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Testing Indicators of Translation Expertise in an Intralingual Task

Abstract

Massey/Ehrensberger-Dow (2014) showed that the focused use of external resources, more frequent but shorter pauses, and fast text production speed correlated with the level of translation experience in participants translating a text from English into German. This paper aims to: (1) investigate whether these indicators distinguish professional translators from trainees and language students who translated from English into Polish, and (2) test which indicators are also present in an intralingual task, i.e., when paraphrasing a text. Additionally, task duration and the quality of the target texts produced by the three groups are compared with a view to expand the list of indicators of translation expertise. The data discussed here come from the ParaTrans research project in which professional translators, translation trainees and language students translated and paraphrased comparable texts.[1] The results confirm that the less frequent use of external resources, shorter problem-solving pauses, fast text production and high quality target texts are strong indicators of expertise in translation. The number of problem-solving pauses was the only parameter found to distinguish professionals from trainees and language students in the paraphrasing task. This suggests that translation expertise perceived as a general construct can be seen as encompassing task expertise: the ability to reformulate meaning (transferable to a paraphrasing task) and the domain knowledge expertise inclusive of the ability to efficiently use bilingual knowledge when producing a translation.

Key words

translation expertise; indicators of expertise; paraphrasing; economy of effort; processing speed; key-logging; bilingual knowledge management

1.   Introduction

Experts are generally expected to process information faster and more accurately (Shreve 2002, Ericsson 2010). Their performance shows economy of effort and they are able to efficiently deal with rare or atypical cases when compared to other professionals and novices (Hoffman 1997). In effect, experts in a domain exhibit "consistently superior performance on a specified set of representative tasks for the domain" (Ericsson/Charness 1994: 731). Specifying the set of representative skills and tasks for the domain of translation has proved to be a major challenge as demonstrated by translation competence research (see Muñoz's 2014 proposal). Translation expertise remains difficult to measure in terms of behaviours that are objectively visible in performance. Massey/Ehrensberger-Dow (2014) showed that the focused use of external resources, short but frequent pausing, and fast typing speeds were strong indicators of translation expertise for participants translating from English into German. This paper reports on a study which tested the above indicators in the translation performance of professional translators, translation trainees, and language students who translated a text from English into Polish and who paraphrased a similar text in Polish (their native language). By comparing performance on the two procedurally and con-

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ceptually similar tasks, the study explores to what extent the 'superior performance' in translation is related to task expertise in reformulating meaning in general and to what extent it is attributed to a better control over the two languages the translator works in. First, the concept of translation expertise is revisited and the selected indicators of expertise are discussed, in order to provide a theoretical background. Next, the motivation behind comparing performance in interlingual and intralingual translation is explained. The description of the study follows, with the methodology, the results and some possible pedagogical implications.

2.   Translation expertise revisited

The nature of translation expertise remains of key interest in cognitively oriented translation studies but the construct itself is complex and has fuzzy boundaries. On the one hand, the term 'translation expertise' alike 'translation competence' is used to refer to the knowledge and skills needed to translate at a professional level (Hurtado et al. 2015). On the other hand, expertise is equated with the maximum level of attainment which guarantees superior performance (Ericsson/Charness 1994, Ericsson 2010, Whyatt 2012: 29). As observed by Muñoz (2014: 9) expertise is usually perceived as a combination of at least three factors: experience, knowledge and problem solving skills which mutually feed on one another and interact in the process of expertise development, but which single-handedly cannot be perceived as equivalent to expertise.

The length of professional experience is often used as a proxy indicator of expertise and this paper is no exception. It is tacitly assumed that a professional translator will be more skilled than a translation trainee, but the length of experience is not an automatic guarantee of superior performance and high quality translation. Jääskeläinen (2010: 215) notes that the requirement of "consistently superior performance" will not be met by all professional translators therefore expertise should not be used as synonymous with professional experience. Expertise scholars (Ericsson/ Charness 1994, Shreve 2002, Ericsson 2010) insist that it is not the length of professional experience that is a condition for expertise development but the ability to use it for deliberate practice and improvement. If used intentionally, experience provides feedback and enhances the cognitive resources needed to translate efficiently by reorganizing knowledge and making it easily accessible for future performance (Diamond/Shreve 2017).

For most people, expertise in a domain means having expert knowledge and skills leading to superior performance on domain specific tasks. Performing a translation task requires the ability to activate, select and integrate all necessary cognitive resources, including the bilingual mental lexicon, factual knowledge and sensitivity to intercultural issues (see Whyatt 2012). When several kinds of knowledge (both declarative and procedural) are "filtered through the translator's cognitive process" (Rojo/Ibarretxe-Antuñano 2013: 13) some information activated from the translator's long-term memory will be prioritized while other information will be inhibited as irrelevant. Such dynamic on-line activation and selective use of knowledge requires efficient organization. Translation expertise does not mean having more knowledge but rather having it effectively and efficiently organized and therefore more readily available (Diamond/Shreve 2017: 478). If the required knowledge, either linguistic or conceptual, is quickly accessed, it will contribute to the overall processing speed and efficient performance. If, however, it cannot be found in the translator's memory, it will have to be searched for in information sources. Because translation is a cross-language task, Diamond/Shreve (2017: 490) claim that "the scope and strength of the two bilingual vocabularies is a critical factor".

