CSCanada
Studies in Literature and Language
Vol. 9, No. 3, 2014, pp. 58-65
DOI: 10.3968/6098

ISSN 1923-1555[Print]
ISSN 1923-1563[Online]
www.cscanada.net
www.cscanada.org

A Multiple Case Study of Chinese-English Translation Strategies

LIU Yanmei[a],[b]; DU Mingmei[c],*

[a]School of Applied English Studies, Shandong University of Finance and Economics, Jinan, China.
[b]School of Foreign Languages and Literature, Shandong University, Jinan, China.
[c]School of Applied English Studies, Shandong University of Finance and Economics, Jinan, China.
*Corresponding author.

Supported by Social Science Planning Program of Shandong Province (14CWXJ29); Humanities and Social Sciences Foundation of Shandong High Education Project (J13WD18).

Received 25 September 2014; accepted 30 November 2014
Published online 26 December 2014

Abstract
The purpose of this study is to investigate the differences of strategy patterns in Chinese-English translation by three translators with different expertise: the novice, the advanced student and the professional translator, as well as the effects of text types on translators' strategies and cognitive performance. Cross-examining the TAPs, the Translog data and the interview shows that translators' immediate reaction to the problem falls into three patterns: intuitional scheme, analytical scheme and instrumental scheme; Advanced student uses the largest number as well as the widest range of strategies; The novice turns most to the external tool—online dictionary for help. The higher the translator's expertise and the more experiences s/he has, the more s/he uses the internal knowledge; Text types affect three translators' strategies in different degree, and generally analytical scheme is more often used in poem than in the other two text types—the operating instruction and the advertisement. Translog data about average pause duration per word and the average pause ratio further validate that poem is the most cognitively demanding text.

Key words: C-E translation strategy; Text types; Think-aloud protocol; Translog; Cognitive effort

Liu, Y. M., & Du, M. M. (2014). A Multiple Case Study of Chinese-English Translation Strategies. *Studies in Literature and Language, 9*(3), 58-65. Available from: http://www.cscanada.net/index.php/sll/article/view/6098
DOI: http://dx.doi.org/10.3968/6098

INTRODUCTION
The empirical research of translation strategy has always been a basic element in translation process research. Different categorizations for the strategies are suggested by scholars according to their particular purposes, and no unanimous conclusions have been drawn up to date. Translation strategy seems to have become a "tricky notion" (Jääskeläinen, 2009) due to its lack of precise and unanimous definition. Of various interpretations of translation strategy, Lörscher's (1991) definition i.e. "A translation strategy is a potentially conscious procedure for the solution of a problem which an individual is faced with when translating a text segment from one language into another." gains more recognitions and is consistent with this study due to its research purpose. The core of this definition is that strategies start from the realization of a problem and terminate with the translator's positive or negative solution to the problem. Lörscher provides several strategy structures such as basic structures, expanded structures and complex structures, which can explain all kinds of translation processes. Especially the basic structures, mainly containing realizing a translational problem, verbalizing a translational problem, search for a (possibly preliminary) solution to a translational problem, (preliminary) solution to a translational problem and a solution to a translational problem to be found, seem a little too general and vague. This study intends to go further to explore the specific strategy patterns adopted by translators with different expertise. Although many

studies about the comparison of strategies employed by translators with different expertise have been conducted (Lörscher, 1993, 1996; Jääskeläinen, 1993; Kussmaul & Tirkkonen-Condit, 1995), research on translators' strategies combining with text types has not been found in the best of the author's knowledge.

Katharina Reiss classified texts into three types: informative, expressive and operative. For example, the reference work is the text variety which is the most fully informative text type; the poem is a highly expressive type, and an advertisement is the clearest operative text type (attempting to persuade someone to buy or to do something) (Munday, 2001). Though each text variety may represent a mixture of more than one linguistic function, there must be a predominate one in a particular text type. When transmitting a particular linguistic function, there may be different strategy patterns adopted by translators. Therefore, another objective of this article is to identify the differences of translation strategies adopted by translators in three texts, and further findings about translators' cognitive effort put in three types of texts are expected. To sum up, three questions will be focused on in this study:

(a) On what ways the strategy patterns used by translators with different expertise are different?

