Processing Metaphorical Expressions in Sight Translation

An Empirical-experimental Research

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Abstract:

This empirical-experimental study focuses on the processing of metaphorical expressions in sight translation (STR), a particular branch of interpreting. In order to test whether linguistic metaphors pose cognitive challenges for sight translators, we designed a within-subject experiment with 30 undergraduate taking an intermediate-level interpreting course at a Chinese university. Three streams of data, namely processing times, translation quality assessments, questionnaires and retrospective interviews, were collected and analysed for triangulation purposes. The results showed that metaphorical expressions took more time to process, and their presence resulted in more translation failures. In other words, the inclusion of linguistic metaphors slowed down the speed of production and compromised the quality of translation, meaning that the STR of metaphors requires more effort than for their literal counterparts. The results also suggested that the extra effort was mainly invested in the reading phase, rather than the production phase. The data revealed that mistranslations resulting from incomplete understanding, and the ensuing imbalance in the allocation of processing capacity between the reading and production tasks, far outnumbered those resulting from the failure to find appropriate target-language terms. By adopting STR as the vehicle for examining metaphorical expressions, this study also shed some light on how metaphors are processed in a bilingual environment.

"Metaphor has been widely discussed within the discipline of Translation Studies, predominantly with respect to translatability and transfer methods" (Schäffner 2004: 1253). However, most attention has been given to metaphor in written translation (Newmark 1988; Dobrzynska 1995; Tirkkonen-Condit 2002; Jensen 2005), even though metaphor is just as pervasive in oral communication.[1] In contrast to written translators, interpreters of oral communications are asked to work on the spot in a real-time environment, and are consequently confronted with even more demanding challenges in dealing with metaphorical expressions interwoven throughout the discourse.

This paper presents the findings of a pilot study on the intricacies and difficulties involved in interpreting metaphors, focusing on the processes entailed as well as the quality of the products. To avoid the potential problem of subjects missing metaphorical expressions as a result of poor acoustic signals, we specifically choose sight translation (STR), a particular sub-branch of interpreting, as the medium for our empirical study. Metaphor is approached from a linguistic perspective to ensure definitive identification of metaphorical expressions in the source texts.

This study forms part of a larger project on the influence of cultural background on the STR of metaphors. It seeks to address four questions: 1) Do metaphorical expressions pose difficulties in STR? 2) If yes, where and why do the difficulties arise? 3) Does the acquisition of cultural background knowledge (CBK) help alleviate the difficulties? And 4) Does CBK have an impact on the subjects' translation strategies? In this present paper we address the first two questions. Before proceeding to our more detailed analysis, we wish to clarify some basic concepts implied in our research questions.

1. Some basic concepts

1.1 "Linguistic metaphor" vs. "conceptual metaphor"

The development of cognitive linguistics has revived the interest in metaphor, a rather

"old" research topic. The seminal work *Metaphors We Live By* (Lakoff and Johnson 1980), has not only reshaped the structure of metaphor research, but also sparked a major revolution in cognitive linguistics. Metaphor no longer exists merely at a linguistic level (as "a novel or poetic linguistic expression where one or more words for a concept are used outside of their normal conventional meaning to express a 'similar' concept"), but also includes a conceptual layer ("a cross-domain mapping in the conceptual system") (Lakoff 1993: 202-203). "Metaphor" in the classic sense can be more accurately described as a "metaphorical expression" ("a linguistic expression that is the surface realization of such a cross-domain mapping") (Lakoff 1993: 203), or as a "linguistic metaphor" (an expression that can be analysed on formal grounds as involving two semantic domains) (Steen 1994).

While both linguistic and cognitive approaches to metaphor have been applied to Translation Studies, much of the attention has been given over to the latter in recent years (Tirkkonen-Condit 2002; Schäffner 2004; Jensen 2005). Annette (2008; 2011) however, made a breakthrough with a linguistic approach, focusing on linguistic metaphors and taking into account the semantic domains of experimental texts in order to identify the metaphorical expressions and their boundaries. We employ her approach in this study, as our overriding objective is to investigate the understanding and reformulation of metaphorical expressions in STR.

1.2 Sight translation

STR, a hybrid between translation and interpreting, is adopted as the vehicle for examining the translation of metaphorical expressions in this study. STR involves "the transposition of a message written in one language into a message delivered orally in another language" (Lambert 2004: 298). In other words, it demands the synchronization of reading and production. Though the source text segment continues to be visually accessible to the translator, STR has been rightly viewed as being closer to interpreting than to translating, because "interpreters are able to apply largely the same strategies that they use when they perform oral-to-oral interpreting" (Dragsted and Hansen 2007: 254). Though not paced by the SL speaker, the sight translator will be intent on producing a smooth delivery under normal circumstances (Agrifoglio 2004: 45).

Comparative analyses between STR and translation or interpretation have

attracted burgeoning interest from scholars. Lambert compares the performance of STR with sight interpretation and simultaneous interpretation, and finds that "the added feature of visual exposure to the message to be interpreted does not necessarily interfere with a subject's already overloaded capacity to listen and speak simultaneously; on the contrary, it may even help the students' performance" (Lambert 2004:294). Agrifoglio's findings, however, are not consonant with Lambert's. After comparing the performance of professional interpreters in STR, simultaneous interpreting and consecutive interpreting, she concludes that "(STR's) cognitive demands on the interpreters are by no means less than those of simultaneous and consecutive" (Agrifolglio 2004: 43). Through the use of technology (i.e. eye-tracking and Translog) to measure the cognitive effort and visual interference in STR, Shreve *et al*. found that "complex syntax required more effort than non-complex syntax to process when it was not masked by what was possibly a result of visual interference" (2010:82). The present research focuses on the cognitive effort required during STR for metaphorical expressions as compared with non-metaphorical ones, referring to relevant research findings in both the research design and the data analysis.

