

Translating grammatical metaphor in a scientific text: Implications of understanding 'favourite clause type' for translator training

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The goal of this paper is to analyse patterns used in scientific texts for the purpose of assisting trainee translators to better deal with the translation challenges stemming from the linguistic aspects of 'special language translation' as well as 'general language translation' (Snell-Hornby 1990: 33). As a kind of special language text, scientific texts are packed with information that often leaves non-expert readers, including trainee translators, feeling distanced and excluded. The difficulty originates not just from the technical terms and subject knowledge, but the 'favourite clause type' inherent in the scientific texts (Halliday 1998/2004: 74). Using Systemic Functional Linguistics (SFL), this paper elaborates upon the favourite clause type used in scientific texts and now also widely used in most other forms of adult writing including special language texts (e.g. business, legal) and general language texts (e.g. some administrative texts) (Halliday 1999/2004: 104). The outcome of my research shows that trainee translators struggle in rendering the favourite clause type both in a scientific text and a visa application text, due to their partial understanding of the grammatical structure.

Key words: scientific texts, trainee translators, special language translation, favourite clause type, Systemic Functional Linguistics (SFL)

1. Introduction

Special language translation is important for translator training as it is, compared with general language translation, regarded as “the main concern of

translation schools” (Snell-Hornby 1990: 33). The focus on special language translation in translation programs reflects the demand of the market. At the same time, special language translation is seen as difficult because of the many technical terms loaded in the texts, and thus it is taught at a later stage in translator training programs. However, the presence of technical terms is not the only factor that contributes to the perception that special language texts are difficult to translate, nor do technical terms pose the greatest challenge for understanding such texts. As Halliday observes, technical terms “are not, in themselves, difficult to master; and students are not particularly dismayed by them” (1989/2004: 161-162). Instead, the greatest problems with translating special language texts arise from the complex relations terms have with one another, in that these complex relations function to define the terms themselves (Halliday 1989/2004: 162).

The complex structures that configure the technical terms in a scientific text can be explained linguistically, drawing on a linguistic theory that specialises in explaining the functions of language. The complex structures of scientific texts can be better translated once it is understood that they exhibit certain patterns, which will be referred to as ‘favourite clause type’. In this paper, the favourite clause type is dealt with using the theoretical framework of Systemic Functional Linguistics (SFL). Specifically, a range of Halliday’s writings on scientific texts will be used.

The favourite clause type used in scientific writing originates from the scientific discourse itself, and takes a simple structure comprising three components: two nominal groups, and one verbal group located between the nominal groups (e.g. *The test results do not mean that you have cancer*). The first nominal group, with a significant expandable space, functions as a summary of the preceding passage, and, together with the rest of the sentence, serves as the departure point for the next passage. This simple construction, which is frequently found in scientific texts, has now spread to other types of written texts and has become a vital part of adult writing.

This paper examines scientific texts for two reasons. First, scientific texts employ a prototypical favourite clause type with a long subject functioning as a signpost which indicates the movement of reasoning in a text. Because this favourite clause type now “pervade[s] most other forms of adult writing” (Halliday 1999/2004: 104), the findings in relation to scientific texts could likely be applied to other special language texts as well as to general language texts, which share similarities with scientific texts in their linguistic structure (i.e.

the two nominal groups and one verbal group structure). Second, though still limited in number, scientific texts and their translations are more available in their published form than other types of special language texts.

In the course of analysing scientific texts, this paper seeks to answer three questions: 1) How should the favourite clause type in English scientific texts be translated in Korean where the English preferred clause type may not be preferred? 2) What can trainee translators learn from published translations when dealing with favourite clause type-related translation challenges? and 3) Keeping in mind that specialised language translation, including translation of scientific texts, and general language translation aim for different readerships (experts vs. non-experts), should taking into consideration the different readerships make any difference when rendering the preferred structure? In answering these questions, this paper is mindful of the fact that students cannot master all areas in a couple of years of training and thus would be better off with “a good foundation in the more generic, transferrable subject areas”, of which clause structure is one kind (Byrne 2006: 6).