(b) Do the differences of strategy patterns change with text types?

(c) If yes, how do the text types affect translators' cognitive performance?

1. RESEARCH DESIGN

1.1 Participants

Three participants have been sampled to represent three translators with different translation expertise: the professional translator, a full-time translator from a prestigious translation company in Jinan, Shandong Province, one MTI student as an advanced learner and a sophomore minoring in English as a novice. The professional translator has five years of translating experience and over 500,000 words of translation. More than 80% of her income is from translation activities. The advanced learner has overall and systematic study of translation theories as well as part-time translating experience but with not more than 20,000 words of translation. The novice has got some plain and scattered translation theory since he has taken two courses of English-Chinese/Chinese-English translation. Except exercises in and after class, he has no any social translation practices. All participants are native speakers of Chinese. The participation is on their free will.

1.2 Experimental Material

The experimental materials contain no especially technical terminology or stylistic complexity which may require an overwhelming amount of time and energy from participants. Three different types of Chinese texts including an operating instruction (217 characters), a poem (45 characters) and an advertisement (119 characters) are selected as the source materials to translate into English. The reason of choosing these three texts is that in Reiss's diagram of text types and text varieties, the poem is the highly expressive text type; the advertisement is the clearest operative text type. The operating instruction is the most suitable material for research experiment representing the informative text type, comparing with reference work, report or lecture. The texts are required to translate from Chinese to English rather than the reverse one partly as the result of the finding (Hansen, 2003) that researchers obtain more information from the participants about translation processes into a foreign language than into the mother tongue, and partly because of the technical limitation of Translog, which couldn't accept Chinese as its target language when this experiment was being done.

1.3 Apparatus

The researcher prepared each computer in advance by installing two software programs: Translog and Camtasia. Translog is used to record the typing process in text production across a computer keyboard. By using Translog program, the items to compare between three translators and three different text types include the number and the length of pauses. Camtasia is used to record all moves on the computer and think-aloud verbalizations. It is also used to document what the translators were doing on the computer outside of Translog, for example how they consulted electronic dictionaries, websites and other tools.

1.4 Procedure

The experiments were carried out either in the translator's work environment, if s/he has, or in the researcher's office. The subjects can use his or her own computers, translation software, dictionaries and the electronic resources s/he is familiar with or the researcher's, if s/he likes, which was equipped with tools they are used to consult. The Experiments were conducted during 9:00-11:30 when, approved by the participants, they were mostly energetic at that time. To avoid the fatigue and the interference of different text types, each participant translates just one text each time.

Before the formal experiment, the translators received the explanation about the method of think aloud, the use of Translog and Camtasia, and were demonstrated two examples. After the participants claimed they understood these, each of them conducted a pilot study involved exploratory interviews to make sure they could operate Translog and practice Think-aloud method properly. After the pilot study and training, the experiments began with activating the Camtasia, and then the Translog User. There was no time limit for the translation experiment, and the subjects could consult freely to the dictionary, the internet

or any other references. The researcher emphasized the need to feel comfortable and to work as if it were an average day on the job. As soon as the translation was completed, the researcher conducted the interview for each translator, in order to know the participants' responses to translation process, the way of think-aloud and the specific translation task.

While the participant was working on the task, the researcher just stayed in the same room to help out with any technical problems, to take notes of the translator's non-computerized activities like using paper reference materials, and tried to make her presence as less visible as possible.

2. DATA COLLECTION AND CODING

The sources of data for this study are multiple. In addition to thinking aloud protocols, Translog files and Camtasia video files, interviews and translated texts are also adopted as supplementary and complementary ways of collection to ensure the validity of data. The data from think-aloud protocols are transcribed and coded and then all the strategies are classified for further analysis. Besides the researcher, the other two professional translators (not participants) as well as university professors teaching translation code the strategies as well. For those discrepancies, three coders discuss further till they agree to each other. The strategy indicators adopted in this study to borrow from part of Lörscher's research (1991), of Kiraly's research (1995) and of recent research by Zheng (2012). Besides, the researcher adds several more in accordance with the experiment in this study. The specific strategy elements are listed in Table 1.

