2016; and Shlesinger 2000).

In Slavic L2 1 and 2, we notice a mix of slightly and significantly longer EVSs than the initial one immediately following the problem triggers contained in sentences 1, 2, 7 and 12. Slavic L2 1 included errors in aspect assignment in two cases, corrected one, and made an error in the target number which was part of sentence 12. Slavic L2 2 maintained a steady flow without major hesitations and made one correction of the

assigned aspect. After the initial EVS of 2:62, the remaining EVSs in Slavic L2 3 became extremely long and indicate the interpreter's loss of control over the meaning. This could be the result of stress, knowing that the speech was not being rendered well.

Next we present the results for Slavic L1 into the Slavic L2 and English L2 audio recordings. Note that these recordings were processed not for analysis of the effect of directionality, but for comparison of parameters with the first set. In the case of Slavic L2 2, we hoped it could serve as an example of (near-) shadowing. Slavic L2 2 was selected as the closest to L1 given that they are distinguished primarily by small lexical differences, while Slavic L2 3 differs in both its lexical and structural elements. On the whole, we did not expect any major problems to occur in this part of the experiment because there were no structural asymmetries between L1 and L2. In fact, L1 Montenegrin is either their mother tongue or the language in which they have near mother-tongue competence. The verbal phrases were unambiguous for aspect and the composite nominal phrases had their primary collocates in the initial position, which means there is no need to wait for it until the end of the phrase like in English.

Table 5. Baseline (no problem triggers)

| S | ME L1 onset | Slavic L2 2 EVS | Slavic L2 3 EVS | English L2 EVS |
|---|---|---|---|---|
| 1 | 0:00.000 | 0:01.310 | 0:01.441 | 0:02.360 |
| 2 | 0:16.401 | 0:02.512 | 0:00.309 | 0:02.50 |
| 3 | 0:24.187 | 0:02.615 | 0:01.911 | 0:02.632 |
| 4 | 0:32.981 | 0:02.579 | 0:00.759 | 0:01.479 |
| 5 | 0:46.790 | 0:02.566 | 0:01.300 | 0:03.17 |
| 6 | 1:04.387 | 0:02.264 | 0:00.516 | 0:02.257 |
| 7 | 1:23.981 | 0:02.291 | 0:00.141 | 0:02.122 |
| 8 | 1:34.781 | 0:02.516 | 0:01.131 | 0:02.211 |
| 9 | 1:47.351 | 0:02.19 | 0:01.944 | 0:02.143 |
| 10 | 1:54.079 | 0:02.535 | 0:01.65 | 0:02.573 |
| 11 | 2:03.030 | 0:03.92 | 0:00.869 | 0:02.91 |
| 12 | 2:32.971 | 0:02.481 | 0:01.802 | 0:04.868 |
| EVS ave. | | 2.41 | 1.08 | 2.5 |
| Pauses | 0:20.600 | 0:03.64 | 0:25.546 | 0:09.650 |

The differences in the respective average EVSs in Table 5 may be ascribed more to the individual style, as no significant problems were identified in the three renditions. They all ran smoothly and put the meaning across accurately. As for the pauses, Slavic L2 2 had many of them filled with "um" sounds (fillers) and were thus not labelled as pauses, and the review of English L2 recording showed that the interpreter hesitated in a few instances before she could find the best equivalent in English L2.

Table 6. Level 1 (three problem triggers, one per critical point)

| S | ME L1 onset | Slavic L2 2 EVS | Slavic L2 3 EVS | English L2 |
|---|---|---|---|---|
| 1 | 0:00.000 | 0:02.060 | 0:01.217 | 0:01.560 |
| 2 | 0:07.650 | 0:01.530 | 0:00.70 | 0:01.535 |
| 3 | 0:17.036 | 0:01.21 | 0:00.567 | 0:01.330 |
| 4 | 0:36.741 | 0:01.491 | 0:03.687 | 0:01.793 |
| 5 | 0:49.348 | 0:03.108 | 0:03.520 | 0:03.206 |
| 6 | 1:01.330 | 0:01.618 | 0:04.923 | 0:03.734 |
| 7 | 1:07.633 | 0:01.468 | 0:05.907 | 0:03.39 |
| 8 | 1:19.843 | 0:01.666 | 0:05.69 | 0:01.473 |
| 9 | 1:31.427 | 0:01.683 | 0:06.193 | 0:01.321 |
| 10 | 1:48.350 | 0:01.180 | 0:03.660 | 0:01.329 |
| 11 | 2:06.862 | 0:03.270 | 0:03.617 | 0:01.259 |
| 12 | 2:18.447 | 0:01.672 | 0:02.308 | 0:03.47 |
| 13 | 2:33.382 | 0:01.465 | 0:01.818 | 0:02.671 |
| EVS ave. | | 1.88 | 3.3 | 1.9 |
| EVS asym. | | 1.66 | 4.5 | 2.66 |
| Pauses | 0:17.700 | 0:01.620 | 0:13.460 | 0:02.410 |