The favourite clause type in English scientific texts packages information as ‘things (nouns)’¹, whereas Korean does not tend to treat information as such, more frequently packaging it as ‘events (verbs)’ (c.f. Lee 2009: 36-37). The different ways of developing reasoning in texts between English and Korean are identified as a major translation issue for trainee translators, who have little experience in translating scientific texts and are more easily affected by the

‘interference’ of the source text structure (Toury 1995: 275; Baker 1998, 2001: 291). For this reason, trainee translators can learn from translators of published works (including translators who are also experts in a given subject area) how to treat and render the different linguistic structures in a scientific text.

As well as special language texts like scientific texts, general language texts use the favourite clause type (Halliday 1999/2004: 104), and it would be useful to examine general language texts which are an integral part of translation training. In this paper, a visa application text is used because it is one of the most commonly used general language texts in the country in which the author is based. In rendering the visa application text, consideration of the target

¹ It is not just English that packages information as such. Other languages including Italian, French, Russian and some other European languages have displayed the same phenomenon since the Renaissance (Halliday 1989/2004: 174).

readership is found to be another skill trainee translators need to foster.

This paper is organised as follows. First, SFL's theory of levels of language is presented, and the concept of favourite clause type is positioned within this linguistic system. In doing this, the favourite clause type is compared with

'clause' configuration in a story text. Second, two criteria for writtenness (I use 'writtenness' to differentiate between 'written' and 'spoken' texts) are elaborated upon in order to highlight the favourite clause type in scientific texts. This elaboration will focus on grammatical metaphor (the substitution of one grammatical structure for another). Third, a comparison is made between a published translation and trainee translators' translations of an extract from a scientific text. Finally, the lesson the trainees can take from the comparison is used to assess their translations of an extract from a general language text, i.e. the visa application.

2. Theoretical framework: SFL and levels of language

As a functional variety of linguistic theory, Systemic Functional Linguistics (SFL) places the functions of language at its centre. In other words, SFL pays special attentions to language as it is used in a social context. Specifically, it considers that language makes meaning through the use of several strata or levels (this concept is referred to as 'stratification'). This is explained below.

2.1. Stratification

In SFL, language comprises a multiple number of levels which include context, semantics (meaning), and grammar (see Figure 1). Closely interconnected, they work together to make sense in a text in a relationship that is referred to as 'realisation': context is realised in semantics and grammar², and semantics is realised in grammar.

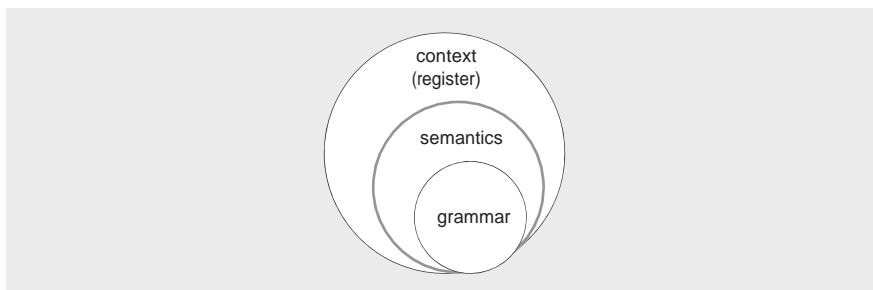
² In a stratified system consisting of, for example, context, semantics and grammar, the organising principle is not causation where context is realised in semantics and semantics is, in turn, realised in grammar. Rather, the organising principle is metaredundancy, where context is realised in both semantics and grammar, and semantics is realised in grammar (c.f. Halliday 1992/2002: 356-358).

‘Register’, which is an aspect of context³, is used to account for the specific situation in which a text originates, and has three variables: field (what is happening), tenor (who is taking part) and mode (the role of language, e.g. written or spoken) (Halliday 1978; Halliday and Hasan 1985). Of the three variables, mode of language (written or spoken) is the focus within the context level in this paper.

