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Impact of Directionality on Student Interpreters' Performance in Consecutive Interpreting*

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***Abstract*—Studies showed that interpreters might differ in performance when it comes to directionality. Nevertheless, limited research has been undertaken concerning the impact of directionality on student interpreters' performance in consecutive interpreting (CI), a type of interpreting categorised by the working mode. This study aims to investigate the relationship between directionality and performance by adopting a quantitative approach. Four student interpreters from a Chinese university were selected as samples with a homogeneity sampling method. The participants used Chinese as their first language (L1, or A language) and English as a second language (L2, or B language). Analytic rating scales were combined with propositional analysis to assign scores for different aspects of accuracy and completeness in the product of the CI test by student interpreters. To determine the impact of directionality on performance, paired samples t-test was adopted in the current study by testing the significance of the difference between two mean scores of the CI test. The results showed that directionality affected the performance of student interpreters. Overall, the participants performed better in the into-B direction than in the into-A direction. Thus, it is recommended that teachers pay more attention to training listening comprehension ability of the source text in into-A direction.**

***Index Terms*—consecutive interpreting, directionality, English-Chinese language pair, performance, student interpreters**

I. Introduction

Directionality, also known as the direction of translation, refers to "whether translation occurs into or out of the translator's native language (or the language of habitual use)" (Shuttleworth & Cowie, 2014, p. 42). It is one of the oldest and the most controversial problems in interpreting research, as shown by a few related works (EMCI, 2002; Godijns & Hinderdael, 2005; Kelly et al., 2003). As a recurring topic in translation and interpreting fields (Gile, 2005), directionality has been one of the factors taken into consideration by researchers in translation and interpreting.

The classification of directionality by the International Association of Conference Interpreters (AIIC) is A-language versus B-language. A-language refers to one's native language, while B-language, known as passive language, is one's non-native language. Although it is widely accepted that into-A (L2 to L1) interpreting produces higher quality (Seleskovitch & Lederer, 1989), into-B (L1 to L2) interpreting is thought to be "cognitively more economical for the interpreter to have fewer options to select" (Denissenko, 1989, p. 157), and interpreting from the A-language to B-language has appeared in certain cases to provide more satisfying output (Tommola & Helevä, 1998). Despite this, the prejudice against into-B interpreting still dominates interpreter training (Nicodemus & Emmorey, 2015), and there is a gap between interpreter training and market needs.

"Consecutive interpreting" (CI) as a term began to be used after the 1920s (Baigorri-Jalón, 2014). It is frequently used in opposition to simultaneous interpreting (SI) by classifying interpreting based on the working mode. CI is different from SI in two aspects, mainly: for one thing, CI involves note-taking in Phase I; for another, CI needs an interpreter's note-reading in Phase II (Gile, 2009). Therefore, many CI studies focused on note-taking, particularly note-taking skills and techniques (Lung, 1999; Campos & Salinas, 2016; Chen, 2017), language choice in note-taking (Dam, 2004; Szabó, 2006; González, 2012), and the relationship between working memory and note-taking (Zhang, 2012; Amini et al., 2020).

The impact of directionality on interpreting has been a heated topic, and the debate over into-A and into-B interpreting never ends. As interpreting in both directions of CI is regarded necessary, many studies on directionality

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have focused on simultaneous interpreting (SI), particularly strategies (Bartłomiejczyk, 2006), cognitive aspects (Gile, 2005), its impact (Chang & Schallert, 2007), and students' self-assessment (Han & Riazi, 2018). Besides, directionality in signed language interpreting has also received wide attention. For example, Nicodemus and Emmorey (2015) compared novices with experts in American Signed Language (ASL)-English interpreting and found that novices performed better when interpreting into the first language (L1, English) than into a second language (L2, ASL) in terms of accuracy; whereas the experts performed equally well in two directions. In CI, directionality was initially found to affect fluency in that both novice and professional interpreters were more fluent in into-A interpreting (Mead, 2005). It was also found to influence the accuracy of English-Thai consecutive interpretation of quantity numbers among beginner-level student interpreters (Chanprapun, 2020). The interpreting direction was also found to influence the cognitive process in Phase I and the product in Phase II of consecutive interpreting (Chen, 2020).

