http://dx.doi.org/10.15749/jts.2021.22.2.008

번역학연구
2021 여름호 제22권2호

Effective Note-taking in Consecutive Interpreting Training: An Initial Analysis of Language Choice Using Working Memory

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1. Introduction

Consecutive interpreting (CI) is a mode of conference interpreting that often incorporates a note-taking element that helps with the eventual performance of the target language (TL). The myriad of cognitive processes that occur between listening to the source language (SL) and producing the target language (TL) are debated in current studies and leave room for arguing for strategies that encourage a more efficient production of the target language. For this study, the authors focus on language choice for note-taking in CI, as this topic is often disputed between major academic figures in the field and is considered vital to pedagogy.

When discussing note-taking during CI, opinions vary and shift over time

as new cognitive theories or practices evolve. Early writings, often without the support of cognitive theories, prescribed the language for note-taking. Rozan (1956), while not taking a hard stance, preferred the use of the TL (2). This same view was echoed by Roderick Jones nearly a half century later (1998/2002). Some authors cautiously skirt around the debate by advising the interpreter to choose the language they are most comfortable with (Gillies 2017: 19). Other authors, under the influence of working memory models, offer a more nuanced recommendation that factors in the ability level of the interpreter (Gile 2009: 189) and the A-language structure and writing system (Mizuno 2017: 9).

Even today, there is no consensus for how notes should be taken or in what language. More academics are moving towards the inclusion of cognitive psychology to help fully understand the processes and resources involved with every step of interpreting. Despite the recent developments, interpreting research, which involves cognitive processes, seems deficient considering its significant role in interpreting. To help fill the gap, the authors draw on Baddeley's working memory model, which is one of the most prominent cognitive models, though less known in interpreting studies. The authors rely on Baddeley's working memory model alongside several practical tests to better understand the role of TL and SL in note-taking during consecutive interpreting.

The hypothesis of the current study, based on the theories of working memory, is that note-taking in the SL allows for a more comprehensive and accurate production. There are various reasons for this: namely, the strategic division of cognitive resources and the less divided focus of attention allow for a more efficient working memory. Consecutive interpreting will always remain an intense cognitive activity, but the strategic management of cognitive resources helps alleviate some of the demands in a way that increases performance and avoids capacity saturation. The authors tested graduate students enrolled in an interpreting and translation program in order to

determine the effects of TL and SL note-taking in regard to their analysis skills of the text and their final TL production.

2. Approaches of Note-taking Language

The authors have discussed language choice in note-taking focusing on the debate over SL versus TL so far, but they are also aware that there are other variables in contest. Although the SL/TL oppositions are the oldest and most dominant discussion in note-taking in consecutive interpreting (works that favor SL: Herbert 1952; Rozan 1956; Ilg 1988; Gile 1995; Alexieva 1993; Lee 2017, those that prefer TL: Mikkelson 1983; Seleskovitch and Lederer 1989; Jones 1998/2002, and those upholding a mixture of both SL and TL: Seleskovitch 1975; Kirch-hoff 1979; Andres 2002), the A or B language distinction and the nature of the languages, to be explained below, involved in interpreting are two more notable variations (Dam 2004; Szabó 2006, c.f. Lee 2017). In her experiment with professional interpreters, Dam argues for the A or B language distinction rather than the SL or TL variation (13). She cites as reasons for the distinction the subjects' choice of language coming from comfort and speed when writing in the A language. In particular, this choice tended to be apparent when the A language was the source language.[1] The nature of language variation is suggested by Szabó, who looked at the Hungarian and English language combination. In the test, the students' A language (Hungarian) was less preferred than their B language (English) as their choice for note-taking language was based on the character of their A-language. The author argues that Hungarian words are very long and difficult to abbreviate while English is "morphologically less complex and is

1) This implies that Dam's argument is not completely free from the SL v TL debate (Szabó 2006: 140).

more economical" to write (2006: 142). This makes the trainees' B language more attractive to use than their A language, irrespective of whether it is the SL or the TL.