1.3 The processing of metaphors

There have been two major schools explaining how metaphors are processed in a monolingual setting, "the Literal First model and the Direct Access model" (McDonald and Carpenter 1981: 231). According to Searle, the comprehension of metaphors entails three stages:

> "First, the literal meaning of the utterance is determined; second, that meaning is checked against the context; third, if there is a conflict between the literal meaning and the context, it is reinterpreted and a conveyed meaning is derived. This model predicts that the processing of metaphors is more effortful, and consequently slower than processing of non-metaphorical language" (as cited in Ortony *et al*. 1978: 466).

Others have found that metaphors do not necessarily take more time to comprehend than their literal counterparts. Ortony *et al*. (1978: 475) assert that "in general, figurative language is processed in much the same way as is literal language", that is

to say, "a hearer or reader uses an already constructed representation of what has gone before (the context) as a conceptual framework for interpreting a target sentence, or any other linguistic unit" (1978: 467). Thus, the chief determinant of processing time, according to them, is not non-literalness, but "the degree of contextual support" (1978: 473).

Recent studies on the processing of metaphors are no longer confined to the monolingual field, but applied also to interlingual communication such as translating and interpreting. The difficulty in translating metaphors has frequently been commented on (Dagut 1976, Dobrzynska 1995). Since most of the metaphorical expressions the translators come across are language-specific (Jakobsen *et al.* 2007: 225) and "strongly culturally conditioned" (Dobrzynska 1995: 597), it is reasonable to assume extra cognitive effort is required to understand and reformulate them. The most relevant researches were conducted by McDonald and Carpenter (1981) and Jakobsen *et al.* (2007). These are both targeted at idioms rather than metaphors, but since the only discernable difference is the number of words, given that "idioms are multiword expressions by definition" while metaphorical expressions may "consist of only one word" (Kövecses 2002: 203), we believe that their findings can serve as helpful reference to the present research. Based on eye-tracking data, McDonald and Carpenter proposed their processing model of sight translating of idiomatic phrases:

> "In translating an idiomatic phrase, the fixation protocols showed an initial pass on the phrase until a meaningful unit was found. Here the phrase was parsed. The parse was marked by regressions on the phrase and a second reading pass--the translation pass. It was during this pass that verbal translation began. The translator continued reading and if a discrepancy was found, the idiomatic phrase was refixated for a third reading pass, the error recovery pass. During this pass, the translator may have given a different parsing to the phrase and a new corresponding translation" (1981:237).

Jakobsen *et al.* investigated the processing of 12 English expressions during the course of translation and STR by five professional translators and five interpreters respectively. The data confirmed their hypothesis that "both translators and interpreters spend more time processing idiomatic expressions than literal ones" (2007: 235). They also discovered that idiom-to-idiom translation is strongly preferred by translators while interpreters' preferred solution is paraphrase (2007: 242).

Based on the aforementioned researches, we designed our own experiment to investigate the way in which English metaphorical expressions are processed by Chinese interpreting trainees in a STR task.

2. Research design

2.1 Subjects

The empirical study was conducted with 30 English major undergraduates enrolled in an intermediate-level interpreting course at a Chinese university. All of them were mainland Chinese students of about the same age, with same language backgrounds (Chinese as L1 and English as L2) and very similar English proficiency (based on their scores in Test for English Major Level 4). For research purposes, the subjects were cross-grouped into an experimental group (EG) and a control group (CG) based on their scores in the final exam of the interpreting course, with the objective of ensuring that both groups' interpreting capabilities were broadly equal. Two experiments (within- and between-subjects) were conducted in which all the 30 members were asked to sight translate the materials provided, with only the EG being offered related CBK beforehand. The within-subjects comparison was aimed to determine whether linguistic metaphors erected barriers to STR, and explore where and why difficulties arose; the between-subjects was to examine whether CBK affected the ways the subjects processed the metaphors. Only the within-subjects findings are presented in this paper.

2.2 Materials

In his book *Politicians and Rhetoric: The Persuasive Power,* Charteris-Black (2006) argues how crucial the use of metaphor is for politicians to develop their public images. Modern political discourse is permeated with metaphor for its communicative and persuasive effect. As we intended to imitate a real-life translation scenario as closely as possible, we employed original English texts as the translation material. Two adjacent excerpts (Text A and Text B, Appendix 1) from Bill Clinton's farewell address were therefore chosen as the source texts. Basic information about the two

texts is listed in Table 1.

Table 1. Basic information on the two source texts

	Words	Complex words[2]	Sentences	Words per sentence
Text A	241	31	11	21.9
Text B	238	22	11	21.6

We adopted the concept of "text complexity" in our further comparison of the two texts. According to Jensen (2009:62), it is a more objective approximation of relative text difficulty, with "readability indices", "word frequency" and "non-literalness (idiom, metonyms and metaphors)" as the main indicators of this concept.

The mean values for Text A and Text B based on all five U.S. grade level indices[3] (ARI, Flesch-Kincaid, Coleman-Liau, Gunning fog and SMOG) indicate that to successfully comprehend the texts, a reader would have to have completed 11.82 and 10.44 years of schooling respectively. As can be seen from Figure 1, Text A scores 61.7 and Text B 66.1 in the FRES index (Flesch 1949: 149), both corresponding to "standard level" (60-70). In the LIX index (Björnsson 1983:484), Text A scores 58 and Text B 57, both categorized as "very difficult texts" (>55). The two source texts exhibit a similar degree of complexity, with Text A slightly more complex in terms of readability.