The parameters in Table 6 seem to suggest that the identification of sentences 5, 6 and 11 as carrying asymmetries was indeed artificial, since the EVSs before and after those sentences do not differ much at all. For the pauses, again, closest to those in L1 is the Slavic L2 3 rendition, with the other two significantly deviating for the reasons outlined with reference to Table 6 above. These conclusions are made based on a repeated review of both the recordings and the transcripts.

In Table 7, the parameters lead to identical conclusions with respect to both the EVSs and the pauses, with no significant deviations found in the recordings, from sentence 1 through to 16.

Table 7. Level 2 (six problem triggers, two per critical point)

| Original | ME L1 onset | Slavic L2 2 EVS | Slavic L2 3 EVS | English L2 |
|---|---|---|---|---|
| 1 | 0:00.000 | 0:01.535 | 0:01.400 | 0:01.860 |
| 2 | 0:13.140 | 0:01.140 | 0:00.220 | 0:01.199 |
| 3 | 0:32.150 | 0:00.980 | 0:01.250 | 0:01.72 |
| 4 | 0:42.540 | 0:00.757 | 0:01.420 | 0:01.651 |
| 5 | 0:51.000 | 0:01.92 | 0:04.370 | 0:01.810 |
| 6 | 1:05.290 | 0:01.73 | 0:02.451 | 0:01.702 |
| 7 | 1:15.650 | 0:01.181 | 0:05.414 | 0:00.901 |
| 8 | 1:26.162 | 0:00.951 | 0:04.162 | 0:02.220 |
| 9 | 1:32.410 | 0:01.32 | 0:03.114 | 0:01.457 |
| 10 | 1:43.320 | 0:00.911 | 0:02.305 | 0:01.281 |
| 11 | 1:46.290 | 0:00.826 | 0:03.298 | 0:01.304 |
| 12 | 2:01.020 | 0:00.944 | 0:01.797 | 0:01.111 |
| 13 | 2:20.810 | 0:01.76 | 0:03.281 | 0:01.434 |
| 14 | 2:25.370 | 0:01.109 | 0:02.520 | 0:01.170 |
| 15 | 2:33.060 | 0:01.297 | 0:03.80 | 0:01.14 |
| 16 | 2:36.890 | 0:01.126 | 0:02.516 | 0:00.885 |
| EVS ave. | | 1.08 | 2.8 | 1.33 |
| EVS asym. | | 1.03 | 2.0 | 1.5 |
| Pauses | 0:18.100 | 0:00.520 | 0:21.60 | 0:03.200 |

**5. Discussion**

This pilot experimental study was conducted to obtain a limited insight into the effect of structural asymmetries on SI between English and Slavic languages and decide on that basis whether a more comprehensive study is worthwhile. More specifically, the aim was to find out whether the structural asymmetries between these languages will lead to a spillover effect, or exported load, given that the number of complex and overlapping mental processes in SI causes a huge cognitive burden on the interpreter even in the absence of any structural asymmetries, which is why it is often compared to walking on a tightrope (Gile 1999; 2009).

One of the key questions in this discussion is whether it is the entire SI or only certain critical points in SI that are tantamount to walking on

a tightrope. Another question is whether the interpreter can learn how to manage her attentional resources better and cope with the critical points well (see Seeber and Kerzel 2011).

The first set of 12 recordings seems to indicate that the cognitive load increased as the asymmetries and problem triggers became more complex and more numerous. This is shown by smooth and accurate renditions of the baseline speech, with mild variations of EVS throughout the SI. By contrast, the renditions of level-1 and level-2 speeches show varying degrees of problems in SI, with one recording showing clear signs that the cognitive load was beyond saturation levels. More specifically, the interpreter lost track and was able to pick only some elements of the meaning. The EVS in all the recordings was notably higher after the sentences with the problem triggers, especially those with double triggers in level-2 speeches, which proves that the load is close to saturation levels at those critical points only. Of the two interpreters who managed problem triggers better, one seems to have had the benefit of a longer initial EVS, which allowed her a better grasp of most aspect-defining components. The other one maintained a fairly good quality throughout the SI at the expense of aspect assignment. Namely, this interpreter probably gave priority to a smooth rendition over precision in aspectual assignment.