Semantics (meaning) plays a core part in making sense in a text. The four modes of meaning (or metafunctions) are the experiential (who did what), the logical (the relations between experiential meanings), the interpersonal (the nature of the social interaction) and the textual (what makes the text a coherent whole). Each of the four modes of meaning is expressed in the grammar level: for example, logical meaning is realised in clause combining systems (how clauses are combined and the relationships between clauses), while textual meaning is manifested in ‘Theme’ systems (the point of departure for the clause) and ‘Information’ systems (what can be referred to as ‘Given’ and ‘New’, where the former is the information presented as recoverable while the latter is the information presented as unrecoverable to the listener [Halliday

1994: 298]). Of the four modes of meaning and their respective grammatical resources, this paper concentrates on clause combination as the grammatical resource of logical meaning, and the associated concept of grammatical metaphor, which will be detailed below.

Figure 1. Stratification (Halliday and Matthiessen 2004: 25, Fig. 1-10 adjusted)



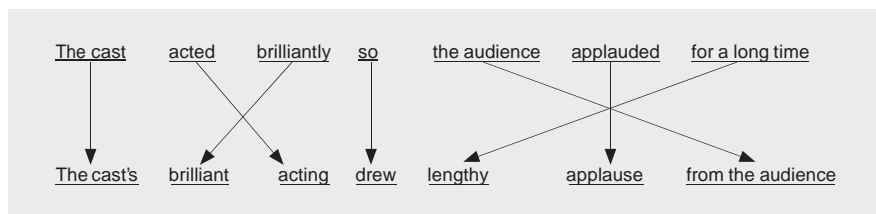
³ In SFL, in the context stratum there is one more level called ‘genre’ which is located beyond the level of register. It is not included in this paper because it is not relevant.

2.1.1. Clause combination and grammatical metaphor

As noted, logical meaning is one of the four modes of meaning in the semantic level of language. It governs the relations between events (human experiences), and is realised in the clause combining systems in the grammar level. When we focus on clause combining systems, we are concerned with whether a particular clause is simple (referred to as a clause simplex) or complex (referred to as a clause complex); and, if it is a clause complex, with which relations the clauses are connected (i.e. logical-semantic relations such as cause and effect). In this light, clause combining systems manifest logical meaning in a text which is situated in a specific context.

In a text, the same message can be encoded in a clause simplex or a clause complex. For example, the sentence: *The cast acted brilliantly so the audience applauded for a long time*, has two clauses and they are linked by the logical-semantic relationship of condition (*so*). The sentence can also be expressed as a clause simplex: *The cast's brilliant acting drew lengthy applause from the audience*. In this second sentence, the same information is recomposed in a different structure (see Figure 2 below). The two clauses (*The cast acted brilliantly*, *the audience applauded for a long time*) have become nominal groups (*The cast's brilliant acting*, *lengthy applause from the audience*) and the linker (*so*) changed to a verbal group (*drew*)⁴. As a result, the clause complex has become simple in structure: a clause simplex comprising two nominal groups produced through nominalisation, with a verbal group that denotes the relation (more specifically, 'to be the cause') between the nominal groups. This structure corresponds with

Figure 2. An example of a clause complex repackaged in a clause simplex (Halliday 1989/2004: 173, adjusted)



⁴ In the second example, the subject is removed and thus the clause is objectified (Thompson 2004: 230).

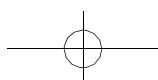
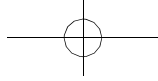
the favourite clause type used in scientific texts referred to above.

The restructuring of the clause complex is referred to as “grammatical metaphor”, which in terms of stratification stands between the semantics (meaning) level and the grammar level (Halliday 2004; Martin 2008: 829)⁵. Grammatical metaphor refers to the substitution of one grammatical structure for another, just as lexical metaphor refers to the substitution of one lexical item for another. What is notable with grammatical metaphor is that the metaphorised clause simplex can be unpacked as a clause complex, or the congruent (i.e. literal, or de-metaphorised) version of the message. This means, clearly, that there are choices involved between using the congruent and the metaphorical options to deliver the same message. The two options (there could be more options, in that multiple congruent forms are possible, depending on how congruent or metaphorical a text is) represent the same state of affairs differently, which is to say, they express meaning differently (Thompson 2004: 223).