In the present study, the SL/TL variation is a main criterion, studied through the lens of working memory, around which data is analyzed for the most part of the study (see 5. Results and Discussion for details). In addition, the two variables above (A or B language distinction and the nature of the languages), appears to be relevant to some extent. The A or B language distinction is pertinent in the sense that preference of writing in the A language is also noted among some participants. Interestingly, this distinction seems to be related to the characteristics of language variables. This is because reasons for choosing an A language/TL rather than an SL in the B-A direction includes characteristics of the language in question and citing orthographical issues of writing in the B language (in this case English). Albeit different in degree, these three variables are all examined in the discussion section below.

3. The Effort Model towards Working Memory

There is no sure way to precisely quantify the amount of cognitive resources demanded during consecutive interpreting. The authors for this study, co-opting the Effort Model from Gile (2009: 157), utilize working memory as a model for detailing all the processes that require cognitive resources. Gile's Effort Model provides a discursive framework, that is both familiar to practitioners and neatly organized as to be easily followed. Gile distinguishes three areas of effort during interpreting: the listening and analysis effort, the production effort, and the memory effort. These three efforts contain numerous processes to perform both simultaneously and consecutively, which requires a practitioner to efficiently manage cognitive resources.

3.1 Gile's Effort Model

Gile divided CI into two discrete phases that follow the same steps an interpreter takes when listening in the SL and then producing in the TL. The first phase, with the heavier cognitive load (Gile 2009: 176), contains the listening and analysis effort (L), short-term memory operations (M), coordination (C), and the more mechanical note-taking (N). Phase two is less intensive, containing remembering (Rem), note-reading (Read), and production (P) (175-176). These processes, in both phases, become part of a system of equations meant to highlight the total required resources and the total resources available. Gile's argument posits that when the total available capacity is exceeded, then the production quality of the interpreting suffers. While this is clear and useful, an obvious equation to help avoid capacity saturation would be to try and balance the resources in the two phases as much as possible (L + C + M + N ≈ Rem + Read + P). Because of the specific requirements and static placement of the individual processes, the authors are aware that a true balance is not feasible or even likely, but there are some strategies an interpreter can use to help delay or move cognitive processes. For instance, the interpreter can utilize a note-taking strategy based on language choice, so that there is more parity in the two phases (for details see 3.2. Incorporating Working Memory into Note-taking Language).

Just by focusing on the listening and analysis effort, the authors found that the cognitive load, though variable depending on the experience and knowledge of the interpreter, required much of the interpreter's resources. Gillies (2017) details the work the interpreter does: "[The interpreter] will not only be listening to the words and content as the normal listener does, but [they] will also be dissecting the speech in [their] head, and analyzing its structure and progression to find out what fits with what and why" (20). Gillies shows that there is considerable effort in listening to the utterance in the SL and then understanding the message for the meaning and for its role in the speech. This

requires the focus of attention to be centered on the utterance. While the interpreter is focused, they must also perform several other cognitive tasks, not least of which is an analysis of the utterance for main points. As is suggested by many theorists and practitioners (e.g. Jones 1998/2002: 41; Gile 2009), the interpreter takes note of the main points rather than scrutinize and interpret every word faithfully. Determining the main ideas requires the interpreter to understand the language, but also to have knowledge of the actual content of the speech. Poor content knowledge can force the interpreter to use more cognitive resources for analysis than is desirable, which in turn could lead to cognitive saturation and a degradation of the interpreting. On top of this, the interpreter usually takes the main points and chunks them and holds them in memory until they are ready to be used (Mizuno 2017: 3). During the listening and analysis, the interpreter is also expected to retain in short term memory (STM) chunks of meaning or otherwise conserve their STM load and selectively commit these chunks on their paper notepad in the form of a skeleton outline of the speech (Jones 1998/2002: 41). The notepad becomes more important if you consider Cowan's (2005) thesis that the "focus of attention serves as one of several storage devices; in which case, making the central executive processing task more difficult might well interfere with storage" (52). It is no secret that interpreting is a highly demanding cognitive task, and any relief that is available should be taken in order to ensure STM storage, which will help with accuracy in the production.