As expected, the processing of the second set of 12 recordings, where the L1 speeches included almost no structural asymmetries, resulted in parameters that are very similar to those of the baseline speech in the first set. Also, there are no major differences between the three speeches in the second set either. This is shown by the absence of deviations in EVS throughout the SI, and a smooth and complete rendition of the L1 speeches.

## 6. Conclusion

In conclusion, although the interpreters differed in their individual styles and overall quality of their renditions, it is clear that the cognitive load in SI increases with an increase in the number of structural asymmetries and other problem triggers. This means that the *universalist* position does not hold true. At the same time, our study included some excellent renditions, which indicates that the cognitive load can be managed and that it gets close to saturation levels at certain critical points only.

As for our hypotheses, hypothesis 1 is partly confirmed in our experiment since the temporal parameters seem to suggest that a different Slavic language than the one that we expected could constitute

a perfect language pair for (near-) shadowing. Whichever the right pair, the parameters for both show that interpreting carries a much higher load than shadowing.

Hypothesis 2 is confirmed, i.e. that SI involving structural asymmetries carries a higher load than SI without such asymmetries. This is shown by the SI of the baseline speech in the first set and all the SI in the second set.

Hypothesis 3 is also confirmed. The largest exported load occurs in those parts of SI that include structural asymmetries alongside other problem triggers because this brings the overall cognitive load very close to saturation levels.

It must be highlighted again that these preliminary conclusions need to be tested on a larger corpus, with more participants, so that we can clearly establish what effect can be ascribed to individual styles or preferences and what to structural asymmetries or other problem triggers in SI. Based on the results of this pilot study, we believe that a more extensive study is worthwhile.

If confirmed, the conclusions could have useful pedagogical implications. First, they could help trainee interpreters for our language pairs raise their awareness of these structural asymmetries. Second, similar input materials could be created so that trainees can have first-hand experience with these triggers. Third, on that basis, coping strategies could be designed and trainees could be trained in managing their attentional resources better and overcoming the critical points in their SI.

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**Works cited:**

Abraham, Werner. "The interdependence of case, aspect, and referentiality in the history of German: the case of the genitive. *Parameters of morphosyntactic change.* Eds Ans van Kemenade and Nigel Vincent. Cambridge: Cambridge University Press (1997): 29-61.

Bartlomiejczyk, Magdalena, and Ewa Gumul. "Disfluencies and directionality in simultaneous interpreting: A corpus study comparing into-B and into-A interpretations from the European Parliament." *Translation &*

*Interpreting* Vol. 16.1 (2024): 38–54 [online:] https://doi.org/10.12807/ti.116201.2024.a03.

Bevilacqua, Lorenzo. "The position of the verb in Germanic languages and simultaneous interpretation." *The Interpreters' Newsletter* 14 (2009): 1–31.

Bulatovic, Vesna. "Thinking for speaking in the right aspect. On whether modern English grammars can do more." *Revista Espanola de Linguistica Aplicada/Spanish Journal of Applied Linguistics* 33:2 (2020): 384-415 [online:] https://doi.org/e-issn 2254-6774.

Bulatovic, Vesna. "Aspect semantics and ESL article use." *International Review of Applied Linguistics in Language Teaching (IRAL)* 60(2) (2022): 491–521 [online:] https://doi.org/10.1515/iral-2019-0016.

Collard, Camille, Bart Defrancq, and Heike Przybyl. "Interpreting into an SOV Language: Memory and the Position of the Verb: A Corpus-Based Comparative Study of Interpreted and Non-mediated Speech." *Meta: journal des traducteurs* 63.3 (2018): 695–716 [online:] https://doi.org/10.7202/1060169ar.hal-03967894.

Gile, Daniel. "Le modèle d'efforts et l'équilibre d'interprétation en interprétation simultanée." *Meta*: *journal des traducteurs* 30.1 (1985): 44–48 [online:] https://doi. org/10.7202/002893ar.

Gile, Daniel. *Basic Concepts and Models for Interpreter and Translator Training*. Amsterdam: John Benjamins (1995).