Word frequency as an indicator of text complexity is largely based on the general assumption that the more frequently a word occurs in a language, the more likely it is to be known to the recipient (Read 2000:160), and hence less cognitive effort is needed to process it (Jensen 2009:69). Figure 2 illustrates the distribution of the words that appear in the two source texts into K1, K2-K20 and off-list frequency bands. Text A has 84.84% of words in the K1 frequency band and Text B has 80.33%, which means Text B would require slightly more cognitive effort than Text A.

It is noted that clearly identifying linguistic metaphors in natural discourse presents a major challenge；however；this is an essential prerequisite for the present study. Apart from the definitions of "linguistic metaphor" or "metaphorical expression" provided in section 1.1, it is also suggested that instead of relying on intuition, the use of dictionaries as a reference norm makes identifying linguistic metaphors more reliable (Krennmayr 2008:113). In this paper, we took account of definitions, contexts and dictionaries in identifying metaphorical expressions. The

Macmillan Dictionary for Advanced Learners (MED) and the *Oxford Advanced Learner's English-Chinese Dictionary* (OALD (E-C)) were used as the main reference sources. As a result, ten linguistic metaphors were identified in Text B (See Appendix 2), while none could be found in Text A.

Thus, the two source texts are almost equal in length and in "words per sentence". Although Text A has more complex words and is evaluated as being slightly more complex for readability, Text B contains a slightly higher percentage of low-frequency words. Their major difference lies in the number of linguistic metaphors: 0 in Text A and 10 in Text B, making them the ideal material for investigating the impact of linguistic metaphor on the STR process.
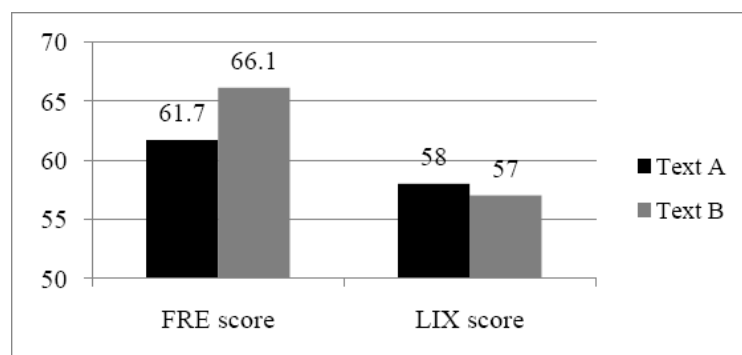
Figure 1. Flesch Reading Ease score (generated by Editcentral.com) and LIX score (generated by Scorestandards-chmandards.com)
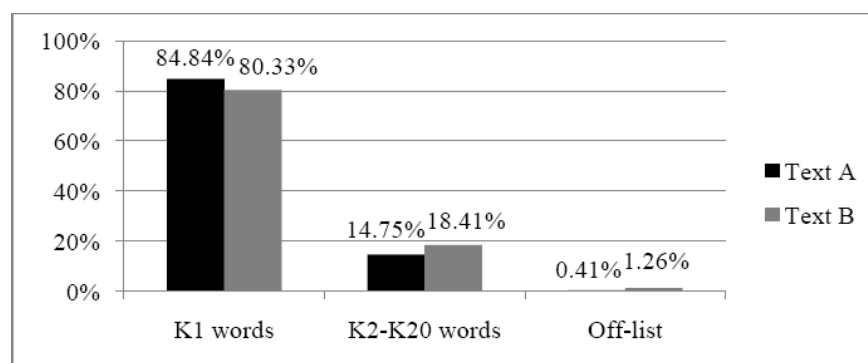
Figure 2. Word frequency scores[4] of Text A and Text B (generated by VocabProfile/BNC)

2.3 Experimental procedures and assessment methods

Three streams of data, including recordings and their transcripts, assessments of the STR products, and questionnaires and interviews from each subject, were collected for the purpose of establishing a triangulation study.

Prior to the formal experiment, a small-scale pilot test was carried out in a

Simultaneous Interpreting Laboratory. The procedure for the formal experiment was as follows: 1) The examiner briefed the subjects about the procedures, assigned a warm-up English-Chinese STR exercise to help them adjust to the test. 2) The CG left the lab for ten minutes while the EG was asked to read a passage entitled "The Clinton Presidency: A Foreign Policy for the Global Age" as socio-cultural background.[5] 3) The CG reentered the lab and participated in the English-Chinese STR experiment[6] together with the EG. Texts appeared using moving window presentations (Macizo and Bajo 2009). The subjects read the screen in front of each of them, and sight translated each paragraph within a fixed time span. 4) After the STR was finished, the examiner distributed questionnaires to the subjects for immediate completion.[7] 5) An interview was then initiated by the examiner raising questions from the console and asking all subjects to retrospectively report on their processing of the ten metaphors during the STR, and to offer suggestions for improved performance. The STR performances and interviews were both recorded and subsequently transcribed. The recordings of the subjects' STR outputs were also processed digitally using *Audacity* (http://audacity.sourceforge.net/) and transcribed, allowing us to examine each subject's speech production speed very accurately (see Jakobsen *et al.* 2007:229).

After independently evaluating the anonymous recordings and the transcripts, two external examiners graded each subject's performances for both Text A and Text B according to "the number of translation units translated correctly". We agreed with Kirsten's view that the clause could serve as the "translation unit" for such research, "because the differences between languages are more marked at the lower levels (Catford 1965, Toury 1986). In addition, the clause is a manageable unit of attentional focus, and it is the smallest linguistic structure realizing propositions (Isham and Lane 1993)" (as cited in Kirsten 1998: 286). In their assessment of the translation units the markers gave equal weight to understanding and expression.

3. Data presentation and analysis

3.1 Quantitative analysis

The following hypotheses were formulated based on the above considerations:

(1) Hypothesis A: The subjects will spend more time in processing Text A than Text B since the former contains no metaphors while the latter ten.