3.2 Incorporating Working Memory into Note-taking Language

The notes relieve the interpreter's cognitive resources and help to avoid a capacity limit. While this relief management is welcome, it can also raise further questions related to working memory. Baddeley (2007) provided that there were limited resources divided among the different cognitive processes (190). Factors such as experience and knowledge lead to automaticity and

assist in lessening the cognitive load and allow more attention to be focused elsewhere. Automaticity, combined with STM and the use of a paper notepad, grants a more efficient focus of attention on listening and analysis, and though this eases the load on the interpreter, it is still possible that the interpreter can exceed capacity (Gile 2009: 159). The notepad is the nexus of all the processes; the place where resources are conserved.

The working memory model (Baddeley 2007; Cowan 2005) provides a guide for easing the capacity and potentially avoiding saturation. The cognitive resources vary for each interpreter as well as how efficiently they are able to process incoming information. The model serves as a framework for how to manage cognitive resources to best complete a given task. This paper focuses on the aspect of working memory that involves "the temporary maintenance and process of information in the support of cognition and action" (Baddeley 2021: 10). As such, this paper will utilize the executive control, which is the conscious part of working memory. The executive control functions to delegate the division of resources in a task. The conscious decision, made by the executive control, should use the best practice for finding parity between the two phases of interpreting.

Using working memory in conjunction with Gile's Effort Model, reveals possibilities for diverting resources between phases to avoid saturation. In Gile's first phase of interpreting, it is clear that listening and analysis (L) is the process that requires the majority of the cognitive resources. It is also clear that (L) cannot be delayed or moved to the second phase in any way. Note-taking, on the other hand, provides an opportunity for the interpreter to make a choice, whether to write in the TL or the SL. Taking notes in the TL may be comfortable for the interpreter and lower any affective filters, though it can cause efficiency problems with regards to language switching, or task switching. Baddeley (2007) suggests that "switching may be attentionally demanding" (132), which in turn utilizes more of the resource pool and increases the chance of exceeding capacity. This becomes important as it is not

an automatic process, though switching does require attention as the interpreter decides which TL word to use. The costs of comfort weighed against the costs of task switching and lexical retrieval efficiency are difficult to determine because each interpreter is different. Factors to consider are the orthography and syntax of the SL compared to the TL, the experience and knowledge of the interpreter, various physical contexts of the utterance, and physical stimuli perceived by the interpreter. While there are variables, the cost of task switching should be a calculation made by the interpreter. There is also the matter of making a decision for choosing the appropriate words for interpreting chunks into the TL. This can cause distraction from listening and analysis or otherwise overload the interpreter by dividing or switching the focus of attention to cover too many tasks at once.

The focus of attention is taxed in phase one as it is divided among several different tasks either simultaneously or through switching. A closer analysis of TL note-taking involves further processes not included in SL note-taking. For instance, the trainee is having to switch languages frequently. Though there are strategies that can limit the cognitive load of bilingual language control, resource costs of mixing between the two languages will still be present (Liu, et. al. 2004). Should the interpreter instead favor taking notes in the SL, then cross language inhibition will be required to limit interference. Inhibition too requires some attentional resources, but this control facilitates the working memory tasks by helping to block irrelevant and distracting information. The focus is instead directed to listening and analysis rather than bilingual switching burdened with mixing costs.

4. Methodology

4.1 Participants

A total of 16 graduate students from a Translation and Interpreting program (T&I) in Korea participated in the study. The T&I program is designed for students with full-time jobs. The students' progress in the program varied between first semester (8 participants) and second semester and above[2] (8 participants). All students have Korean as their A language and English as their B language. A couple of participants had been excluded from the final results due to an inability to read their notes written in a language neither author knew or they were extreme outliers. One student had Chinese as the A language and had taken notes using Chinese characters. The authors had dropped the Chinese student's results from the study as they were unable to accurately decode her notes. The study was voluntary and no monetary or academic compensation was awarded.

4.2 Procedure

Due to current Covid-19 restrictions, all tests were conducted online. The participants were given two tests through Skype. The moderator played a recorded speech in English and the students took notes and then recorded their interpreting into Korean. The students then scanned their notes and emailed the notes and their recordings to the authors. The process was copied for a second speech, which was in Korean and interpreted into English. After each speech, the students were given a short questionnaire that tested their memory of the speech and also solicited specific cognitive responses from the participants. The memory test was not mentioned prior to the test and the subjects had no reason to retain information from the text. This prevented subjects from

2) These students range from the second semester to the fifth semester.

actively rehearsing the text for recall. The students were allowed to take notes in any language according to their preference and the entirety of the two tests took approximately one-hour.