Gile, Daniel. "Testing the Effort Models' Tightrope Hypothesis in Simultaneous Interpreting – A Contribution." *Hermes* 23 (1999): 153–172, [online:] https://doi.org/10.7146/hjlcb.v12i23.25553.

Gile, Daniel. "Local cognitive load in simultaneous interpreting and its implications for empirical research." *Forum* 6 (2008): 59–77.

Gile, Daniel. "The Effort Models and Gravitational Model. Clarifications and Update. Version with Updates on the Social Situatedness of the EMs and Risk Assessment" (2017): [online:] http://www.cirinandgile.com/powerpoint-The-Effort-Models-and-Gravitationa-Model-Clarifications-and-update.pdf - 10.12.2017.

Gumul, Ewa. *Explicitation in simultaneous interpreting: a study into explicitating behaviour of trainee interpreters*. Katowice: Wydawnictwo Uniwersytetu Śląskiego (2017).

Hyönä, Jukka, Jorma Tommola, and Anna-Mari Alaja. "Pupil dilation as a measure of processing load in simultaneous interpreting and other language tasks." *The Quarterly Journal of Experimental Psychology* 48A (1995): 598–612.

Kabakčiev, Krasimir. "On the History of Compositional Aspect: Vicissitudes, Issues, Prospects." *Athens Journal of Philology* 6.3 (2019): 201–224 [online:] https:// doi.org/10.30958/ajp.6-3-4.

Kabakčiev, Krasimir. *Aspect in English: A Common-Sense View of the Interplay between Verbal and Nominal Referents.* Dordrecht: Kluwer (2000) [online:] https://doi.org/10.1007/978-94-015-9355-7.

Kabakčiev, Krasimir, and Desislava Dimitrova (2023) "Hearer's Real-Time Aspect Recognition in English as a Compositional-Aspect Language vis-à-vis Aspect Recognition in Verbal-Aspect Languages." Belgrade English Language and Literature Studies Vol. 15 (2023): 13–32 [online:] https://doi.org/10.18485/bells.2023.15.1.

Kim, Hye-Rim. "Linguistic Characteristics and Interpretation Strategy Based on EVS Analysis of Korean-Chinese, Korean-Japanese Interpretation." *Meta* 504 (2005) [online:] https://doi.org/10.7202/019846ar.

Lederer, Marianne*. La traduction simultanée – expérience et théorie.* Paris: Minard Lettres Modernes (1981).

Mazza, Cristina. "Numbers in Simultaneous Interpretation." *The Interpreters' Newsletter* 11. Trieste: EUT Edizioni Università di Trieste (2001): 87–104.

Mead, Peter. "Control of Pauses by Trainee Interpreters in Their A and B Languages." *The Interpreters' Newsletter* 10 (2000): 89–102.

Meyer, Bernd. "Interpreting Proper Names: Different Interventions in Simultaneous and Consecutive Interpreting?" *Trans-kom* 1.1 (2008): 105–122.

Pavlović, Nataša. "Directionality in Translation and Interpreting Practice. Report on a Questionnaire Survey in Croatia." *Forum* 5.2 (2007): 79–99.

Parczynski. Martin, Ray Jackendoff, and Gina Kuperberg "When events change their nature: the neurocognitive mechanisms underlying aspectual coercion." *Cognitive Neuroscience* 26.9 (2014): 1905–17 [online:] https://doi.org/10.1162/jocn_a_00638

Pellegrino, François, Christophe Coupé and Egidio Marsico. "Across-Language Perspective on Speech Information Rate." *Language* 87.3 (2011): 539–558 [online:] https://doi.org/10.1353/lan.2011.0057.

Plevoets, Koen, and Bart Defrancq. "The cognitive load of interpreters in the European Parliament. A corpus-based study of predictors for the disfluency *uh(m)*." *Interpreting* 20.1 (2018): 1–28 [online:] https://doi.org/10.1075/intp.00001.ple 2018.

Plevoets, Koen, and Bart Defrancq. "The effect of informational load on disfluencies in interpreting: A corpus-based regression analysis." *Translation and Interpreting Studies* 11.2 (2016): 202–224.

Riccardi, Alessandra, and David Clyde Snelling. "Sintassi tedesca: vero a falso problema per l'interpretazione?" *Nuovi orientamenti negli studi sull'interpretazion., S.E.R.T., 6.* A cura di L. Gran e A. Riccardi, SSLMIT, Trieste (1996): 148–164.