Table 1
Strategy Elements Employed by Three Participants

No.	Strategy elements (abbreviations)	Examples
S1	Realizing a translation problem (RP)	"新"这个词要怎么表达?
S2	Verbalizing a translation problem (VP)	"安西"是个地名吧? 为什么没有解释? "使-安-西"没听过.
S3	Intuitional solution (IS♂)	新这个词要怎么表达, brighter?
S4	Interim solution (IS♀)	直接翻译成 please 劝君 have one more drink
S5	Judgment on intuitional/interim solution (JUDG.♂♀)	cup肯定不行吧, 好那个小家子气的感觉.
S6	Uncertainty regarding acceptability (UNCERT)	south of Xianyang City, Shanxi Province, 这样在诗里是不是不太好, 又不是一篇文章.
S7	Accept intuitional/interim solution (ACCEP.♂♀)	Yeas. "They are new." Ok. It just passed my head, and I follow it
S8	Negative solution to a translation problem (SP=Ø)	安西要不要解释一下, 算了.
S9	Refer to(=¤) collocation (¤C0LLO.)	只用一个care就可以吗? 不用加介词吗?
S10	Refer to synonyms (¤SYNO.)	使湿润, moist, humidity, 用哪个词好呢, wet 肯定不太好, humidify 使湿润可以.
S11	Attempt syntactic reconstruction (SYN.RECON)	工作状态下, the operating condition/the computer, 变成一个祈使句吗?
S12	Rephrase ST segment (REPHR. SL)	电源开关往左移动两秒, 电源开关/往左移动, 保持两秒即可开机.
S13	Comment/analyze on a ST segment (ANAL. SL)	朝雨扮演了一个重要角色, 浥是湿润的意思, 这里用的很有分寸/电脑工作状态下, 主语应该是电脑.
S14	Refer to translation expectation structure (¤STR.)	电源开关往左移动保持两秒saved after, 嗳, 跟上一句一样. 这样句式会不会太单调?
S15	Monitor for TL accuracy (MONI. TL)	这样是不是能表现出它"保持两秒"?
S16	Conceiving a second, third etc. translation version (T2, 3…)	Yuan Er, please have more drink 或者说 another drink.
S17	Refer to SL context (¤SL.CON.)	还是简化一下, 像上一步做的那样.
S18	Refer to extra-linguistics context (¤EX.CON)	觉得有种那种, 什么感情就要呼之欲出了, 加个感叹词才能表现出来.
S19	Assess the chosen translation (ASSE.T)	但是没有翻译出来出使, to An Xi.
S20	Employ memonic aid (MEMO.AID)	老师讲过要直接从古文翻译成英语, 不要看现代文的翻译, 那样就少了很多美感.
S21	Refer to text types (¤TYPE)	在咸阳市南部, south of Xianyang City, Shan'xi Province, 这样在诗里是不是不太好, 又不是一篇文章.
S22	Pause(over five seconds) for consideration (PAUSE)	

To be continued

Continued

No.	Strategy elements (abbreviations)	Examples
S23	Revise the translation (REV.T)	这个 Cause 要大写/不用加 the了.
S24	Search dictionary (SEAR.DIC)	power 电源, 好吧, 要查一下.
S25	Judgment on dictionary/internet solution (JUDGE. DIC/INTER)	难道没有drizzle这个词吗, light rain, drizzle毛毛雨.
S26	Accept dictionary/internet solution (ACEP.DIC/ INTER)	是的, 我就想要这个词.
S27	Internet search (SEAR.INTER)	查一下安西, 应该是个地名, 哦是, 河西走廊.
S28	Reject dictionary/internet solution (REJ.DIC/ INTER)	【有道】falling asleep. You can't let a computer fall asleep.
S29	Self-evaluation (SELF-EVA.)	诗词翻译一直觉得很恐怖. 《送元二使》要翻译出来它的/主要是它的音律美, ……层次级别还不够, 翻译不出来那个音律……..方面的东西.
S30	Refer to word matching (¤MATCH)	这switch是要摁的. 对, 像这种不是触屏电脑上的, 可以用switch吗？是滑动的呀.