The topic for the English text was an article from the 2010s on French unemployment.[3] It was a topic unfamiliar to all of the students as it was far removed culturally and temporally from the students' experience. This topic was chosen to avoid long term memory retrieval to aid the students in their interpreting. The authors were more interested in how well the students would perform with their production based on which language they took notes in rather than their ability to retrieve information to guide them. With the second round of tests, the authors were able to make a comparison between first semester and the further along students as well as a small set within the first semester students.

The results were then correlated to the language the subject chose during note-taking. The notes were broken down and turned into raw data by systematically numbering the L-units (L-units are any orthographic markings that convey meaning, which excludes non-language based units like symbols, Dam 2004; Lee 2017) and symbolic units. The L-units were further divided into SL and TL and Korean and English. The authors then transcribed the interpreting and graded the production for accuracy and completeness.

The Korean to English text had approximately half the amount of semantic units as the English to Korean text. This was a deliberate choice that allowed the authors to place a greater focus on English and B language note-taking. This greater focus on the English to Korean text is detailed later in section 5. Result and Discussion. The semantic units were determined through the use of ideational meaning as a part of Systemic Functional Linguistics (SFL): a variety of functional linguistics that focuses on the use of language. In SFL,

3) The English source text can be retrieved from http://www.speechpool.net/en/79-speeches-uk/2410-unemployment-in-france. It was modified for the purpose of this study.

meaning is of paramount importance which is presented as being threefold. One of the three is ideational meaning that governs one's experience of the world (who did what where when, etc.) and the connection between different experiences of the world (Halliday and Matthiessen 2004 Chapter 5). Because SFL's ideational meaning is instrumental to examining meaning units, the authors employ it for analyzing meaning error in students' interpreting. Each unit in a clause and the connector between clauses are counted as semantic units for this paper. For example, the sentence "In February 2017, the unemployment in the EU as a whole was 8 percent but the numbers in France was much higher" has eight semantic units and each of the units are analyzed as shown in the example below. (The notation '||' is a clause breaker and one function label within a set of square brackets is one semantic unit).

> In February 2017 [Circumstance], the unemployment rates in the EU as a whole [Participant 1] was [Process] 8 percent [Participant 2] || but [Linker] the numbers in France [Participant 1] was [Process] much higher [Participant 2].

5. Results and Discussion

The authors performed two rounds of tests. The first round was dismissed as the students were highly influenced by the teaching of their trainer to take notes in the target language (TL), which is their A language in the direction of English to Korean interpreting. The trainer gave a slight preference to TL language notes according to suggestions from her own textbooks and her own training (Jones 1998/2002: 61). Students, influenced by their training, followed their trainer and took notes in TL with the occasional use of the source language (SL) of English when they could not immediately think of a Korean translation. Many of their comments on the post-test survey regarding

note-taking in the language they chose showed this to be an accurate assumption. Due to this influence, the authors modified their second round of tests to account for the student's training and preferences.

5.1 Students' Note-taking Preference

The second round of tests proved to have a greater variety of note-taking in SL and TL. With a more deliberate approach to allowing the students to choose their language for notes, the authors were careful to shy away from showing preference for taking notes in either the TL or the SL. For the English to Korean text, the second semester and beyond students unanimously took notes in the TL of Korean, while the first semester students mostly (5 out of 8) took notes in the SL of English. For the Korean to English text, all students with the exception of one, took notes in Korean, their A language, which also happens to be the SL. The one student that took notes in English, did that for both tests. As summed up in Table 1, students further along in the program (Group 1) preferred Korean, their A language, irrespective of the language direction, while the new students (Group 2) showed a tendency to take notes in the SL for both texts with a minority using the TL (c.f. Dam 2004).