Based on the literature mentioned above, only a few studies have investigated the impact of directionality on performance among student interpreters in the product of CI. Thus, this study intends to examine the significance of the difference between the two directions of CI among student interpreters between Chinese and English by addressing the following research questions:

a) Is there any significant difference between into-A and into-B mean scores by student interpreters in CI (at .05 significance level)?

b) In which direction do student interpreters perform better in CI?

II. Data and Methodology

A. Data

The data used in this research were oral exam recordings of interpreting courses among student interpreters from a Chinese university. The final exam was an achievement test to assess how well students had achieved in their CI capacity. On the students' part, they took the course to earn credits. Hence, failing the course would result in no credit and retaking the course the next semester. The assessment materials for the undergraduate student participants included five different sets of speeches to avoid any possibility of plagiarism and repetition. Each set has a Chinese speech and an English speech. Nevertheless, the five sets of speeches were similar in difficulty level regarding the information density and duration.

During the exam, 32 students in the class were divided into eight groups to draw lots to select a set of passages. After randomly drawing their choice, the participants listened to the two speeches (one in Chinese and the other in English). They were then given 1.5 times the duration of the source speeches to interpret the two speeches into the target languages. Subsequently, the students were required to immediately send their interpreted speeches in MP3 format to the teacher's e-mail. The sampling method in this case study employed a homogeneous sampling strategy, where the samples share specific experiences related to the study (Nimehchisalem, 2020). Resultantly, four students who interpreted the same set of passages were chosen as the study sample. The Chinese speech is entitled "数字经济" (Digital Economy), while the English speech is about "The Internet". Therefore, the data in this study contain one English source speech with four Chinese target speeches and one Chinese source speech with four English target speeches by student interpreters.

B. Participants

The study participants were four undergraduate student interpreters aged between 22 and 25 from a Chinese university. These four female students were in their seventh semester and majored in English. Since interpreters are not commonly bilingual from childhood to mediate between two native languages (Bartłomiejczyk, 2015), most interpreters only have one native language, which is referred to as A language or L1 in the classification by AIIC. After approximately 12 years of English learning, English majors in China can be labelled as bilinguals with Chinese as their A language (L1) and English as their B language (L2), their strongest foreign language. The four participants have taken the Business Interpreting course for about 32 hours, with two hours per week. They were primarily trained on CI skills during the course, such as note-taking skills, short-term memory ability, English listening skills, and figure interpreting. In other words, they were supposed to have grasped the basic knowledge of theories and CI strategies after the training.

C. Methodology

This study adopted a non-experimental quantitative method by focusing only on the student interpreters' exam results. The verbatim transcription method was used to convert the student interpreters' audio recordings into text while writing down every single word, including pauses, repetitions, and hesitations such as "uh" and stuttering. The data collection method for the quantitative data was rating scales, which allowed raters to evaluate the participants' test performance (Nimehchisalem, 2020). Analytic rating scales were explicitly used to assign different scores for different aspects of accuracy and completeness in the product of CI. The data analysis method involved the descriptive statistics method, using paired samples t-test to determine if directionality significantly affects student interpreters' performance.

The method for performance rating is propositional analysis (Liu & Chiu, 2009) combined with scale-based scoring (Han et al., 2021). Based on Bovair and Kieras' (1985) guidelines, the propositional analysis was conducted, and the texts were divided into scoring units. The calculation of propositions aimed to fulfil two purposes:

(i)To quantify the information density of each source text

(ii) To rate the interpreting performance based on the scoring units

In each source text, the proportion of the number of propositions to the number of total words was calculated to decide the information density because "the higher the score, the denser the information" (Liu & Chiu, 2009). For the interpreter's performance rating, the scale of the score was determined by comparing the source and interpreted texts, based on the calculation of error frequencies and the propositional analysis. If the student interpreters correctly interpreted one scoring unit, one score was given. If the scoring unit was partially interpreted, a 0.5 score was given. In contrast, a zero score was given if the meaning of a unit was misinterpreted.

III. Results

This section reports the findings of performance rating and answers the research question on the impact of directionality on student interpreters' performance.

A. Overview of Source Speeches and Target Speeches

First, the researchers compared the audio duration and word length of the source English and Chinese speeches with those of the target Chinese and English renditions by the student interpreters. The four student interpreters were numbered as S1, S2, S3, and S4 in the study, as shown in Table 1.