(2) Hypothesis B: Within Text B, the processing time for metaphorical expressions will be longer than for non-metaphorical ones. In particular, the processing time for each word in the target text equivalent to the metaphor will be longer than for non-metaphor equivalents.

(3) Hypothesis C: If the processing time is equal, the translation quality of Text B will be compromised.

Both hypothesis A and B are concerned with measuring the processing time in the two texts and in metaphorical expressions; while hypothesis C focuses on the product's quality. By integrating these two aspects we aim to offer more comprehensive and convincing findings.

3.1.1 Processing time

Processing time is the time that interpreters use to perceive the source message, mentally develop an interpretation, and deliver it. In the process of translating/ interpreting or language production, it is assumed that pauses signal cognitive processes (Schilperoord 1996; O'Brien 2006; Dragsted and Hansen 2009). Hence, in the present research, the processing time for each metaphorical expression includes the pause time immediately ahead and the time taken to deliver the target text. However, this approach might raise the following two concerns. The first is that the pause time immediately ahead does not necessarily reflect the cognitive processing effort in interpreting the following metaphor. Jakobsen *et al*. clearly addressed this issue in their article: "without the reinforcement that eye movement data might supply, we can only guess that pauses appearing in the production stream at the point of entry to an idiom being formulated are in fact reflections of processing targeted at producing the downstream idiom" (2007: 237). However, Schilperoord argues that in the particular combination of production behaviour such as 'speaking-pausing-speaking', "arguably this pause serves to activate the mental structure underlying the subsequent speaking increment" (1996:11). In the present research, STR as the vehicle for language production, is well suited to the 'speaking-pausing-speaking' combination. And we can be much more certain that under the time constraints for performing the STR, the majority of the pause time was allocated to the planning and

preparation of the translation of the following metaphorical expression. The second issue is that in sight translating a particular metaphor, the planning step might go beyond the pause section preceding the targeted metaphor. This concern echoes Ford and Holmes' (1978) argument: in a monolingual speaking exercise, some planning of a later clause may take place even before the current clause has been completely uttered; in other words, planning processes may occur outside pauses, that is, along with speaking (as cited in Schilperoord 1996:10). However, Gran and Fabbro (1995) found that for verbal tasks requiring divided attention, and in particular during simultaneous interpretation, untrained subjects tended to alternate their attention by focusing it mainly either on the incoming message or on their own output (as cited in Lambert 2004:298). When looking closer at STR, Moser-Mercer speculated that STR "operates on distinct reading (input) and oral (output) channels and that the two are separate enough to prevent interference" (as cited in Lambert 2004:300). In Viezzi's (1989) experiment, the result shows that information retention rates after sight translation were lower than those after simultaneous interpretation. This is because in STR, "information is constantly available to the interpreter who does not need to process the incoming information chunks, storing them for some time before articulating the translation" (Lambert 2004: 300). On the above basis, we assume that our subjects, who are not very experienced in STR, are more likely to concentrate on either reading or speaking during STR, rather than sharing their attention between multiple tasks.

In order to render the rather abstract notion of "processing time" more concrete, we borrowed the concept of "time and event tracks" from Schilperoord (1996) (see Figure 3). Here the time track serves as a point of reference from which event transitions can be viewed ($t_1, t_2, t_3, \ldots t_n$), whereas time lapses ($t_2 - t_1, t_3 - t_2, \ldots t_n - t_{n-1}$) characterize event units (Schilperoord 1996:15).
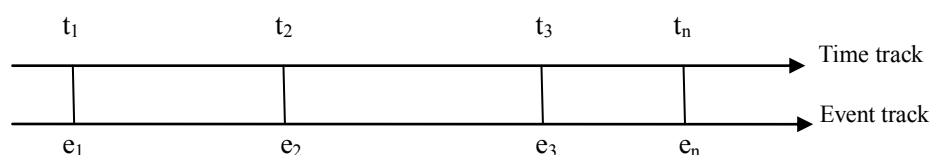

Figure 3. Project from the event track to the time track

Audicity speech analysis software was used to measure the pauses and processing times. All recorded materials were represented as oscillograms. Figure 4 is

an oscillographic representation of a sight translation of the following sentence: "the billions around the world who **live on the knife's edge of survival"** (with the metaphorical expression highlighted)**.**
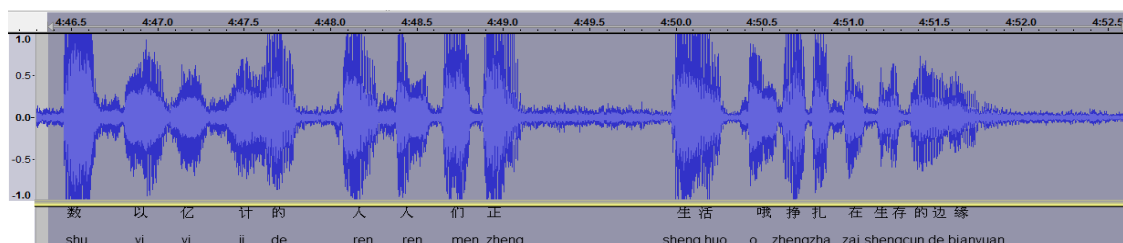

Figure 4. Oscillographic representation of the STR production of a sentence

Since a large data base of processing time was analysed, it was considered reasonable to round off measurements to tenths of a second. In the example in Figure 4, the processing time for interpreting the metaphorical expression (**live on the knife's edge of survival)** is 2.6sec (4:51.7-4:49.1=2.6).