〈Table 1〉 Note-taking preference

Gr	1								2							
St	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
EK	K	K	K	K	K	K	K	K	K	E	K	E	E	K	E	E
KE	K	K	K	K	K	K	K	K	K	K	K	K	K	K	E	K

5.2 Memory Test and L-units and Shortened L-units

One of the initial tests given to the students was a memory test that proved to be inconclusive in some respects, and helpful in others. The authors expected the memory test to show a clear relation between taking notes in the

SL and retention of the text in their memory. While Group 1 performed better on the memory test (see Table 2), Group 2 performed better on meaning accuracy. The authors posit that one of the reasons for this reversal is that Group 2 relied more on their notes rather than their memory. Group 1, on average, recorded fewer L-units in their notes, showing a tendency to rely on their experience and memory for interpreting, but also had a lower meaning accuracy than Group 2.

〈Table 2〉 Memory test

Gr	1									2								
St	1	2	3	4	5	6	7	8	avg.	9	10	11	12	13	14	15	16	avg.
E K (7)	7	5	5	4	7	5	6	5	5.5 (78.6%)	5	6	6	4	4	3	4	4	4.5 (64.3%)
K E (6)	6	6	6	4	6	6	4	5	5.4 (90%)	6	6	6	6	5	5	6	5	5.6 (93.3%)
									84.3%									78.8%

Because of the homogeneity of Group 1's (the further along students) note taking preferences, the authors instead focused on Group 2 (the first semester students), particularly, the English to Korean direction. The Group 1 students are not automatically dismissed from the study, as they do provide a contrast that is consistent with the findings of working memory. Group 1－having had more experience and training－were able to rely on that training more when taking notes. Consequently, they needed less notes as they could rely on long term memory retrieval to aid them in their translation (Table 3). Group 2, on average, had 13.4% more Language based units (Language units) for the English to Korean text than Group 1. For the Korean to English text, Group 2 had 13% more L-units. Group 2, finding consecutive interpreting a novel experience, compensated their lack of experience and skills by taking down significantly more notes.

A similar contrast is found among Group 2 students. When the numbers are then compared between those that took notes in the Korean (TL) and those that took notes in English (SL), there is a significant difference in quantity (see Table 3). The total average of L-units in Group 2 is 109.4. The average L-Units for notes taken in Korean (Students 9, 11, and 14) is 97.7 and the average for English notes (Students 10, 12, 13, 15 and 16) is 116.4. The difficulty of taking notes in English, something the participants were not trained for or comfortable with, showed they compensated by cautiously writing down more L-units. Considering comparisons between the two groups and among the second group students, the authors suspect that less notes in Group 1 is attributable to not just training but also having to switch the focus of attention and lexical retrieval. The increase of notes did not, however, lend itself to increasing memory of the text. The scores from the memory test of the English text showed a clear advantage for training as Group 1 scored an average of 78.6% while Group 2 averaged 64.3% (Table 2 above). But when the Group 2 scores are broken down into participants who wrote in Korean (TL) versus those who wrote in English (SL), there is not a significant difference. Those that wrote in English scored 62.9% while those that wrote in Korean scored 65.7%. A larger sample size is needed to test this further.

〈Table 3〉 L-units distributed between the groups and tests

		EK			KE		
Gr	St	No. of units	No. of L-units (%)	Dist. of L-units (SL v TL)	No. of units	No. of L-units (%)	Dist. of L-uints (SL v TL)
1	1	109	54	10 v 44	115	84	77 V 7
	2	118	66	20 v 46	156	128	121 V 6 (C*1)
	3	96	50	1 v 49	113	87	83 V 3 (C*1)
	4	67	35	10 v 25	133	107	107 v 0
	5	135	93	20 v 71	143	106	106 v 0

				(C*2)			
	6	88	34	14 v 20	133	99	94 v 5
	7	73	45	16 v 29	133	108	99 v 9
	8	124	71	14 v 57	137	102	93 v 3
	avg.	101	56 (55.4%)	11.9 v 42.4	132.9	102.6 (77.2%)	97.5 v 3.9
2	9	107	81	9 v 72	123	105	91 v 14
	10	130	108	104 v 4	110	93	87 v 6
	11	122	57	21 v 36	132	102	95 v 7
	12	119	75	48 v 27	186	150	137 v 13
	13	160	116	165 v 10	134	109	105 v 4
	14	64	35	2 v 33	111	103	102 v 1
	15	30	14	13 v 1	43	28	8 v 20
	16	143	116	84 v 32	135	117	115 v 2
	avg.	109.4	75.3 (68.8%)	55.8 v 26.9	121.8	109.9 (90.2%)	92.5 v 8.4

*C refers to Chinese characters.