TABLE 1
OVERVIEW OF AUDIO DURATION AND WORD LENGTH OF ST AND TT

	ST		TT		
	E-C	C-E		E-C	C-E
Audio Duration	57s	43s	S1	34s	1m5s
			S2	1m8s	1m8s
			S3	56s	1m12s
			S4	51s	1m5s
Word Length	132	157	Reference Translation	261	103
			S1	145	77
			S2	221	89
			S3	176	96
			S4	160	82

Note: Abbreviation = ST - Source speech text/ TT - Target speech text/ C-E - Chinese-English direction/ E-C - English-Chinese direction/ S1 – Student 1/ S2 – Student 2/ S3 – Student 3/ S4 – Student 4

As shown in Table 1, the English source speech lasted 57 seconds. The duration of the four students' interpreted speeches for the English speech varies from one another. The S1's interpretation of the English source speech lasted only 34 seconds and was the shortest among the four. The interpretation of S2 was the longest, lasting 1 minute and 8 seconds. The duration of S3's interpretation (56s) was closest to the source speech, while S4's interpreted speech was 51 seconds, slightly above 50 seconds. Regarding the word length, the reference translation for the English source text was 261 words. Nonetheless, the transcriptions of students' interpreted texts ranged from 145 to 221 words. Thus, their interpreted texts were shorter than the reference translation.

Table 1 also shows that the Chinese source speech lasted 43 seconds. Nevertheless, the four students' interpreted speeches of the Chinese source speech were longer than 1 minute, with very little difference among them. Notably, the audio duration of S1 and S4 was similar. Both speeches lasted 1 minute and 5 seconds. The longest speech was by S3 (1 minute 12 seconds). The word length of the reference translation of the Chinese source text was 103 English words. Conversely, the shortest among the students' interpreted texts was by S1, with only 77 words. The longest text was by S3 (96 words), close to the word length of the reference translation. The word length of the S2 and S4 was between 80 to 90 words.

A clear idea of the information density of the source speeches is required to rate the interpreter's performance accurately. Information density (ID) is one of the parameters indicating the difficulty level of the source speech text. It is calculated by using the number of propositions divided by the number of total words. The formula is:

$$\text{Information Density} = \frac{\text{No. of Propositions}}{\text{No. of Total Words}}$$

The information densities of the source English and Chinese speech texts are shown in Table 2 below.

TABLE 2
INFORMATION DENSITY OF ST

Directionality	No. of words	No. of propositions	Information density
E-C (into-A)	132	25	18.9%
C-E (into-B)	157	20	12.7%

Note: ST - Source speech text/ E-C - English-Chinese direction/ C-E - Chinese-English direction

Table 2 shows the information density of the two source texts, where both texts have similar information densities. In English-Chinese (into-A) direction, the information density was 18.9%, while the information density of the Chinese-English (into-B) source text was 12.7%. This indicated that the two texts did not contain dense information, although the English source text had slightly denser information than the Chinese text.

Speaking rate is another parameter that can be used to evaluate speech difficulty level and is "often expressed in words per minute (wpm)" (Vasylovych, 2020, p. 220). The formula for calculating the speaking rate (Barnard, 2022) is:

$$\text{Speaking rate (wpm)} = \frac{\text{Total words}}{\text{Number of minutes}}$$

The speaking rates of the source Chinese and English speeches are shown in Table 3.

TABLE 3
SPEAKING RATE OF ST

Directionality	Total number of words	Number of minutes	Speaking rate (wpm)
E-C (into-A)	132	0.95	139
C-E (into-B)	157	0.72	218

Note: E-C - English-Chinese direction/ C-E - Chinese-English direction

Table 3 shows that the speaking rate of the Chinese source speech was much higher than that of the English source speech. Nevertheless, the difference in the speaking rate was mainly due to the difference between the two languages. According to the National Centre for Voice and Speech, "the average conversation rate for English speakers in the United States is about 150 wpm" (Barnard, 2022). Therefore, the English source speech is slightly slower than the average conversation rate. Conversely, the normal speaking rate for Chinese speakers is about 245 wpm (Meng, 2006). In other words, the speaking rate of the Chinese source speech in the current study was also slower than the average Chinese language speaking rate. The discrepancy between the average and the actual speaking rate of the source text was 11 (English passage) and 27 (Chinese passage), respectively. The difference indicates that the average speaking rate in the Chinese source text was slightly lower than that of the English source text concerning the average speaking rate of the respective languages.