3. RESULTS AND DISCUSSION

3.1 Strategy Differences Due to Translation Expertise

Totally, 30 strategies are adopted by three translators, of which 15 are used with high frequency.[1] They are "Realizing a Problem", "Intuitional Solution", "Accept Intuition/Interim Solution", "Rephrase ST Segment", "Comment/Analyze on a ST Segment", "Revise Translation", "Pause for Consideration (lasting for over five seconds)", "Search Dictionary", "Search Internet", "Judgment on Dictionary/Internet Solution", "Accept Dictionary/Internet Solution", "Monitor for TL Accuracy", "Refer to Synonyms", "Attempt Syntactic Reconstruction" and "Uncertainty Regarding Acceptability".

3.1.1 The General Strategy Structure

Since the strategy heads from "realizing a problem" explicitly or implicitly, and terminates with the solution of the problem; thus a cluster of strategies come into being between the two ends. This study finds that ways of "problem-solving" can be categorized into the following patterns (see Figure 1).

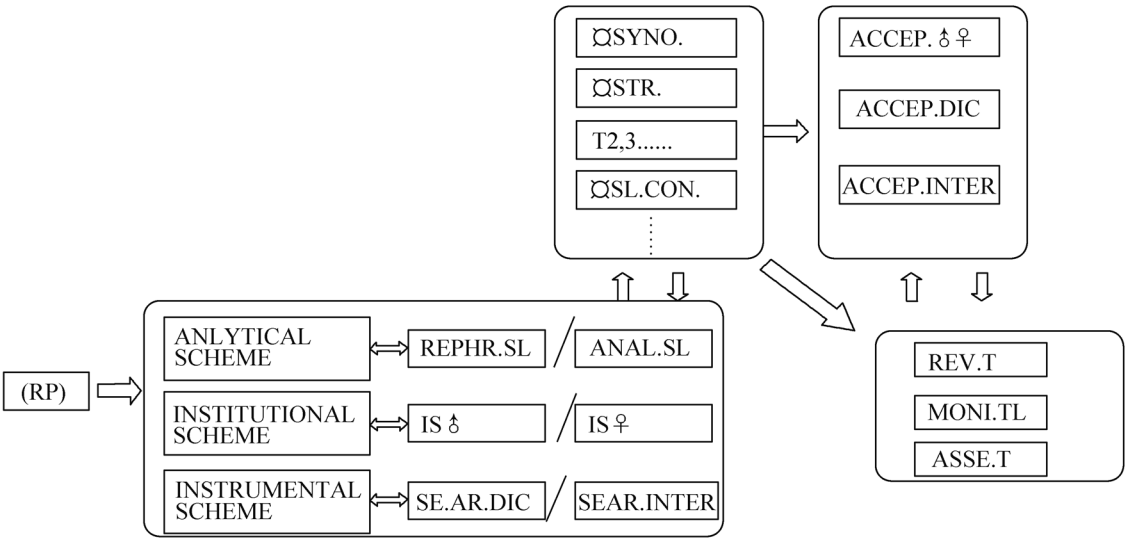

Figure 1
Translation Strategy Structure

Lörscher (1991) recognized twenty two elements constituting translation strategies, which are combined by translators into basic structures, expanded structures or complex structures. Of the basic structures, five main types of strategy include elements such as "realizing a translation problem", "preliminary solution to a translation problem", "search for a solution to a translation problem", "parts of a solution to a translation problem" etc. such kind of strategy elements seem vague and general, without clarifying how the translator search for a solution or solve the problem partly. Figure 1 specifies Lörscher's basic

[1] Strategies with high frequency in this study refer to those ones that are used more than ten times by at least one participant.

structure, making the translator's decision process more transparent. Generally, the translator's immediate reaction to problem-solving falls into three patterns: analytical scheme such as rephrase source language text segments and analyze/comment source language text segments; intuitional scheme including intuitional /interim solution; instrumental scheme including searching dictionary/internet. After this process, the translator may pause for consideration, judge the intuitional/interim solution, judge the dictionary/internet solution, and sometimes he may refer to synonyms, the source language structure, consider the second or the third translation version before accepting the intuitional/interim solution, the dictionary/internet solution or before revising translation, assessing translation or monitoring the target language. Partial decision procedure may be reversed by the translator.