A paired t-test was performed to determine if the difference between processing times for Text B and Text A were significant. The mean time difference (M=1.5, SD=12.9, N=30) was merely 1.5 seconds (204.5sec vs 203sec), t(29)=0.621, two-tailed p=0.539>0.05, providing evidence that the difference in processing times between Text B and Text A is not significant. A 95% Confidence Level about mean difference is (-3.36, 6.29). A closer study into the data reveals that 15 subjects spent more time on Text B while the other 15 spent less. As a result, **Hypothesis A** was not confirmed.

The results could be attributed to the design of the experiment. In order to set up a similar working environment to an actual STR scenario, all the subjects were asked to carry out the STR by reading the moving PPT slides presented on their computer screens. Hence, the total processing time was partially restricted by the showing time of each slide as monitored by the examiner.

We are now moving a step further to compare the processing time spent on translating each word in metaphorical expressions and in Text B as a whole, i.e. comparing the values of MPT/MWC (Metaphor Production Time/Metaphor Word Count) and the values of TPT/TWC (Total Production Time/Total Word Count). The MWC and TWC are calculated based on the transcription of the oral products.

A paired t-test was performed to determine if the inclusion of metaphors impacted on their processing time cost. The mean difference between MPT/MWC and

TPT/TWC (M=0.03, SD=0.045, N=30) is 0.03, accounting for about 10% of the mean value for TPT/TWC(0.29); t(29)=3.588, two-tailed p=0.001<0.05, providing evidence that the difference between MPT/MWC and TPT/TWC is significant. A 95% Confidence Level about mean difference is (0.013, 0.046). The mean value for MPT/MWC=0.32, while the mean for TPT/TWC=0.29, indicating that the subjects spent more time in generating each word in metaphor equivalence than that in the whole of Text B.

This result is reinforced by the MPT formula designed by Jakobsen *et al*. (2007: 237). But for the present research which focuses on metaphor processing time, we slightly modified the formula with our specific terms: Metaphor Processing Ratio (MPR)=((100/((100 / TWC)*MWC)) * ((100 / TPT)*MPT))-100", on which the percentages in Table 2 are based.

Table 2. Metaphor Processing Ratio

Subjects	MPT relative to non-metaphor processing time (%)	Positive /Negative	Subjects	MPT relative to non-metaphor processing time (%)	Positive /Negative
S1	9.180434	+	S16	19.90057	+
S2	7.843982	+	S17	14.15848	+
S3	**-11.9702**	-	S18	27.30323	+
S4	25.84012	+	S19	23.31289	+
S5	**-3.95586**	-	S20	38.86806	+
S6	1.733629	+	S21	**-11.5682**	-
S7	10.68317	+	S22	3.51933	+
S8	2.551828	+	S23	1.3582	+
S9	**-27.3511**	-	S24	21.27862	+
S10	7.409228	+	S25	15.93191	+
S11	**-2.53138**	-	S26	20.16811	+
S12	5.474656	+	S27	**-1.20038**	-
S13	33.89938	+	S28	11.0521	+
S14	2.18117	+	S29	8.90337	+
S15	4.004268	+	S30	31.58764	+

As can be seen from Table 2, 80% (24/30) of the MPR were marked as positive value, revealing that for the majority of subjects, metaphorical expressions delayed their STR production. The average value of MPR was 9.65%, indicating that metaphors cost about 10% extra time compared to non-metaphor environment; i.e. subjects invested around 10% more in cognitive effort in processing metaphorical expressions.

The above data corroborate **Hypothesis B** that the processing time for metaphorical expressions will be longer than for non-metaphorical ones.

3.1.2 The assessment of STR quality

As indicated, our statistical results do not support **Hypothesis A**, and the processing time between Text A and Text B demonstrates no significant difference. In order to answer our initial research question (i.e. do metaphorical expressions pose difficulties for STR?), it is instructive to examine **Hypothesis C**: if the processing time is equal, the translation quality of Text B will be compromised.

We first of all performed a correlational analysis for score(Text A) and score(Text B). The result shows that the two texts have the following relationship: score(Test B)=-8.066 + 1.004*score(Text A). Table 3 reveals that the score(Text B) correlates closely with score(Text A) (correlation coefficient=1.0045, p=0.000<0.05), indicating that the subjects have consistent performances in sight translating Text A and Text B.

Table 3. Correlational analysis of score(Text A) and score(Text B).

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	-8.06606	12.53	-0.644	0.525	0.0146
score(Text A)	1.0045	0.1535	6.54	0.000	0.6045

Based on the results of the correlational analysis, a paired t-test was also performed to examine if the inclusion of metaphors compromised the quality of the STR. The mean difference between score(Text A) and score(Text B) (M=7.7, SD=5.37, N=30) was significantly greater than zero, t(29)=7.85, two-tail p=0.000<0.05, providing evidence that the difference between score(Text A) and score(Text B) is significant. A 95% Confidence Level about mean difference is (5.7, 9.7). Moreover, the mean value for the score of Text A (81.37) is higher than that of Text B (73.67), indicating that, based on similar processing time, the translation quality of Text B is compromised compared with Text A and thus Hypothesis C is confirmed.

Supported by the above statistical data and quantitative analysis, the conclusion can be safely drawn that metaphorical expressions do impede the process of STR and have negative impact on the subjects' performances. The subjects spent roughly equal time on processing Text A and Text B, but the translation quality of Text B was compromised. Within Text B, our data reveal that the ten metaphors took up more

processing time than the non-metaphorical expressions.

This led us on to investigating where and why difficulties arose in processing metaphorical expressions. To answer thee questions we examined data from the questionnaire responses.