Building efficient knowledge networks is a product of translation experience coupled with the translator's deliberate effort to encode newly acquired knowledge into the existing network. Professional translators often specialize in certain domains and acquire extensive conceptual knowledge and specialized vocabulary. Many studies report on the exceptionally fast access to long-term memory resources among experts in various domains (Ericsson/Charness 1994, Ericsson 2010). There is also evidence that the cognitively demanding cooperation between the translator's working memory and long-term memory, including constant language switching, results in

enhanced executive control, more effective metacognition, efficient encoding mechanisms (Diamond/Shreve 2017), larger verbal and spatial memory spans (Babcock/Vallesi 2015) and interference suppression (Dong/Zhong 2017). The cognitive effects of the repeated use of knowledge in translation practice, both procedural and declarative, contribute to efficient problem solving, which is the next attribute of expertise.

The problem-solving skills of professional translators have been frequently compared to those of trainees and language learners and there is a robust body of evidence that professionals process information with more economy of effort. Knowing that what differentiates professionals' performance from novices will help to educate future translators has been pedagogical motivation (Pym 2009: 136) and the driving force of many multi-method projects, with PACTE (2003), TransComp (Göpferich 2013), and CTP – Capturing Translation Processes (Massey/Ehrensberger-Dow 2014) as outstanding examples.

The differences in the processing patterns which distinguish professionals from novices can be classified into the macro-level and micro-level ones (see Tirkkonen-Condit/Jääskeläinen 2000, Jakobsen 2014). At the macro level professional translators outperform trainees in the way they approach the source text (ST), become sensitive to its function, text type and expectations of the potential readers of the target text (TT). Hönig (1991) referred to these aspects as being characteristic of a macro-strategy which provides experienced translators with guidance when they solve problems and make decisions at the micro-level of TT production, which is when they translate chunks of the ST and produce their target language representation. Such goal-oriented behaviour is not a feature of inexperienced translators (see Göpferich 2009).

When working at the micro level of TT production, expert translators are able to pick up "salient cues to problem solving in the input stream" (Diamond/Shreve 2017: 485), retrieve relevant information and envisage its effect on the potential reader of the translated text. Following Slobin's (1996) theory of 'thinking for speaking', expert translators might engage in 'thinking for translating' and efficiently reformulate meaning by encoding it in linguistic frames that are available in their long-term memory, and which will be readily activated by the reader of the TT during his/her construal of meaning. Englund Dimitrova (2005), Göpferich (2009), Massey/Ehrensberger-Dow (2014), among others, reported that professional translators when compared to trainees are more self-reliant when making decisions. They efficiently segment the source language text and need less time to plan longer stretches of target text (Dragsted 2005, Englund Dimitrova 2005, Jakobsen 2005, Hurtado et al. 2015). Translation trainees are in the process of developing their expertise and their problem solving shows less economy of effort, less control over their performance, and more need for consulting information sources to make decisions. They need more time to segment the source text and resolve local lexical/semantic problems. In effect, their language processing patterns are cognitively more effortful and their cognitive rhythm is less fluent (Dragsted 2005, Buchweitz/Alves 2006).

Translation expertise as a unique combination of experience, knowledge and skills is the aim of professional development which starts in translation training programmes and progressively develops when supported by deliberate practice. Expertise is also believed to be transferable to procedurally and conceptually similar tasks, but it still remains difficult to operationalize. Yet, "as an artifact for scientific research, expertise is only interesting if it can be operationalized and related to behavior" (Muñoz 2014: 10).

3. Indicators of translation expertise

Although translation expertise is used in a general sense as "the bulk of cognitive resources and abilities leading to behaviours that lead to superior performance in translation tasks" (Muñoz 2014: 34), the nature of superior performance is underspecified. The two features that are usually referred to when talking about expert performance are the processing speed and accuracy, which is tacitly assumed to lead to high quality translations. According to Massey/Ehrensberger-Dow

(2014: 81) "[f]ocused use of external resources, pausing and speed of target text production" are closely related to the level of translation experience. The three measures of the translation process have a direct impact on the overall processing speed that, as mentioned, is a common attribute of expertise. Therefore, by extension they will be treated in this paper as indicators of translation expertise. Let us have a closer look at the research into the three indicators.

3.1. The use of external resources and the level of expertise

Even the most effectively organized knowledge ascribed to expert translators may not be sufficient to perform a translation task, especially if it is outside the translator's usual area of expertise. Translating texts involves not only the use of the translator's memory but in its embedded and extended nature (Risku et al. 2013), it heavily relies on the support derived from other information sources (Dam-Jensen/Heine 2013: 94). These external resources can be viewed as the repositories of a collective social memory, a kind of cognitive-cultural heritage now available at the fingertips via Internet search engines (see Wilss 1996 and his predictions).[2] From the TPR studies which included the use of external resources, the study by Massey/Ehrensberger-Dow (2014: 84) showed that their use is clearly modulated by the level of experience. The data collected from participants at three levels of expertise – beginners, MA translation students and professional translators elicited during the first 15 minutes of the translation process by key-logging and screen-recording – revealed that the beginners consulted information sources more frequently than the translation students, and nearly twice as often as the professionals (Massey/Ehrensberger-Dow 2014: 86). Experienced translators showed more self-confidence, relied on their knowledge and, when they turned to information sources, their use was more focused (fewer but longer searches).