3.1.2 The General Rising-Descending Tendency

The three translators in this study are found to have adopted altogether 30 kinds of strategies. There appears a general rising-descending tendency, from the least proficient novice to the most proficient professional translator (see Figure 2).

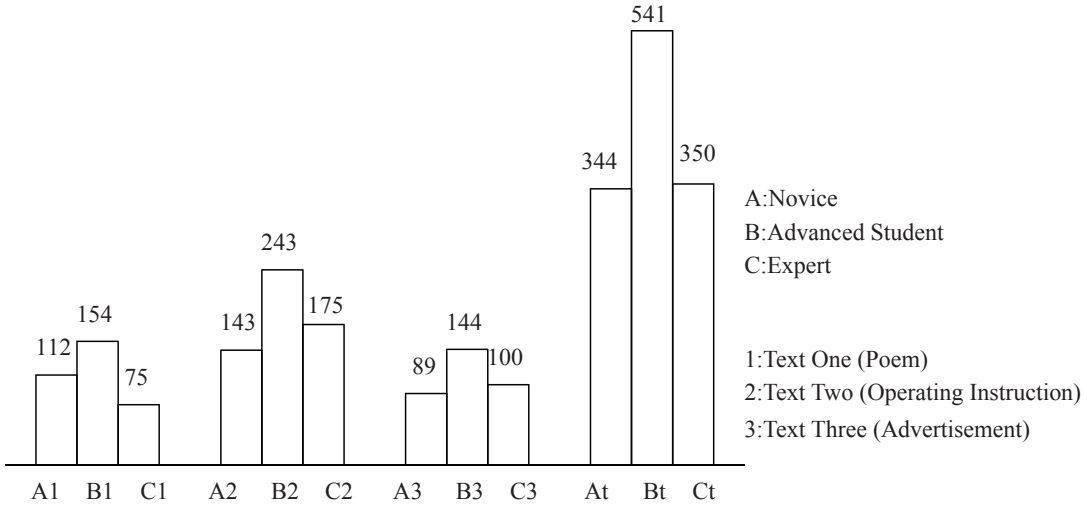

Figure 2
Strategies Emp Figure 1 Translation Strategy Structure Loyed by Three Translators in Three Texts Respectively & Totally

Figure 2 shows that the advanced student adopts the largest number of strategies either in the sole text or in the total three texts, and the novice uses the least number of strategies. In addition, the advanced student employs the widest range of strategies covering 30 kinds in total, while the novice only uses 20 kinds and the professional translator, 27.

It is assumed that this result is related to the fact that strategy use is affected by the participants' translation expertise. The reasons could be that compared with the novice translator, the advanced student, i.e. the medium proficient one has learned quite a lot about translation theory and knows more about translation theories, principles and TL features and so on while at the same time lacks enough practices of translating. On account of the rich reserve of knowledge in this area, she may try every way she knows to attain her ideal goal during translation process. But on the other hand, due to her less practical experience, she may need more cognitive effort than both novices and professional translators. The novice uses the least number and variety of strategies, which stands for less mental activities because of his little store of translating knowledge he can draw from. The professional translator with higher translation expertise relies more on her experiences or internal knowledge which also calls for less mental activities. Due to the limited subjects, it may not be powerful to claim that when a translator's expertise reaches a certain level, s/he will decrease the use of strategies. This "certain level" may be viewed as a "threshold" for a translator. If s/he can step over that threshold, s/he will work more unconsciously.