B. Rating Performance

Performance refers to how well the participants interpreted the source speeches. As mentioned in the methodology, the performance was rated by propositional analysis and scale-based scoring based on the calculation of error frequencies. In this case study, the course teacher, one of the authors of this paper, rated the student interpreters. The final rating scores of the four students' performances are illustrated in Table 4.

TABLE 4
RATING SCORES OF PERFORMANCES

	E-C (into-A)			C-E (into-B)		
	Score (Total score:25)	Norm. Score by LCM (lowest common multiple: 100)	Percentage of accuracy & completeness	Score (Total score:20)	Norm. Score by LCM (lowest common multiple: 100)	Percentage of accuracy & completeness
S1	5	20	20%	6.5	32.5	32.5%
S2	7	28	28%	15.5	77.5	77.5%
S3	6.5	26	26%	11.5	57.5	57.5%
S4	15.5	62	62%	12.5	62.5	62.5%

Note: E-C - English-Chinese direction/ C-E - Chinese-English direction/ S1 – Student 1/ S2 – Student 2/ S3 – Student 3/ S4 – Student 4

Table 4 shows the rating scores of student interpreters' performance. As the total scores of the source English and Chinese texts differed, the lowest common multiple (LCM) was used to normalise the scores in two directions. From the above rating scores of student interpreters' performance, it can be seen that the four students performed differently in two directions. They all scored exceedingly higher in the Chinese-English direction than in the English-Chinese direction. Only one of them (S4) scored almost the same in the two directions. The percentage of accuracy and completeness for S1 in the Chinese-English direction was 32.5%, higher than the percentage of accuracy and completeness in the English-Chinese direction (20%). Among the four students, S2 performed best in the Chinese-English direction with a high score of 15.5 (total score is 20). The into-B score of S2 is approximately three times higher than her into-A score. For S3, the percentage of accuracy and completeness of into-A direction was 26%, about

twice lower than into-B direction (57.5%). The only student with a minor discrepancy between the two directions was S4, but the statistics showed that her into-B score (62.5) was also slightly higher than her into-A score (62).

C. Paired Samples T-Test Results

Paired samples t-test is typically used for testing the significance of the difference between two mean scores of the same group. In the current study, a paired-samples t-test was used to compare the two directions in CI of the same group of student interpreters. This study performed statistical analysis by running Statistical Package for Social Science (SPSS) 23 to test the relationship between directionality and performance in CI among student interpreters. Two-tailed p-values less than 0.05 were considered to be statistically significant. The value of Cohen's *d* and the effect-size correlation r_{YI} was calculated online using the means and standard deviations of the two directions. After computing Cohen's d and the effect size by using an online effect size calculator, the result showed that Cohen's d = -0.47 and effect-size r = -0.23.

By running the two-tailed paired samples t-test in SPSS, the statistics shown in Table 5 were obtained.

TABLE 5
PAIRED SAMPLES STATISTICS

Directionality			Mean	N	Std. Deviation	Std. Error Mean
Into-A	Pair 1	Directionality	1.0000	4	.00000	.00000
		Score	34.0000	4	18.97367	9.48683
Into-B	Pair 1	Directionality	2.0000	4	.00000	.00000
		Score	57.5000	4	18.70829	9.35414

The first research question concerning the difference between into-A and into-B mean scores by student interpreters in CI (at .05 level of significance) can be addressed here. The above-paired samples statistics show that the mean score of into-A direction (M = 34) is lower than into-B direction, implying that student interpreters generally perform better in the into-B direction (M = 57.5, SD = 18.71). In other words, there was a significant difference between the mean scores of the CI test by student interpreters in this case study.

The impact of directionality on CI performance is determined by the paired differences between the two directions by the same group of participants, as shown in Table 6. The null hypothesis denotes that performance (Dependent variable - DV) is independent of directionality (Independent Variable - IV).

TABLE 6
PAIRED SAMPLES TEST

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Directionality - Score	-44.25000	21.18793	7.49107	-61.96356	-26.53644	-5.907	7	.001

Based on the results of paired samples t-test in Table 6 (t = -5.907, p = .001), the confidence interval of the difference is 95% [-61.96, -26.54]. Since the significance value is smaller than alpha (α = .05), the null hypothesis was rejected. Conclusively, a significant difference exists between into-A and into-B mean scores by student interpreters in CI. The sampled students performed better in into-B direction (M = 57.5, SD = 18.71) compared to into-A direction (M = 34, SD = 18.97) in accuracy and completeness.