   This conclusion does not seem surprising, but the fact that the use of external resources in itself adds up to the overall cognitive effort needed to produce a translation, both in terms of time and cognitive capacity, should not be overlooked. The act of consulting external resources has its positive side of finding the necessary information which will allow the translator to solve a problem (see Enríquez 2014 for a detailed analysis of the translator's web searching behaviour). However, it can be cognitively costly due to the need to switch between the task of reading the ST and/or typing the TT to the task of searching for information. After searching for information the translator returns to the place where the transfer could not proceed without help and usually has to re-read the part of the text which has been produced and try to incorporate the newly found information into the emerging text (Asadi/Séguinot 2005). Sometimes the ST segment will also need to be re-read to refresh the working memory and proceed with the task. As demonstrated by cognitive psychology, task switching is taxing for the overall cognitive capacity. Monsel (2003: 134) reports that after switching between quite simple tasks the responses are more error-prone and substantially slower. In effect, the more frequent use of external resources contributes to slower processing speed.

3.2. Pausing and the level of expertise

Pausing is a natural phenomenon in any language production, as whatever is said or written needs to be planned and sometimes rehearsed, self-revised or self-corrected (Schilperoord 1996, Torrance et al. 2007). Hesitations occur in spontaneous speech or writing at points where the speaker has to make decisions and choices (Schilperoord/Sanders 1997: 248). The major difference between naturally occurring pauses and problem solving pauses is their duration. Long pauses (usually longer than 5 seconds) in text production have been treated as "observable and measurable

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2   Unfortunately, a lot of TPR studies using key-logging and eye-tracking have not included the use of external resources (online dictionaries, data bases, etc.) in their design (see Whyatt et al. 2017b) although the way in which the easy access to information sources has changed the work of translators is commonly acknowledged. Donald (2001: 569) refers to the www as a "global memory palace'", "an exploding global storehouse" with virtually limitless records and poses the question of how we should educate people to handle its "sheer immensity". This observation pertains also to translation trainees.

behavioural correlates" (Jakobsen 2014: 75) of problem-solving. Many studies using key-logging and eye-tracking demonstrated that the more difficult the problem is to solve, the longer the pause is in text production (Dragsted 2005, Englund Dimitrova 2005, Buchweitz/Alves 2006, Immonen 2006, Carl/Dragsted 2012, Jakobsen 2016).

There is a general consensus that expertise modulates the number and length of pauses as well as the length of production units in-between pauses. Experienced translators produce longer stretches of text and work at clause level (Dragsted 2005) while trainees tend to make longer pauses and type shorter segments of the target text (single words or phrases). Massey/Ehrensberger-Dow (2014: 89-90) found that their professional translators paused significantly more than beginners, but their pauses were shorter and they still managed to produce more text in the first 10 minutes of their TT drafting stage. This finding is in line with the enhanced problem-solving behaviour in expertise research and confirms the economy of effort ascribed to expert translators.

3.3. The speed of target text production and the level of expertise

The speed of TT production was found to correlate with the level of expertise by Massey/Ehrensberger-Dow (2014: 90) who reported that professional translators produced 72 words while MA students only 50.5 and beginners 49 words in the first 10 minutes of the drafting phase they studied. The speed of TT production was significantly higher for professionals (6.1 words per minute) than for trainees (4.7) and beginners (3.9). Similarly, Dragsted (2005) found that "[t]he average production speed, excluding revision, was almost twice as high in the professional group (620 sec.) as in the student group (1231 sec.) in the translation of the easy text. In the difficult text, the professionals produced 1.7 times faster than the students".

The complexity of text production in translation deserves more attention for at least two reasons. The first reason is the multitasking it requires in terms of (1) "harvesting a new translatable unit" (Jakobsen 2016: 166) of the ST, (2) searching through the bilingual mental lexicon (or an online dictionary) to select matching target language words, (3) switching over to the target language writing system (including the text type conventions), (4) inhibiting interference from the source language, and (5) self-monitoring the TT production while holding meaning construed from the ST available in the working memory, so that it can be matched against the meaning which is anticipated to emerge from the TT when read by a potential reader. Needless to say, the more information the translator considers while selecting a target language word there is a better chance that the formulated TT chunk will fit in with the already produced text and its emerging sense. This brings the second reason to consider when looking at the speed of TT production - the limitations of the working memory. Experts are believed to be able to exceed the limitations imposed on the working memory capacity, most likely because of having automatized certain low-level processes (e.g. vocabulary access). They may also demonstrate excellent cooperation between mental processing and motor skills execution – the mind is working on finding the most suitable TT equivalent and the typing starts immediately to offload the processed content from the working memory (see Alamargot 2007 on writing as a process of interaction between the text just produced and the intended semantic content in the writer's mind). The less experienced translators might need more time to reach acceptable problem solutions in their minds first before they offload their working memory by typing the TT chunk.[3] This approach will slow down text production to a considerable degree.