Riccardi, Alessandra. "Interpretazione simultanea: strategie generali e specifiche." *Interpretazione Simultanea e Consecutiva: Problemi teorici e metodologie didattiche*. Eds. Caterina Falbo, Mariachiara Russo and Francesco Straniero Sergio. Milano: Hoepli (1999): 161–173.

Seeber, Kilian G, and Dirk Kerzel. "Cognitive load in simultaneous interpreting: Model meets Data." *International Journal of Bilingualism* 16.2 (2011): 228–242.

Seleskovitch, Danica. "Les anticipations dans la compréhension." *Interpréter pour traduire*. Eds. Danica Seleskovitch and Marianne Lederer. Paris: Didier (1984): 273–283.

Setton, Robin. *Simultaneous Interpretation. A cognitive-pragmatic analysis*, Amsterdam-Philadelphia: John Benjamins Publishing Company (1999).

Shlesinger, Miriam. *Strategic Allocation of Working Memory and Other Attentional Resources in Simultaneous Interpreting.* Unpublished doctoral dissertation, Ramat-Gan: Bar-Ilan University (2000).

Tissi, Benedetta. "Silent Pauses and Disfluencies in Simultaneous Interpretation: A Descriptive Analysis." *The Interpreters' Newsletter*. 10.4 (2000): 103–127.

Tommola, Jorma, and Pekka Niemi. "Mental load in simultaneous interpreting: An on-line pilot study." *Nordic research in text linguistics and discourse analysis.* Ed. Lars Sigfred Evensen, Trondheim: Tapir (1986): 171–184.

Tommola Jorma, and Jukka Hyönä. "Mental load in Listening, Speech Shadowing and Simultaneous Interpreting: A Pupillometric Study." Paper presented at the Meeting of the World Congress of Applied Linguistics, Thessaloniki, Greece, April 15–21, 1990.

Vendler, Zeno. "Verbs and times." *Philosophical Review* 56 (1957): 143/160.

Verkuyl, Henk. *On the compositional nature of aspects.* Dordrecht: Reidel (1972).

Verkuyl, Henk. "Aspectual classes and aspectual composition." *Linguistics and Philosophy* 12 (1989): 39–94.

## STRUKTURNA ASIMETRIJA I KOGNITIVNO OPTEREĆENJE U SP IZMEĐU ENGLESKOG I SLOVENSKIH JEZIKA - PILOT STUDIJA

Značajan dio istraživanja u oblasti simultanog prevođenja ('SP') od početka do današnjeg dana nadahnula je žestoka debata između dvije škole mišljenja. Jedna tvrdi da strukturne asimetrije između dva jezika ne utiču na SP budući da se prevodi značenje, a ne strukture. Druga tvrdi da razlike među jezicima dovode do dodatnih teškoća u procesuiranju poruke i do većeg kognitivnog opterećenja tokom SP. Brojni eksperimenti sprovedeni u prilog ove druge škole uglavnom su rađeni na germanskim i romanskim jezicima. Ovo pilot istraživanje ima za cilj da ispita uticaj morfosintaksičke asimetrije između engleskog, germanskog jezika, i tri slovenska jezika, crnogorskog, bosanskog i ruskog, na ukupno kognitivno opterećenje u SP. Primjeri asimetrije izabrani za ovaj eksperiment tiču se prvenstveno aspekta, ali i drugih mogućih teškoća, kao što su složene imenske fraze, lična imena i brojevi. Ulazni govori i izlazni audio snimci profesionalnih prevodilaca analiziraju se istovremeno uz pomoć *Audacity*, aplikacije za digitalnu obradu i snimanje. Uvidi dobijeni na taj način upotpunjuju se direktnim pregledom audio snimaka i njihovih prepisa. Rezultati ukazuju na pozitivnu korelaciju između slučajeva morfosintaksičke asimetrije i

kognitivnog opterećenja u SP između engleskog i tri slovenska jezika. Pilot studija sugeriše kakve opsežnije buduće studije bi mogle biti od koristi i prezentuje zapažanja o teškoćama u procesuiranju poruka i kontroli pažnje tokom SP, kao i moguće pedagoške implikacije.

**Ključne riječi:** simultano prevođenje ('SP'), kognitivno opterećenje, morfo-sintastička asimetrija, Audacity, obuka iz SP.