3.1.3 The Rising and Descending Tendencies

Further comparison of the strategies with high frequency between the novice, the advanced student and the professional translator shows that there is a rising tendency in the use of such strategies as "Refer to Synonyms", "Rephrase ST Segment", "Search Internet", and "Monitor for TL Accuracy" (see Figure 3). The higher level translators adopting more strategies of "Refer to Synonyms", "Rephrase ST Segment", and "Monitor for TL Accuracy" implies they make more analysis of the SL text and more monitoring for the TL text. The frequent internet searching strategy may stand for deep and professional analysis for the text or the translation rather than the direct acceptance of the tool's methods, which is supported by the descending tendency in the strategy use of "Accept Dictionary/Internet Solution" as shown in Figure 4.

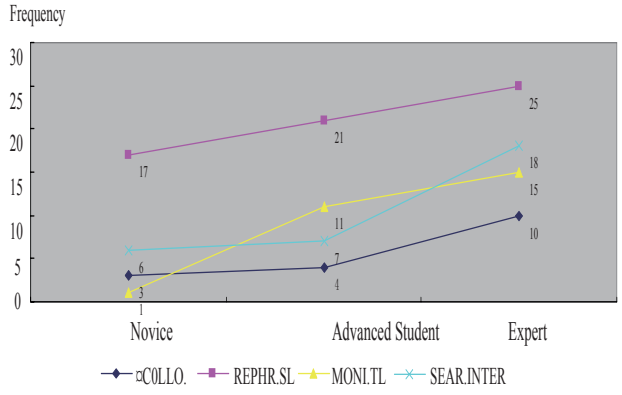

Figure 3
Rising Tendencies in Specific Strategy Use

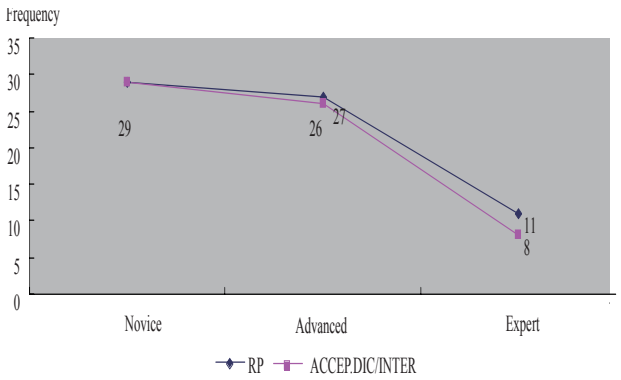

Figure 4
Descending Tendencies in Specific

It is an indication that the novice's resort to external references, mainly the dictionary was more often than the other two translators. From another perspective, the higher expertise the translator has, the more analytic and monitoring strategies the translator uses, which reveals the translator's confidence and independency in the application of internal knowledge. This finding is surprisingly similar with the research of the second language writing by Kamimura (2000) and Wang (2005), who indicates that when a student's L2 writing level reaches a certain level, s/he may adopt certain strategies more than some other strategies.

3.2 Strategy Differences Due to Text Types

Another question this study focuses on is the differences of strategy patterns due to different text types. Experiments show that three translators are aware of the differences on the typology of texts as each of them refers to text types three times during translation. The author wants to explore whether translators adopt any corresponding strategic measures toward the different text types.

Four typical features filtered are as follows: Firstly, these two strategies as "Refer to Extra-linguistic Context" and "Assess the Chose Translation" adopted in text one (the poem) by all three translators with different expertise far outnumber others. Further examination with their TAPs implies that translators have noticed the specificity of poem translation and have tried to transmit the aesthetic form regardless of how the ultimate effects are. Secondly, in text two (the operation instruction), three of them put forth effort on the "Monitor for TL Accuracy " and "Revise the Translation", which can suggest that they care much on the accuracy of informative texts. Thirdly, in text three (the advertisement), the novice and the advanced student rely much on "Search Dictionary", "Judgment on Dictionary" and "Accept Dictionary". These three strategies account for 37.1% and 26.4% respectively of their total number of strategies by the two translators. While the professional translator turns much to the internet for getting more information about the product. The researcher assumes that only the professional translator tries to elicit the desired response of the target readers by borrowing some idiomatic expressions from the products' promotional websites. In the following interview, both the novice and the advanced student admit that they are unable to make the equivalent effect of the advertisement, although they have noticed its appellative function. They just try to guarantee the completeness of the version and the proper choice of the words. Fourthly, in text one, both the advanced student and the professional translator employ more "Analytical scheme" rather than the other two patterns of "Intuitional Scheme" and "Instrumental Scheme", which implies that translators need to make more efforts to analyze the source text. Besides, 44 words in text one drive three translators to use 112, 154 and 75 strategies respectively. The comparatively highest frequency of strategy uses seemingly reveals that text one i.e. the poem is the most cognitively demanding segment. To identify this hypothesis, the following data will be examined in each text segment: the total processing time, the pause time, number of words, number of pauses and a series of derivatives.