The purpose of this experimental study was to test whether the three indicators of expertise reported by Massey/Ehrensberger-Dow (2014) will retain their status in another language pair – an

English to Polish translation task. The three indicators are further tested in a paraphrasing task.[4] There are two reasons for testing whether the indicators of translation expertise will also differentiate professionals from the less experienced participants when they perform a paraphrasing task; (1) to confirm whether translation expertise is transferable to similar tasks and (2) to investigate whether translation expertise as a general construct can be broken down to task expertise responsible for the skill of reformulating meaning and to domain knowledge expertise including the skill of bilingual knowledge management. Apart from testing the three factors suggested by Massey/ Ehrensberger-Dow (2014), task duration is added as another indicator of processing speed and the quality of the target texts is compared as a measure of accuracy – the second attribute of expertise (see Sirén/Hakkarainen 2002).

4.   The study

4.1.   The rationale behind comparing performance in translation and paraphrasing

Although expertise in general is assumed to be domain specific, it is also held to be transferable to procedurally similar tasks (Kimball/Holyoak 2000: 110). The rationale behind testing the indicators of translation expertise in an intralingual task (i.e., a paraphrasing task) is based precisely on the procedural and conceptual similarity between the two kinds of translation. Contrary to Mossop's view that "intralingual work differs procedurally, formally and in particular functionally from interlingual work" (2016: 1), there is empirical evidence that translators use similar strategies in both tasks and demonstrate similar goal-oriented behaviour. Zethsen (2009: 808) reported that simplification, explicitation, omission and restructuring were among the strategies used in her case study of intralingual translation of the Bible. Whyatt et al. (2016: 213) found "positive correlations between the processing speed, the number of pauses and text chunks" in a translation task and a paraphrasing task performed by professional translators. More evidence confirming the possible transfer of skills from interlingual to intralingual tasks was also reported by Christensen (2012: 86). She compared translation trainees and communication students and noted that the trainees were more focused on the ST and its close relationship to the TT than the communication students with no experience in translation. The above empirical findings confirm the procedural similarity between interlingual and intralingual translation, but the fundamental difference between the two kinds of transfer also needs to be recognised.

"Translation proper" (Jakobson 1959) involves working in two languages with the aim to express the same or similar sense in another language. This makes translation a cross-language task and requires the controlled management and application of bilingual knowledge, apart from the more generic ability to reformulate meaning in different linguistic forms (also present in intralingual transfer). The ability to efficiently switch between the two languages, that of the ST and that of the TT, and the stability of the communicative skills in both languages, including the two bilingual vocabularies, are key factors (Diamond/Shreve 2017: 490).

Acknowledging the procedural similarity and the fundamental difference between the two kinds of translation provides perfect conditions for investigating whether translation expertise can be broken down to task expertise (reformulation and re-expression of meaning) and domain knowledge expertise (including the management of bilingual knowledge).

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4   Paraphrasing is treated here as a sub-form of intralingual translation – saying more or less the same but in different wording and for a different purpose. Intralingual translation is a broad area of practice (see Whyatt 2017) and the debate whether it should be included in the discipline of Translation Studies is ongoing with advocates (Zethsen 2007, 2009, Whyatt et al. 2016) and opponents (Mossop 2016) voicing their arguments.

4.2. Hypotheses and the study design[5]

The following hypotheses were formulated:

1. Fewer consultations in online resources, shorter problem solving pauses, faster text production speed, shorter task duration, and better quality target texts differentiate professionals from trainees and language students and therefore can be treated as indicators of translation expertise;

2. Translation expertise is only partially transferred to a paraphrasing task because performance in intralingual translation shares only the task expertise component (i.e., ability to reformulate meaning) with the performance in a translation task;

3. The differences in the indicators of expertise between the two tasks point to the domain knowledge component (including the bilingual knowledge) of translation expertise.

If confirmed, Hypothesis 1 will support the findings by Massey/Ehrensberger-Dow (2014) and expand the indicators by task duration and TT quality. Hypothesis 2 and 3, if confirmed, will corroborate the dual nature of translation expertise, with one more generic component of task expertise (reformulation of meaning), and one more specific component responsible for the efficient application of the domain knowledge. As both components participate in problem solving, their separation is a purely theoretical suggestion but potentially useful for pedagogical purposes.

The study is a 3 × 2 design. The independent variables are the three groups of participants with different levels of translation experience and the two tasks: translating and paraphrasing a text. The dependent variables are (a) the number of consultations in online resources, (b) the number of problem solving pauses, (c) text production speed, (d) total task duration and (e) the quality of the target texts.

4.3. Participants, materials, procedure and data analysis

The data were collected from participants with assumed different levels of translation expertise: professional translators (N22), translation trainees in the final year of their MA studies (N22) and language students also in the final year of their MA studies in English (N22).[6] All the participants translated a text from English (their L2) into Polish (their L1) and paraphrased a similar text in their L1. The texts were of a comparable level of complexity (12.8 on the SMOG readability index for the text in English and 13.9 for the text in Polish). They also belonged to the same text type (hotel website promotional texts), had the same rhetorical structure (see Alves et al. 2011) and the same target readership. The participants received clear instructions to translate and paraphrase the texts for the same purpose, namely they were told that the texts will appear in the same holiday brochure.[7] All participants worked on their own in an eye-tracking lab and there was no time limit. Most participants spent about 90–120 minutes in the lab to become familiar with the set-up, receive instructions and perform the experimental tasks. Task order was counterbalanced to eliminate spill-over effects from task order or fatigue.