While Group 1 tended to remain devoted to their A language, the group as a whole preferred to use English (SL) for abbreviations in the English to Korean text (6.3 in English compared to 3.6 in Korean) (Table 4). This difference was even greater in Group 2 (8.9 to 2). In the post test self-evaluation, several of the Group 1 students said they preferred taking notes in Korean because the orthography and spelling in English caused them to slow down or have to pause too much. The aversion to English was a practical choice for them, except when they felt the effort to interpret a word into the TL proved too difficult at the time, so they switched to the SL. Because of orthography and spelling issues, the words that may have been difficult or cognitively demanding were then abbreviated to avoid any issues, though most shortened L-units (any form of abbreviation of a word which is opposed to a fully spelt-out one, c.f. Dam, 2004; Lee 2017) applied to country names, organization names, and months. Furthermore, the abbreviations were interpreted correctly eight out of nine times, showing a high accuracy rate. Students used English abbreviations as a way to delay momentary cognitive

demands for a later phase in the interpreting process. This is consistent when looking at shortened L-units in the Korean to English text where the numbers are significantly less. In the English to Korean text, the average total of shortened L-units in both languages for all sixteen participants is 10.4, while the average for the Korean to English text is 3.7 (Table 3). Since Korean is the A language, the students had less need for delaying or circumventing cognitive demands.

〈Table 4〉 A comparison between the distribution of shortened L-units in the SL and the TL

		EK				KE			
Gr	St	No. of units	No. of L-units (%)	Dist. of L-units (SL v TL)	Dist. of shortened L-units (SL v TL)	No. of units	No. of L-units (%)	Dist. of L-units (SL v TL)	Dist. of shortened L-units (SL v TL)
1	1	109	54	10 v 44	9 v 1	115	84	77 v 7	2 v 4
	2	118	66	20 v 46	6 v 0	156	128	121 v 6 (C1)	1 v 2
	3	96	50	1 v 49	1 v 6	113	87	83 v 3 (C1)	0 v 0
	4	67	35	10 v 25	6 v 2	133	107	107 v 0	4 v 0
	5	135	93	20 v 71 (C2)	5 v 1	143	106	106 v 0	0 v 0
	6	88	34	14 v 20	10 v 2	133	99	94 v 5	1 v 1
	7	73	45	16 v 29	4 v 2	133	108	99 v 9	0 v 0
	8	124	71	14 v 57	9 v 15	137	102	93 v 3	5 v 5
	avg	101	56 (55.4 %)	11.9 v 42.4	6.3 v 3. 6	132.9	102.6 (77.2 %)	97.5 v 3.9	1.6 v 1.5
2	9	107	81	9 v 72	4 v 0	123	105	91 v 14	0 v 3
	10	130	108	104 v 4	18 v 0	110	93	87 v 6	1 v 0
	11	122	57	21 v 36	3 v 2	132	102	95 v 7	1 v 2
	12	119	75	48 v 27	21 v 4	186	150	137 v 13	11 v 1
	13	160	116	165 v 10	4 v 0	134	109	105 v 4	0 v 0

	14	64	35	2 v 33	2 v 9	111	103	102 v 1	0 v 0
	15	30	14	13 v 1	12 v 1	43	28	8 v 20	1 v 12
	16	143	116	84 v 32	7 v 0	135	117	115 v 2	2 v 0
	avg	109.4	75.3 (68.8 %)	55.8 v 26.9	8.9 v 2	121.8	109.9 (90.2 %)	92.5 v 8.4	2 v 2.3