3.3 Differences of Translators' Cognitive Effort Due to Text Types

It has been claimed that pauses are indicators of cognitive effort in both monolingual language production and in translation process research (O'Brien, 2006； Lacruz, Shreve, & Angelone, 2012) It is assumed within cognitive psychology that longer pauses reflect cognitive processes that are more effortful compared to processes reflected by shorter pauses (Rydning, 2002). Lacruz et al. find that the average pause ratio was higher for less cognitively demanding segments than for more cognitively demanding segments. (Lacruz, Shreve, & Angelone, 2012) But to date there is less agreement on the length of pause as the indicator of cognitive process. Jakobsen (1998) suggests that a pause length of 1 second is appropriate for observing delays in a text production event. Rydning believes five seconds of pauses should be more appropriate because they eliminate those ones resulting from more mechanical activities such as different typing

speed between the translating subjects, thus allowing the researchers to concentrate on pauses assumed to be related to the translating process itself (Rydning, 2002). This study will adopt average pause duration per word (total pause duration/number of words) and the average pause ratio (average time per pause/average time per word) as the indicators of cognitive load. Pauses lasting more than five seconds are viewed as the symbol of cognitive processing. The results were found that for three translators, the average pause duration per word lasts longest in text one (poem) and shortest in text two (the operating instruction), while the average pause ratio is lowest in text one and highest in text two. Previous studies (Rydning, 2002; Lacruz**,** Shreve, & Angelone, 2012) have shown that longer pauses and lower average pause ratio means more cognitive effort. The current study reveals that text one (poem) is the most cognitively demanding and text two (the operating instruction) is the least cognitively demanding. (See Table 2)This gets proved by the interview after the experiment in which three translators claim unanimously that operating instruction is easier for them while poem is the most difficult one.

Table 2
The Technical and Temporal Data Provided by Translog in Three Texts by the Translators

	A1	A2	A3	B1	B2	B3	C1	C2	C3
Total processing time (Min)	20.60	29.60	22.17	23.05	41.44	25.26	20.33	43.49	27.59
Total pause duration (Min)	15.70	21.32	17.23	15.46	28.70	18.38	17.68	36.09	23.22
Number of words	44	217	119	44	217	119	44	217	119
Average time per word (Sec)[a]	28.09	8.18	11.18	31.43	11.46	12.74	27.72	12.02	13.91
Average pause duration per word (Sec)[b]	21.40	5.89	8.69	21.08	7.93	9.27	24.11	9.98	11.71
Number of pauses	37	53	35	34	64	41	24	56	32
Average time per pause (Sec)[c]	25.46	24.14	29.54	27.28	26.91	26.90	44.20	38.67	43.54
Average pause ratio[d]	0.91	2.95	2.64	0.87	2.35	2.11	1.59	3.22	3.13

*Note.*A=Novice, B=Advanced Student C=Professional translator
1=Text one (poem) 2=Text two (operating instruction) 3=Text three (advertisement)
a=Total processing time/number of words,
b=Total pause duration/number of words,
c=Total pause duration/number of pauses,
d=Average time per pause/average time per word.

CONCLUSION

The researcher of this study classifies translators' immediate reaction to translation problems into intuitional scheme, analytical scheme and instrumental scheme. During the procedure of solving each problem, translators form a strategy cluster, either explicitly or implicitly. Each strategy cluster starts from realizing a problem and ends with the positive or negative solution of the problem. Between the two ends, each strategy element such as "Rephrase ST Segment" "Comment/Analyze ST Segment" "Refer to Synonyms" is defined more concretely and figuratively than those of Lörscher's basic structure such as "preliminary solution to a translation problem", "search for a solution to a translation problem", "parts of a solution to a translation problem" etc..