The translation process data analysed in this study were collected by the key-logging software Translog II and the screen capture programme Morae by TechSmith.[8] For technical reasons, and due to the typological differences between English and Polish, the texts differed in the number of words (307 for translation and 258 for paraphrasing), so all the process data obtained in the study

5 The data for the present study come from the ParaTrans project (see Whyatt et al. 2016). More on the ParaTrans project at https://paratrans.wordpress.com/

6 For a more detailed description of participants see Whyatt et al. 2017b.

7 Matching texts in typologically different languages for the same level of complexity is extremely difficult and readability scores are not the best predictor of translation difficulty. All the possible measures including the translation brief were taken to assure that the source texts were comparable.

8 The eye-tracking data were also collected in the ParaTrans project but are not used in this study.

were normalized for a 250-word text before they were analysed.[9] The assessment of the quality of the texts produced in the experiment was done by two experienced translation trainers in two steps. First, they assessed the texts holistically for their communicative quality and readability on a scale from 1-5 (where 1 means very poor, 2 means poor, 3 means satisfactory, 4 means good, and 5 means excellent). Next they assessed the texts using an internal evaluation scheme based on error detection (see Ipsen/Dam 2016) according to which the maximum number of points a text can score is 20, and for each error depending on its gravity points are subtracted. The closer the number scored to 20, means that fewer errors were detected and thus the better the quality of the target text. [10]

4.4. The results

The results are reported by descriptive statistics (mean (*M*) and standard deviation (*SD*)). The inferential statistics is based on the one-way analysis of variance (ANOVA) to establish the main effects of expertise. Post hoc analyses using Tukey's HSD were carried out for the statistically significant results to establish where (between which groups of participants) the main effects of translation expertise on the dependent variables were located. Within-subjects t-tests were carried out to compare the effect of the task on the performance for each group. The effect size was calculated using Cohen's *d* to assess how strong the effect was and how meaningful the significant results are.

4.4.1. The use of external resources

The level of translation expertise modulated the use of online resources in the translation task (*F* = 24.9; p < .001) and in the paraphrasing task (*F* = 3.43; p = .03). The post hoc tests for the translation task showed a significant difference between the professional translators and the trainees (p < .001) and between the professional translators and the language students (p < .001). When translating, trainees and language students turned to online resources in the Internet browser on average twice as often (14 and 13 times respectively) as professional translators (7 times). The post hoc tests for the paraphrasing task showed a statistically significant difference only between the trainees and the language students (p = .01) with the trainees using online resources most often. When comparing the use of online resources between the two tasks, all three groups used online resources significantly more when translating than when paraphrasing (p < .001). Figure 1 shows the means for all groups in both tasks.
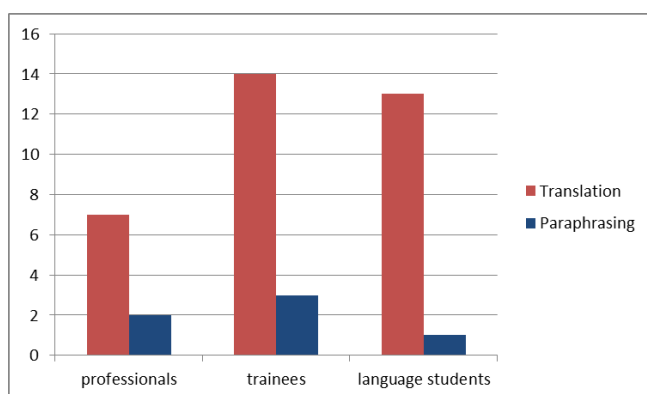

Figure 1. Number of consultations in online resources during translation and paraphrasing

9   The normalization of data samples is commonly applied in corpus studies when the samples are not identical in word length. Because of the complex system of inflections, Polish generally tends to have longer words than English.
10 The internal evaluation scheme is used in the translation training programmes in the Faculty of English at Adam Mickiewicz University. The points scored on error detection are then converted into grades in the following way: 1–11 fail; 12–13.75 pass; 14–14.75 pass plus; 15–16.75 good; 17–17.75 good plus; 18–20 excellent.

4.4.2. The number of problem solving pauses

Problem-solving pauses were measured at two levels – longer than 5 seconds and longer than 10 seconds, following the assumption that pauses longer than 10 seconds will reflect more processing difficulty in the participants than pauses longer than 5 seconds. There was no statistically significant difference between the number of pauses longer than 5 seconds during the translation task ($M = 70$ for the professionals, 78 for the trainees, and 73 for the language students). However, there was a statistically significant difference in the number of pauses longer than 10 seconds ($F = 13.67$; $p < .001$). On average, professional translators paused for more than 10 seconds only 32 times while trainees made as many as 67 such pauses, and language students paused for more than 10 seconds 53 times when typing their translations.