IV. DISCUSSION

This case study sampled four student interpreters in a Chinese university to examine the impact of directionality on performance in CI, based on the analytic rating scales of students' test products. It aims to answer the following two research questions: a) Is there any significant difference between into-A and into-B mean scores by student interpreters in CI (at .05 significance level)? b) In which direction do student interpreters perform better in CI? Paired samples t-test results showed that there was a significant difference between the mean scores in two directions of the CI test by student interpreters. They all performed better in into-B direction in terms of accuracy and completeness.

Due to the popularity of the Interpretive Theory of Translation by the Paris School, the default option for interpreting and translation is the into-A direction for a long time and remains so today. Nonetheless, the results of the present study show that student interpreters generally performed better in into-B interpreting than into-A interpreting in CI. The findings align with Chanprapun (2020) but contradict the Paris School's assumptions (Seleskovitch & Lederer, 1989).

The overall lengths of the two source speeches in the sampled tests were similar, which is less than one minute. The delivery speed of the recordings of the Chinese and the English source speeches was below the average speed of the normal speaking rate. The information density of both texts was less than 20%. Thus, the Chinese and the English source speeches were within the student interpreters' processing capacity considering the length, information density, and speaking rate of the source texts.

The impact of directionality on student interpreters' performance was found in their CI activities. Most student interpreters performed better in the into-B direction, although they were more fluent in the into-A direction. The fluency of into-A direction in CI by novice and professional interpreters was confirmed earlier by Mead (2005).

Based on Gile's Effort Models (Gile, 2009), there are two stages in the process of CI. The first stage involves listening comprehension, note-taking, and memorising, while the second stage includes note-reading and production. The fact that student interpreters performed better in the into-B direction indicates that listening comprehension plays a more vital part in determining the quality of CI. When students have difficulty understanding the source message, it becomes challenging for them to proceed with the subsequent coordination activities in interpreting, such as memorising, note-taking, note-reading and producing the interpreted text. As proved by Cai et al. (2015), L2 proficiency is probably the most important factor contributing to individual differences in developing CI competence for student interpreters. What matters more is the first stage of CI, which directly results in the inability to produce the correct information in the target language. Without a complete and correct understanding of the source speech, it is absolutely impossible to produce a target text faithfully. The target speech produced under this circumstance would deviate from the original meaning of the source text.

When teaching CI to student interpreters, the above results indicate that teachers should pay more attention to training listening comprehension ability of the source text in into-A direction. As Zhong and Wang (2009) pointed out, improving the bilingual ability of interpreters is vital as the foundation of interpreting is listening and comprehension ability. If student interpreters' listening comprehension ability is not good enough, cognitive overload would be high in the subsequent interpreting stages.

V. Conclusion

This study examined the impact of directionality on performance in CI among student interpreters. Four student interpreters were sampled for this case study, with L1 (A language) as Chinese and L2 (B language) as English. After taking the interpreting course for one semester, they were assumed to have grasped the basic knowledge of CI and the fundamental skills of note-taking and short-term memory required in the CI process. The data were collected from their final exam of the interpreting course. By adopting a quantitative method, the current study conducted a paired samples t-test to investigate the impact of directionality on performance in CI between Chinese and English languages. The findings of this study indicated that the mean scores of into-A and into-B directions were significantly different. Besides, the participants performed better in the into-B (Chinese to English) direction than in the into-A (English to Chinese) direction.

Since CI involves many factors and cognitive processes, the findings of this case study may shed light on undertaking further research involving the coordinating and cognitive processes in two phases of CI. In the pedagogical aspect, listening comprehension training should be included in the CI curriculum for students or trainees to develop CI competence easily. Furthermore, student interpreters need to improve their L2 proficiency before taking any interpreting course or training as interpreting is "one of the most challenging linguistic tasks possible" (Nicodemus & Emmorey, 2013).

As this study is only a case study, several limitations exist. The study is limited to data from four student interpreters only. Further investigation into more student interpreters' CI outputs in the two directions is required to obtain a deeper insight into the relationship between directionality and performance.

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