5.3 A Correlation between Note-taking Language and Meaning Error

The larger quantity of L-units for Group 2 did equate into greater accuracy of meaning.[4)][5)] Group 1, the second semester and further along students, performed less accurately than the first semester students of Group 2. The rate of Group 1's average meaning error is higher than Group 2, scoring 30% to 25.5% (Table 5). In language directions, the difference is only a small margin of 0.6% on the English to Korean text (34.5% to 33.9%), but it is 8.3% on the Korean to English text (25.3% to 17%) (Table 5). One thing to note here is that both groups showed greater accuracy of meaning when interpreting from an A language to a B language.[6)] When the SL is in the A language, it makes the process easier as the notes were almost exclusively taken in Korean. This is not true of the English to Korean text, which proved to be more difficult for the students by causing a greater amount of meaning errors.

When focusing on Group 2 working from English to Korean, the students

4) Phrases like 'accuracy of meaning' or 'meaning errors' in this paper refer to the message within the spoken test. Minor grammatical errors that do not affect the overall message were not included.'

5) One thing to note is that accuracy of meaning is not an absolute or the only criteria for determining the students' interpreting. There could be other variables including English language competence of the participants. However, there are no first semester students whose English competence is well above the further along students; they even have less experience in using interpreting skills like note-taking.

6) Meaning 'in accuracy of meaning' or 'meaning errors' in this paper refers to the message of the text. Minor grammatical errors that do not affect the overall message were not counted.

that took notes in Korean (Students 9, 11, and 14) performed worse than those who took notes in English (Students 10, 12, 13, 15, 16) (71.8% to 63.1%). This is a small set of samples and there can be a number of reasons affecting this other than what the researchers are proposing. However, the data appears to be consistent with what the authors are proposing, in that taking notes in the SL is helpful for managing cognitive resources and, although with a small difference, more accurate interpreting.

〈Table 5〉 Meaning errors: Group 2 performed slightly better than Group 1

Gr	1									2								
St	1	2	3	4	5	6	7	8	avg	9	10	11	12	13	14	15	16	avg
E K (196*)	42.5	63.5	35	X**	67	77	116	73	67.7 (34.5%)	79	64.5	63	64.5	24	73.5	87.5	75	66.4 (33.9%)
K E (92*)	9.5	21.5	24.5	28	20	24	42.5	16.5	23.3 (25.3%)	12	13	22.5	13	10	11	X**	27.5	15.6 (17%)
Avg									30%									25.5%

*The total number of semantic units

**Their notes were submitted but their recordings failed to be sent in; however, the missing recordings do not greatly affect the particular focus on the English to Korean text in Group 2. For this reason, meaning errors of the two renderings were not counted.

As mentioned, the assumption that taking notes in SL alleviates cognitive strain and leads to less meaning errors occurring during Phase 1 in Gile's Effort Model could be challenged. Possible arguments suggest accuracy could also be associated with Phase 2 and ask how the authors know whether a meaning error originates from Phase 1 or Phase 2. In an attempt to respond to the foreseeable challenge, the authors counted the number of meaning errors originating in either of the two phases of the English-to-Korean text. The result shows that meaning errors that originate from Phase 1 account for 91.5% of total errors and errors originating from Phase 2 account for 8.5% (Table 6). As can be seen in the table, most of the meaning errors came from Phase 1 (over

9 out of 10).

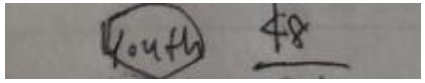
〈Table 6〉 Meaning errors: Meaning errors: Originating from Phase 1 or Phase 2

Gr	1								2								
St	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	avg
P1	100	96.9	91.4	X	85.1	96.1	95.7	98.6	98.7	86.8	94.4	95.3	56.3	98.6	99.4	79.3	91.5%
P2	0	3.1	8.6	X	14.9	3.9	4.3	1.4	1.3	13.2	5.6	4.7	43.7	1.4	0.6	20.7	8.5%

Types of meaning errors originating from Phase 1 are twofold: one is omission and the other has to do with listening and analysis of the source text. Meaning errors from Phase 2 were found to be omission only. Some examples are presented below.