   When paraphrasing, there was a significant difference in the number of pauses longer than 5 seconds ($F = 10.68$; $p < .001$). Professional translators made significantly more pauses longer than 5 seconds (64) than trainees (42) – $p = .001$, and language students (39) – $p < .001$. There was no significant difference in the number of pauses longer than 10 seconds in the paraphrasing task. When comparing the number of pauses for all three groups in both tasks the trainees and the language students made significantly more pauses longer than 5 seconds ($p < .001$) and longer than 10 seconds ($p < .001$) when translating than when paraphrasing. The difference in the number of such long pauses was non-significant for the professional translators in both tasks: $p = .17$ for pauses longer than 5 seconds, and $p = .36$ for pauses longer than 10 seconds. Figure 2 and Figure 3 illustrate the mean number of pauses longer than 5 seconds and longer than 10 seconds for the three groups in both tasks.
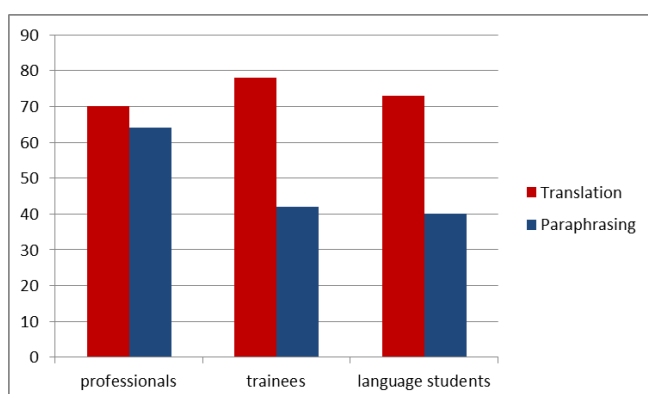

Figure 2. Number of pauses longer than 5 seconds during translation and paraphrasing
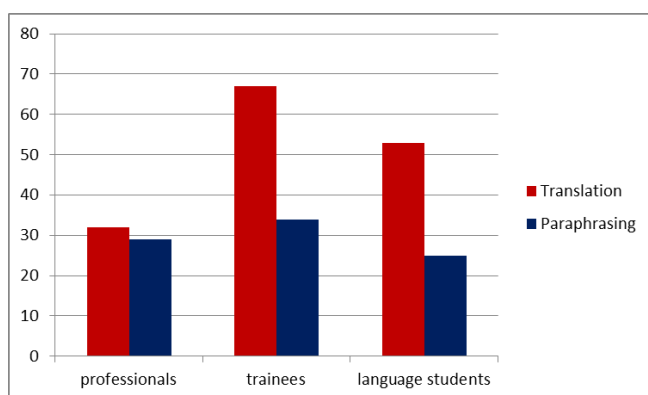

Figure 3. Number of pauses longer than 10 seconds during translation and paraphrasing

4.4.3. Text production speed

Translog gives two measures which reflect the speed of typing the target text. One is the number of total user events which calculate the overall keyboard activity, including not only letter keystrokes and spaces but also function keystrokes such as delete, backspace control, shift, etc. The other measure, referred to as text production per minute, includes only letter keystrokes and spaces. In this study both measures were analysed. Professional translators had a higher rate of overall keyboard activity ($M = 101$ events per minute) than trainees (78), and language students (82). The difference is statistically significant for professionals and trainees ($p < .01$), and professionals and language students ($p < .03$). Text production per minute, however, showed no significant differences between the means for the three groups of participants ($M = 68$ for professionals vs. 58 for the trainees, and 59 for the language students).

In the paraphrasing task, professionals, trainees and language students typed their TTs at a similar pace and there were no statistically significant effects of expertise on the number of total user events ($M = 115$ for the professionals vs. 105 for the trainees, and 109 for the language students), or on the number of text production per minute ($M = 80$ for the professionals vs. 75 for the trainees, 79 for the language students). In effect, all the groups worked significantly faster when paraphrasing than when translating. The difference in the number of total user events per minute between the translation task and the paraphrasing was significant for professionals ($p = .01$), for trainees ($p = .001$) and for language students ($p < .001$). Figure 4 shows the number of total user events for all participants in translation and Figure 5 shows the same measurement in the paraphrasing task.
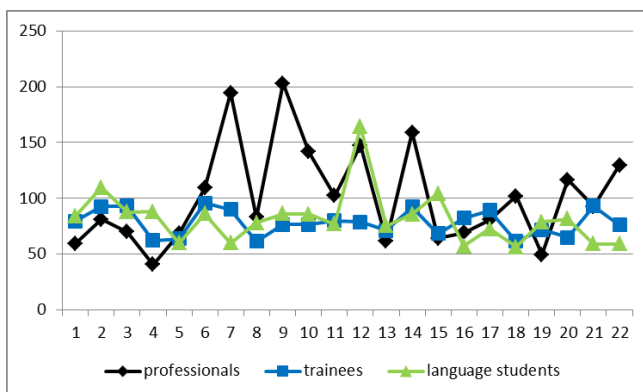

Figure 4. The number of total user events per minute for all participants during translation
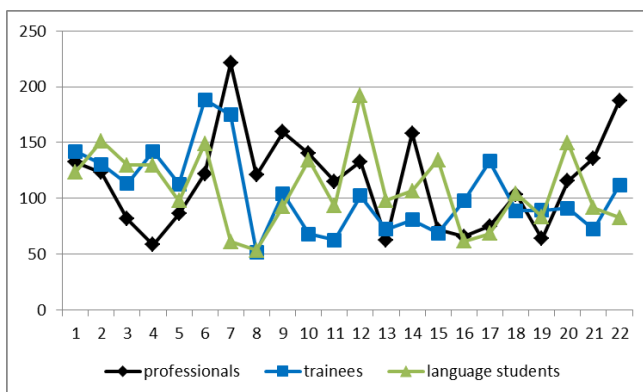