The results of the range and number of strategy uses by three translators suggest that when the translator's expertise reaches a certain threshold, s/he puts more cognitive effort to translating than the novice as well as the professional translator. The more proficient the translator is, the more internal knowledge of analytic and monitoring strategies s/he uses and the less s/he turns to external aid like searching on-line dictionary.

Generally the analytical scheme is more often used in the poem and instrumental scheme in the advertisement. The Translog data demonstrate that the poem calls for most cognitive effort and operating instruction the least. But it still lacks sufficient evidence to deduce that Reiss's three text types: informative (with the operating instruction as the representative in this study), expressive (with the poem as the representative) and operative (with the advertisement as the representative) texts enjoy the same strategy patterns. The largest scale of experimental study is still needed to further prove the correlation between the cognitive effort and text types.

REFERENCES

Hansen, G. (2003). Controlling the process: Theoretical and methodological reflections on research into translation processes. In F. Alves (Ed.), *Triangulating translation: Perspectives in process-oriented research*. Amsterdam: John Benjamins.

Jääskeläinen, R. (2009). Looking for a working definition of "translation strategies". In M. I. Mees, F. Alves, & S. Göpferich (Eds.), *Methodology, technology and innovation in translation process research- A tribute to Arnt Lykke Jakobsen* (pp.375-387). Frederiksberg: Samfundslitteratur.

Jääskeläinen, R. (1993). Investigating translation strategies. In S. Tirkkonen-Condit & J. Laffling (Eds.), *Recent trends in empirical translation research* (pp.99-120). Joensuu: Faculty of Arts.

Jakobsen, A.-L. (1998). Logging time delay in translation, LSP texts and the translation process. *Copenhagen Working Papers,* 73-101.

Kamimura, T. (2000). Integrating of process and product orientations in EFL writing instruction. *RELC Journal, 31*(2), 1-25.

Kiraly, D. (1995). *Pathways to translation: Pedagogy and process*. Kent: The Kent State University Press.

Kussmaul, P., & Tirkkonen-Condit, S. (1995). Think-aloud protocol analysis in translation studies. *TTR: Traduction, Terminologie, R*édaction*, 8*(1), 177-199.

Lacruz, I., Gregory, M. S., & Angelone, E. (2012). *Average pause ratio as an indicator of cognitive effort in post-editing: A case study*. Retrieved from http://amta2012.amtaweb.org/AMTA2012Files/html/2/2_paper.pdf

Lörscher, W. (1991). *Translation performance, translation process, and translation strategies: A psycholinguistic investigation*. Tubingen: Gunter Narr.

Lörscher, W. (1993). Translation process analysis. In Y. Gambier & J. Tommola (Eds.), *Translation and knowledge* (pp.195-212). Turku: University of Turku, Center for Translation and Interpreting.

Lörscher, W. (1996). A psycholinguistic analysis of translation processes. *Meta, 1,* 26-32.

Munday, J. (2001). *Introducing translation studies: Theories and applications*. London and New York: Routledge.

O'Brien, S. (2006). Pauses as indicators of cognitive effort in post-editing machine translation output. *Across Languages and Cultures, 7* (1), 1-21.

Rydning, A. F. (2002). *Brief Introduction to the Methodology of Translog and Think Aloud Protocols (TAPs)*. Retrieved from http://wenku.baidu.com/view/79e5fabe960590c69ec376ce.html.

Timarová, S., Dragsted, B., & Hansen, I. G. (2011). Time lag in translation and interpreting. In C. Alvstad, A. Hild, & E. Tiselius (Eds.), *Methods and strategies of process research* (pp.121-1146). Amsterdam/Philadelphia: John Benjamins.

Wang, J. J. (2005). *From ideas to text: A cognitive study of English writing processes*. Jinan, China: Shandong University Press.

Zheng, B. H. (2012). *Choice-making in the process of English-to-Chinese translation: An empirical study*. Beijing: Foreign Language Teaching and Research Press.