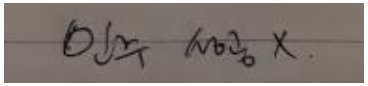
Phase 1 Omission: the utterance "... a horrifying figure for youth unemployment of 48% ..." was interpreted as "youth unemployment of 48%". This rendering reflected the note taken in Figure 1, which missed the nominal group "a horrifying figure". The word "unemployment" was not taken down but seems to have been retrieved from the context because it was a speech on unemployment.

Figure 1 Phase 1: Omission



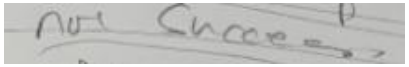
Phase 1 Listening/analysis: Notes were taken incorrectly due to a listening comprehension/analysis issue. The clause was "The demographics are not in France's favor", but the nominal group "the demographics" was written as "민주(democracy)" in the note and "in France's favor" as "성공(success)" (see Figure 2).

Figure 2 Phase 1: Listening/analysis



Phase 2 Omission: The clause "(He) has not been successful" was written down (Figure 3) but was not read out, seemingly due to inability to remember how it fitted into the text around it.

Figure 3 Phase 2: Omission



6. Conclusions and Future Studies

The results from the interpreting and notes show that there is a correlation between SL notes and meaning accuracy. The connections made by the authors are based on a small sample set, which will need to be further expanded by testing incoming students. A further exploration of meaning error distribution should prove insightful into how SL note-taking helps with cognitive overload and interpreting accuracy. The authors found the area of meaning accuracy a particularly salient element in sorting their evidence, especially as this is an element often either overlooked or omitted from many working memory studies in interpreting and translation.

Mentioned earlier, the authors administered a short memory test to the participants. The test proved to be too difficult in its construction and did not accurately perform in its intended purpose. The researchers should have tested prior knowledge of the participants to see how much they were able to rely on knowledge and how much prior knowledge would improve their accuracy as well as how much it determined the amount of notes they take. As is, it did

show that the second semester and beyond students (Group 1) were able to remember more from the text, revealing less cognitive demand on them while interpreting. Their STM performed more efficiently as they were able to store some of the information due to better automaticity and less resources were required for lexical retrieval and language switching during all phases of the interpreting. Automaticity in the further along students required less cognitive effort in both phases of Gile's Effort Model. Despite automaticity in the further along students, however, the test results showed that they scored lower in accuracy of meaning than the more inexperienced students. One of the possible reasons is that they took notes in the TL, which required more cognitive resources in switching languages. In future studies, it would prove interesting to test the further along students who differ in their language preference in note-taking.

Future studies in orthography and cognitive resources is worth revisiting in detail. There is scant material on the cognitive demands of switching orthographies from such disparate writing systems as the English alphabet to the Korean Hangul. The authors believe that switching between writing systems requires extra resources and may have hindered the participants and dissuaded them from taking notes in English. The extra demand on cognitive resources may be enough to affect the comfort levels of the participants. The connection between comfort, resources, and accuracy should be examined in future studies.

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[Abstract]

Effective Note-taking in Consecutive Interpreting Training: An Initial Analysis of Language Choice Using Working Memory

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This study looks to investigate the cognitive resources used during the note-taking task for consecutive interpreting. The authors posit that taking notes in the source language (SL) can help avoid cognitive saturation than notes taken in the target language (TL). they use Gile's Effort Model of interpreting as a framework for discussing cognitive processes in a way that is familiar for researchers in the field. Working memory (Baddeley 2007; Cowan 2005) provides the theoretical model used for approximating the cognitive processes and resources, and when applied, suggests a shift towards note-taking in the SL. The study includes sixteen graduate students in an interpreting program taking two rounds of tests in consecutive interpreting. The data includes interpreting recordings, their notes, and a memory test. Analysis showed that some gains in accuracy were made when a student took notes in the SL as opposed to the TL. The authors' account for this gain as relieving the interpreter of cognitive overload by displacing some of the cognitive resources to the second phase.

▸ Key Words: consecutive interpreting, working memory, note-taking, cognitive load, Effort Model
▸ 주제어: 순차 통역, 작업 기억, 노트 테이킹, 인지 부하, 노력 모델

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논문투고일: 2021년 5월 9일
심사완료일: 2021년 5월 28일
게재확정일: 2021년 6월 24일