Figure 5. The number of total user events per minute for all participants while paraphrasing

4.4.4. Task duration

Although the trainees took longer to translate the text (M = 44 minutes) as compared to professional translators (M = 39 minutes) and the language students (M = 39 minutes), the difference is not significant. When paraphrasing the text, language students needed on average 27 minutes while professionals took 33 minutes, and trainees 32 minutes to complete the task. The level of translation expertise did not have a statistically significant impact on the duration of both tasks, but all groups needed significantly more time to translate a text than to paraphrase a similar text. Table 1 shows the results of the t-test within groups together with the effect size (*d*) showing that the type of the task had a strong effect on the duration for all of the groups.

task duration in milliseconds	professionals			trainees			language students		
	Mean (*SD*)	(*t*) p-value	*d*	Mean (*SD*)	(*t*) p-value	*d*	Mean (*SD*)	(*t*) p-value	*d*
in translation	2363957 (779196.3)			2617696 (584751.0)			2359622 (460520.0)		
in paraphrasing	1992960 (635618.4)	(2.96) p = .007	.6	1949531 (765844.3)	(3.50) p = .002	.7	1620769 (462479.3)	(7.28) p < .001	1.5

Table 1. The significant effect of task on total task duration for all groups of participants

4.4.5. Target text quality

The professional translators and the trainees produced better quality translations than the language students and the difference was statistically significant (p < .001) on the holistic quality assessment and on error detection. Although the professionals scored slightly higher than the trainees on the holistic assessment, the difference was not significant. The trainees scored higher on the error detection but again the difference exceeded the level of statistical significance – p = .07.

The texts paraphrased by the professional translators and the trainees received more points on the holistic quality assessment than those produced by the language students, but the difference was statistically significant only for the group of trainees and language students (p = .007). The difference between the professionals and the language students exceeded the level of statistical significance (p = .06). Similar to the scores for the translated texts, there was a statistically significant effect of expertise on the quality of the paraphrased texts. Fewer errors were detected in the texts by the professionals and the trainees than in those paraphrased by the language students (p = .001).

Interestingly, when the quality scores for the translated and paraphrased texts were compared within the groups, all the participants irrespective of their level of expertise produced better quality texts when paraphrasing than when translating. The differences were significant for all groups. Table 2 shows the means, standard deviations in the two quality assessments for both tasks, and the statistically significant differences between the higher scores for the paraphrased texts and the lower scores for the translated texts in all of the groups. It is worth noting that the effect of the task on the quality was the largest for the language students whose paraphrased texts were assessed as fairly good but the translated texts were assessed as very poor.

Target text quality	professionals			trainees			language students		
	Mean (*SD*)	(*t*) p-value	*d*	Mean (*SD*)	(*t*) p-value	*d*	Mean (*SD*)	(*t*) p-value	*d*
Translation holistic assessment	3.8 (0.65)			3.7 (0.68)			2.2 (0.45)		
Paraphrasing holistic assessment	4.2 (0.52)	(- 2.17) p =.04	-.5	4.4 (0.38)	(-4.54) p < .001	-1	3.8 (0.74)	(-8.6) p < .001	-1.8
Translation error detection	13.6 (2.29)			14.9 (1.56)			7.9 (3.17)		
Paraphrasing error detection	17.1 (1.36)	(- 5.79) p < .001	-1.2	17.2 (0.4)	-7.5 p < .001	-1.6	15.4 (2.6)	(-9.13) p < .001	-1.9

Table 2. Significant differences in the quality of translated and paraphrased texts

5. Discussion

The aim of this study was twofold: (1) to test which out of five selected indicators of expertise – the focused use of external resources, the number of long pauses, text production speed (reported by Massey/Ehrensberger-Dow, 2014), and expanded here by total task duration and TT quality – distinguish professional translators from trainees and language students in the task of translating a text from English into Polish and in a paraphrasing task; (2) to investigate whether translation expertise can be broken down to task expertise (responsible for reformulating meaning and transferable to the task of paraphrasing a text), and domain knowledge expertise, inclusive of bilingual knowledge management skills, unique only to a translation task.

The results confirmed that professional translators used online resources significantly less than trainees and language students, made fewer long pauses, had faster overall keyboard activity, and generally produced better quality translations, but not significantly better than trainees. The level of expertise did not have a significant effect on the total task duration, which in this study did not prove to be an indicator of translation expertise. This seems to suggest that translation expertise modulates the ways of information processing rather than the overall task duration. Although the professional translators did not use online resources as much as the trainees and the language students, they obviously used their time differently, possibly to reach a high level of accuracy/quality in their target texts.

These findings are in line with the expertise literature, according to which expert knowledge is efficiently organized and readily available in domain specific tasks and results in higher processing speeds (Diamond/Shreve 2017). Trainees and language students either do not have such reliable knowledge networks or lack self-confidence in applying what they know to the task at hand, and therefore need to refer to information sources and take more time to solve problems. Interestingly, the trainees transferred the need to rely on external resources also to the paraphrasing task.