Table 4. Q and A results from the questionnaires on difficulties encountered in metaphor STR

	Which text is more difficult?		What makes this text more difficult? (multiple answers permitted)				What is the main cause of difficulty in metaphor STR?			At which step do the difficulties occur?	
	A	B	Background knowledge	Unknown Vocabulary	Logic	Metaphors	Vocabulary	Linguistic context	CBK	Understanding	Reformulating
Number of answers	5	25	6	3	14	21	0	15	15	7	23
Percent (%)	16.7	83.3	20	10	46.7	70	0	50	50	23.3	76.7

As Table 4 shows, 83.3% of the 30 subjects regarded Text B as more difficult, of whom 70% attributed the difficulty to the frequent use of metaphors. It is clear that the subjects were conscious of a heavier cognitive effort imposed by metaphorical expressions, and this is in line with the data presented earlier, i.e. longer processing time and compromised translation quality.

When asked subjects to identify the main cause of difficulty in metaphor STR, half of them chose CBK (cultural background knowledge) while the other half chose linguistic context. It becomes clear that, compared with lexical meaning, context plays a decisive role in the comprehension of metaphors. This is logical because "metaphorical sense results from the use of an expression in a specific linguistic and situation context" (Dobrzynska 1995: 596). However, the data from the answers to the last question were somehow unexpected: 76.7% of the subjects reckoned that reformulating was more challenging than understanding the metaphors. An in-depth discussion of this result is offered in the following section.

3.2 Qualitative analysis

The results for the last question in Table 4 are unexpected: 23 subjects believed that it

was more difficult to reformulate metaphor than understand it. We assume that this may be related to the unique feature of STR. As Gile puts it:

> In interpretation, the sounds of the source-language speech disappear rapidly from the interpreter's memory, permitting the reconstruction of the speech from its semantic content rather than from the words and linguistic structures; in STR, words and linguistic structures are ever-present before the practitioner's eyes. This significantly increases the risk of interference between the two languages (1995: 184).

The continuous presence of the source language also seems to be "impacting on target language expression and on the coordination of silent reading and oral translating" (Agrifoglio 2004:61; Shreve *et al*. 2010:83). It is true that "de-verbalization" in STR is a considerably more challenging operation. Most subjects in their interview acknowledged the difficulty of having to fight the structural interference of the English sentences and of coming up with appropriate Chinese expressions within such a limited time. Consequently, in each of the ten metaphors (particularly M3, M8 and M9&10), mistakes were made that compromised the accuracy or fluency of the Chinese translations, as can be seen in Table 5.

Table 5. Examples of inappropriate expressions

Metaphors in the original text	Examples of inappropriate expressions
M3. on the knife's edge	①*刀刃的生存上*(daoren de shengcun shang/surviving on the knife' edge) ②*刀子...生命边缘*(daozi...shengming bianyuan/knife...the end of life) ③*在挣扎的刀刃上*(zai zhengzha de daoren shang/on the struggling knife's edge) ④*水深火热，垂死挣扎在剪刀叉的不利状况下*(shuishenhuore, chuisi zhengzha zai jiandaocha de buli zhuangkuang xia/death-bed struggles under the scissors)
M8. put a human face on the global economy	①*将所有的人放到经济上*(jiang suoyou de ren fangdao jingji shang/put all human beings on economy) ②*把人类的面容展现在世界经济中*(ba renlei de mianrong zhanxian zai shijie jingji zhong /display a human face in the world economy) ③*为全球经济放置一张人类的面孔*(wei quanqiu jingji fangzhi yizhang renlei de miankong/place a face in front of global economy) ④*把人道主义面对全球经济*(ba rendaozhuyi miandui quanqiu jingji/face humanism to the global economy)
M9&10. weave the threads of our coat of many colors into the fabric of one America	①*编织许多颜色的衣服，把它成为一种布料*(bianzhi xuduo yanse de yifu, ba ta chengwei yizhong buliao/make clothes of many colors, and make them a fabric) ②*用各种颜色来穿针引线,编织一个美国的衣服*(yong gezhong yanse lai chuanzhenyinxian, bianzhi yige meiguo de yifu/make a piece of clothes for America by weaving the threads of all colors) ③*把不同的思想，就像把不同颜色的外衣都缝入一个美国人的地方*(ba butong de sixiang, jiu xiang ba butong yanse de waiyi dou fengru yige meiguoren de difang/weave all thoughts into America, just the way we weave clothes of different colors into this country) ④*编织外套，还要使整个国家都有一个统一的色彩*(bianzhi waitao,

haiyao shi zhengge guojia dou you yige tongyi de secai/weave a coat, and dress the whole country in one color)

Note: Transliteration/back translations in brackets were provided by the authors.

These examples clearly indicate that the subjects were mired in the labyrinth of words and structures of the original text. Due to the great morpho-syntactic differences between Chinese and English, the rather rigid Chinese translations were near to incomprehensible. Brady (1989: 182) emphasizes that: "As regards source-language interference, sight translation is a considerably more hazardous operation than simultaneous interpretation." Accordingly, "Some problems result not from comprehension, but from finding appropriate target-language terms and from processing capacity requirements arising from the need to fight linguistic interference between the source and target languages" (Gile 1995: 205). Undoubtedly, compared with the other branches of interpreting, STR poses exceptional difficulties for the reformulation of metaphors. However, does the response ratio (23:7) between metaphor reformulating and understanding in Table 4 provide convincing evidence that the former is far more difficult than the latter? Bearing this question in mind, we further investigated the recordings and interviews with an emphasis on the subjects' thinking processes, and analysed the causes of point loss in each of the ten metaphors.

Table 6. Point loss in the translation of the ten metaphors

Metaphors in the original text	Number of people marked down	Number (percent) of incorrect understanding	Number (percent) of inappropriate expression
M1. close the gap/global gap	9	8(88.9%)	1(11.1%)
M2. on the cutting edge	19	16(84.2%)	3(15.8%)
M3. on the knife's edge	12	5(41.7%)	7(58.3%)
M4. a powder keg	14	12(85.7%)	2(14.3%)
M5. be ignited by our indifference	13	13(100%)	0
M6. entangling alliances	25	18(72%)	7(28%)
M7. disentangle itself from the world	9	7(78%)	2(22%)
M8. put a human face on the global economy	21	18(85.7%)	3(14.3%)
M9&10*. weave the threads of our coat of many colors into the fabric of one America	18	8(44.4%)	10(55.6%)

*M9 and M10 are treated as one package (M9&10) in the analysis as they are so closely integrated that many subjects naturally paraphrase them as a whole unit.