The finding reported in this study according to which the effect of expertise was visible only in the number of pauses longer than 10 seconds points to the need to study longer pauses in line with the problem processing pause duration correlation (Jakobsen 2014, see also Kumpulainen 2015 on the operationalisation of pauses). Professional translators needed less time to start typing their TTs possibly because they efficiently segment the ST, they have better access to their long-term memory, and/or operate with ready-made chunks of target language such as fixed phrases, or lexical bundles, which they have used many times in their previous translation work, and which they can recall and type in one 'burst' (see Slobin 1996, Langacker 2008). This is also confirmed by the significantly higher rate of keyboard activity in professional translators as an indicator of higher processing speed. They seem to offload the processed information from their working memory and type the target text as soon as possible, and even if they will immediately make some changes to the emerging text. The trainees and the language students seem to take more time, their language processing patterns are marked by more uncertainty (see Angelone 2010), and they possibly try to reach an acceptable solution before they start typing the TT (Dragsted 2005, Englund

Dimitrova 2005, Jakobsen 2005). This is in line with the results reported by other TPR studies (Jakobsen 2014, Hurtado et al. 2015).

The TT quality was confirmed to be a strong indicator of expertise but the significant difference in the quality was found only between the language students and professionals and between the language students and trainees. The trainees and professionals produced translations of a comparable high quality. This does not come as a surprise, as the length of translation experience is only one component of translation expertise. As pointed out by Jääskeläinen (2000), professional translators can also produce poor quality translations (Sirén/Hakkarainen 2002), and the trainees in this study might have been just very well prepared to deal with this particular text type. Possibly, the effect of expertise on the quality would be stronger with a more demanding source text. Although the quality assessment is the least objective measure reported in this study, its value as an indicator of expertise is confirmed by the sharp contrast in the quality between translators (including trainees as translators-to-be) and language students. The quality of translation as an indicator of expertise requires more attention in future empirical TPR studies as a tacit attribute of expertise – after all, translators are paid for their products, not the process.

To sum up at this point, while Hypothesis (1) was confirmed except for the total task duration, the validation of Hypothesis (2) and (3) is somehow less straightforward and the discussion of the results might seem more speculative as it opens, or rather re-ignites a discussion on the transferability of expertise, and on the dual nature of translation expertise. The finding that the professional translators made a similar number of pauses longer than 5 seconds and longer than 10 seconds irrespective of whether they translated a text, or paraphrased a text might suggest that task expertise is transferable only at a professional level and not in the earlier stages of development. The trainees and the language students made far more such problem solving pauses when translating than when paraphrasing. It seems that the professional translators have more efficient processing patterns (ST segmentation and segment processing) and better bilingual knowledge management skills. The trainees and language students, being less experienced, found the translating task far more demanding because their processing patterns are less stable and they do not capitalize on their bilingual knowledge management skills as much as professionals do.

The impact of expertise on the quality of the paraphrased texts provides further evidence for the transferability of expertise to procedurally similar tasks. The quality of the texts paraphrased by the professionals and by the trainees was significantly higher on the error detection assessment as there were fewer errors found than in the texts paraphrased by the language students. Finally, all participants produced better quality target texts when they paraphrased them than when they translated them, although they spent significantly more time translating than paraphrasing the texts. This finding confirms that translation is cognitively a much more demanding task.

In what follows, the postulated dual nature of translation expertise remains a theoretical suggestion, as in practice task expertise and the domain knowledge expertise feed on each other and are impossible to disentangle. Still, the dual nature of expertise can be useful in the pedagogical context of training future translators. The pedagogical implication that can be suggested at this point is that translation expertise can be fostered in a way consistent with its hypothesized dual nature. Paraphrasing tasks can provide a good exercise in practicing the generic task expertise of reformulating meaning, including efficient source text segmentation into manageable chunks and the awareness of how similar meanings can be expressed in different wordings. These text processing skills are needed in translation, which involves a considerable amount of intralingual work as well, especially at the stage of revising and improving the target text. The domain specific knowledge, which includes the proceduralized bilingual knowledge management skills, can be optimized by deliberate practice. This optimization of translation expertise, as suggested by Diamond/Shreve (2017) can include a range of tasks whose aim is to improve executive control (see De Groot/Christoffels 2006; Green/Abutalebi 2013, Diamond et al. 2014) and foster the growth and strength of the bilingual mental lexicon to enable efficient access and integration of knowledge for the purpose of translation which can be performed with more economy of effort.

6.   Conclusion

The present study has substantiated the complexity of translation expertise. Four out of five indicators of expertise – the focused use of external resources, fewer problem-solving pauses, higher text production speed and target text quality were corroborated by the results. The results excluded total task duration as an indicator of translation expertise. A further comparison of task performance when translating and paraphrasing similar texts revealed that the professional translators most likely transferred their task expertise to the paraphrasing task. The professionals and trainees also produced better quality paraphrases than the language students. This allows for a tentative conclusion that expertise in translation leads to superior performance in two areas: general meaning transfer expertise – transferable to intralingual translation – and domain knowledge expertise, responsible for bilingual knowledge management in the context of translation as a cross-language task. The dual nature of translation expertise can be optimized in translation training programmes and in individual self-development by deliberate practice. The study reported in this paper showed that bilingual proficiency should not be taken for granted. In conclusion, more attention needs to be paid to the way in which this particular part of translation expertise evolves and gradually allows for more economy of effort and better quality translations.

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