When assessing the translation quality of metaphorical expressions in Text B, we firstly referred to Dobrzynska's three strategies in metaphor translation: "use of an

exact equivalent of the original metaphor (M→M), choice of another metaphorical phrase with the same meaning (M$_1$→M$_2$), and paraphrase (M→P)"(1995: 595). Thus, our main focus was not on a rigid "form", but rather, on the preservation of "meaning" in three aspects, namely, "a semantic, a pragmatic and a textual aspect" (House 2001: 247). We attributed the reason for point loss on the basis of the retrospective interviews. In these the subjects were asked to report on their understanding and reformulation process for these ten metaphorical expressions. If the subject's understanding at that time displayed "a high degree of explicit divergence from source text (ST)" (Al-Qinai 2000: 500), we assumed that s/he had an "incorrect understanding"; on the other hand, if the interview showed that the subject had a correct understanding of the metaphors, yet produced a response that was inadequate by "the 'normal' standard usage of native speakers in a given situation" (House 1997: 18) or even "alien to the target language recipients" (Al-Qinai 2000: 507), the point loss fell under the category of "inappropriate expression".

Of the ten metaphors, M9&10 features the most complicated structure, and poses the biggest challenge for reformulation. As Table 6 shows, 44.4% of the subjects completely failed to understand its meaning and 55.6% failed to dissect the English structure and come up with acceptable Chinese expressions although they understood what it meant. In this case, as well as in the case of M3, disruption in communication was mainly caused by the formulation of the target language rather than the understanding of the source language. But other than these three metaphors, most of the point loss was caused by errors in understanding rather than in formulation.

The discrepancy between the reality and the subjects' perception could be explained by Gile's 'Effort Model'. According to this model, "In order for interpretation to proceed smoothly... the total processing capacity requirements should not exceed the total available capacity....Capacity available for each Effort should be sufficient to complete the task the Effort is engaged in" (Gile 1995: 171). In other words, if too much capacity goes to one task, there is not enough left for the others and the interpreter's performance will inevitably suffer as a result. STR is viewed by Gile as an interplay of two Efforts, namely 'Reading Effort' and 'Production Effort', each of which takes up part of a limited supply of processing capacity. To guarantee smooth delivery, sight translators cannot devote all their efforts to understanding when reading the text, but must think of its translation as well. Yet metaphor entails a more complicated process of understanding compared with non-figurative expressions.

Inevitably, in our experiment, the subjects devoted more capacity to the reading task in order to identify the metaphors and infer their meaning. Therefore, the production task was given less attention. Consequently, the Effort load for reformulation was increased and the subjects were suddenly under huge stress. In their retrospect interviews about processing some metaphors, many of the subjects produced expressions such as "no time", "stressed", "worried", "in a hurry", "flustered", "had to say something", "running out of time, couldn't produce a translation". This may well explain why they perceived the reformulation as more challenging than the understanding.

It is undeniable that sight translators face enormous difficulty in "de-verbalizing" English metaphors in fluent and accurate Chinese within a short space of time since they are constantly distracted by the words and sentence structures of the source text. The root cause, however, does not lie in target language expression per se, but rather in the incomplete understanding of the source language and the resultant imbalanced distribution of processing capacity. Coordination of the reading and production tasks is seriously compromised, which, in turn, leads to flawed or even nonsensical translations. Thus, mistranslations resulting from target language reformulation are much fewer than those resulting from incomplete understanding and the ensuing unbalanced coordination of the two tasks.

4. Concluding remarks

The experiment results confirmed Hypotheses B and C which we set out to test. Within Text B, the processing time for metaphorical expressions is longer than that for non-metaphor expressions, which means, in the process of STR, metaphorical expressions entail more cognitive effort than literal ones. In the case of Text A and Text B, Hypothesis A was rejected, meaning that the time difference in processing the two texts was insignificant. However, based on this same evidence, Hypotheses C was confirmed since the translation quality of Text B was compromised when compared with that of Text A. This result does imply that Text B entails a heavier cognitive load than Text A. Since a majority of the subjects put production speed as their first priority in STR (supported by their questionnaires), they found it impossible not to sacrifice accuracy and fluency in their outputs. Both texts, A and B, exhibit a similar

degree of complexity in terms of "readability indices" and "word frequency", therefore, the gap in the students performances within the same time span could largely be attributed to the "non-literalness" aspect.

Our finding also supports the proposition that the cognitive effort added to STR by metaphorical expressions mainly happens in the understanding phase. Sight translators are constantly distracted by the presence of the source language text; thus the reformulation of the message becomes a trickier task compared with other types of interpreting. In their questionnaires, 76.7% subjects reckoned that reformulating the metaphorical expressions was more challenging than understanding them. However, a more careful analysis of the data helps us to see beyond this superficial impression and arrive at a more logical conclusion: mistranslations resulting from incomplete understanding and the ensuing imbalanced allocation of processing capacity between the two tasks far outnumber those resulting from a failure to find appropriate target-language expressions. According to Gile's 'Effort Model' (1995), if too much capacity goes into the reading task, there is not enough left for the production task and the sight translators' performance in that phase inevitably suffers.

Having outlined the main findings of the study, we feel obliged to make a few caveats. Firstly, we share the same opinion as Jakobsen *et al*. (2007) that eye movement data collected by eye-trackers would be helpful in accessing the processing time for metaphorical expressions more accurately. Secondly, the empirical research is relatively limited in scope, as it only looks at ten metaphors and involves a small number of students. Furthermore, there are certain limitations in the parameters of the experiment (for instance, the individual backgrounds of the subjects, despite their language backgrounds, were not taken into careful consideration). Hence, a larger study supported by more accurate devices is necessary in order to investigate whether our findings can be substantiated or refined.

Notes

1. Littlemore (2001) observes that it would be impossible for a person to speak without using metaphor at some point, whether knowingly or not.

2. The complex words are marked and calculated by Editcentral.com, a website that returns the complexity scores of a text which is entered into an online query box by users.

3. The five US grade level indices, namely Automated Readability Index (ARI), Flesch-Kincaid, Coleman-Liau, Gunning fog and SMOG, are designed to indicate comprehension difficulty and gauge the understandability of an English text. The formula of each index is as follows (obtained from Editcentral.com):

   ARI= 4.71*characters/words+0.5*words/sentences-21.43;

   Flesch-Kincaid =4.71*characters/words+0.5*words/sentences-21.43;

   Coleman-Liau=5.89*characters/words-0.3*sentences/(100*words)-15.8;

   Gunning fog =0.4*(words/sentences+100*((words >= 3 syllables)/words));

   SMOG=square root of (((words >= 3 syllables)/sentence)*30) + 3.

4. The word frequency scores are based on British National Corpus (BCN-20). Words that belong to K1 frequency band are most common (1-1000 most frequent words); words that belong to K2-K20 frequency bands are less common (1001-20000 most frequent words); and words that belong to the off-list band are the least common.

5. The passage is abridged from "Record of Progress" which appeared on a website launched by Bill Clinton himself. [Accessed 16 Jan 2012]

   http://clinton5.nara.gov/WH/Accomplishments/eightyears-10.html.

6. The examiner presented the PPT page by page during the experiment. There was no deliberate pause between Text A and Text B, so as to ensure continuity in the subjects' performance.

7. The questionnaire consisted of two parts: the first part addressed the difficulties caused by linguistic metaphors in STR, and the second part explored the role of CBK in the process of decoding and re-coding metaphors.

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Appendix 1. Source texts: Clinton's Farewell Speech (2001)

[Text A]: Tonight, I want to leave you with three thoughts about our future. First, America must maintain our record of fiscal responsibility. Through our last four budgets, we've turned record deficits to record surpluses, and we've been able to pay down $600 billion of our national debt, on track to be debt free by the end of the decade for the first time since 1835.

Staying on that course will bring lower interest rates, greater prosperity and the opportunity to meet our big challenges. If we choose wisely, we can pay down the debt, deal with the retirement of the baby boomers, invest more in our future and provide tax relief.

Second, because the world is more connected every day in every way, America's security and prosperity require us to continue to lead in the world. At this remarkable moment in history, more people live in freedom than ever before. Our alliances are stronger than ever. People all around the world look to America to be a force for peace and prosperity, freedom and security. The global economy is giving more of our own people, and billions around the world, the chance to work and live and raise their families with dignity.

But the forces of integration that have created these good opportunities also make us more subject to global forces of destruction, to terrorism, organized crime and narco-trafficking, the spread of deadly weapons and disease, the degradation of the global environment.

[Text B]: The expansion of trade hasn't fully closed the gap between those of us who live on the cutting edge of the global economy and the billions around the world who live on the knife's edge of survival.

This global gap requires more than compassion. It requires action. Global poverty is a powder keg that could be ignited by our indifference.

In his first inaugural address, Thomas Jefferson warned of entangling alliances. But in our times, America cannot and must not disentangle itself from the world. If we want the world to embody our shared values, then we must assume a shared responsibility.

If the wars of the 20th century, especially the recent ones in Kosovo and Bosnia, have taught us anything, it is that we achieve our aims by defending our values and leading the forces of freedom and peace. We must embrace boldly and resolutely that duty to lead, to stand with our allies in word and deed, and to put a human face on the global economy so that expanded trade benefits all people in all nations, lifting lives and hopes all across the world.

Third, we must remember that America cannot lead in the world unless here at home we weave the threads of our coat of many colors into the fabric of one America. As we become ever more diverse, we must work harder to unite around our common values and our common humanity.

Appendix 2. The identification of linguistic metaphors in Text B

Linguistic Metaphors	Source semantic domain	Target semantic domain	Identification method
M1*. close the gap /global gap	cover the opening or break in something or between two things	bridge the separation between two parts	OALD (E-C)
M2. the cutting edge	the cutting surface of a blade	the most modern and advanced point in the development of something	MED
M3. the knife's edge	cutting edge of the blade of a knife	at a critical point	OALD (E-C)
M4. a powder keg	a small barrel for holding gunpowder	potentially dangerous or explosive situation	OALD (E-C)
M5. be ignited by our indifference	a powder keg be ignited by fuse	global poverty be triggered by indifference	Definition and context
M6. entangling alliances	becoming twisted, tangled or caught (in something)	involving somebody/oneself (in difficult or complicated circumstances)	OALD (E-C)
M7. disentangle itself from the world	free something/somebody from something that impedes it/him	free something/somebody from a relationship with something/somebody	OALD (E-C)
M8. put a human face on the global economy	connect things to an actual person.	make something seem more real and easier to understand	MED
M9. weave the threads …into the fabric of one America	weave threads into a fabric	make America into a melting pot with many nationalities and diversified cultures	Definition and context
M10. coat of many colors	the name for the multicolored garment that Joseph owned (in the Hebrew Bible)	people of all ethnic groups	Definition and context

* The 10 metaphors are encoded from M1 to M10 (M for <u>M</u>etaphor).

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