As the above discussion has indicated, at the heart of grammatical metaphor is nominalisation, which is achieved through replacing a verbal group (or a clause) with a nominal group. In English, a nominal group expands by a process known as modification, in which one noun functions as the head (‘Thing’) and the remaining words are organised around it with different functions (Halliday 1998/2004: 61). The items of a common type of noun group are as follows (It should be noted that function labels are used, such as ‘Thing’ and ‘Qualifier’, instead of class labels, like noun and verb, because class labels can be used for multiple functions and this may lead to confusion.). ‘Deictic’ refers to determiners such as *the* and *their*. ‘Epithet’ signifies qualities that could be considered somewhat transitory, e.g. a *red sedan*. ‘Classifier’, in contrast to ‘Epithet’, tends to represent long-term and inherent qualities, e.g. *heart failure*. ‘Qualifier’ is the only item that post-modifies the Thing that functions as head of a nominal group, e.g. *the black swan in the pond* (Martin et al. 2010: 166-167). The capacity of a nominal group to include all these elements is indicative of its ability to condense an event (a clause) into a thing, thus giving it greater mobility in a text than a clause (see below for more examples).

The first nominal group in a metaphorical clause (in the: nominal group +

⁵ Martin and Rose see this state as being indicative of “inter-stratal tension” and they argue that the meaning of grammatical metaphor is more than the sum of its parts (2005: 39).



Deictic	Epithet	Classifier	Thing	Qualifier
The cast's	brilliant		acting	
The	natural	Buffering	capacity	of the agricultural soil
Griffith's		energy balance	approach	to strength and fracture

(Examples extracted from Halliday 1998/2004: 78, 1989/2004: 173, adjusted)

verbal group⁶ + nominal group structure) functions as the driving force behind the development of a text, particularly in a scientific text. Functioning as the Subject of the sentence, the nominal group recapitulates the previous idea as the point of departure in a clause (the Theme) and at the same time presents the information that is recoverable by the listener as the old information (the Given) (Halliday 1995/2004: 19, c.f. Snell-Hornby 1990: 68)⁷. The interplay of the Theme and the Given “constitutes an immensely powerful discursive resource; it is the primary source of energy for the dynamic of scientific and technical argument” (Halliday 1998/2004: 72).

Without the knowledge of how grammatical metaphor works, the favourite clause type used in scientific texts cannot be understood, and this may pose a translation problem particularly for the language pair of English and Korean. While English has a highly expandable nominal group and favours grammatical metaphor in its written texts, Korean tends to work otherwise. Korean is inclined not to use the abstract ‘non-human’ nominal groups as Theme (Suh 1994, 2006: 444) but typically relies more on verbal groups (and thus clauses) in developing a text (c.f. Lee 2009: 36-37). These different ways of unfolding a text demand different translation strategies depending on the language direction of a particular translation (more congruence is required for the English into Korean translation; more grammatical metaphor is required for the Korean into English translation). In this paper, translation from English into Korean is investigated and thus a clear understanding of grammatical metaphor

⁶ The kind of verbal group used in the favourite clause type is referred to as ‘relational Process’. The relational Process establishes the relations between the two nominal groups (Halliday 1994: 119).

⁷ The nominalised Theme has the potential to become a technical term as points within a text are progressively developed. It can ultimately become a string of nouns after going through a series of metaphorisations (e.g. *glass crack growth rate*). The result is not just a rewording but a “remeaning”, which is unrecoverable without the help of an expert from the given field (Halliday 1999/2004: 125; c.f. Martin 1990).

is crucial for grasping the meaning of the source text. In the next section, a further examination is made of the common types of grammatical metaphor. The section also presents the method that will be used for data analysis as well as the data itself.

3. Method and data

As noted, grammatical metaphor is used in the favourite clause type in a scientific text; and importantly, as also noted, grammatical metaphor has now become a fundamental indication of ‘writtenness/spokenness’ in a wide variety of language environments. From the perspective of SFL, writtenness/spokenness provides the “context” for texts (here we are concerned with the level of register: mode of language). To determine how written the favourite clause type is, this paper uses two main criteria: the first is grammatical metaphor, which has been discussed, and the second is lexical density, which will be explained below. Of the two criteria, the concept of grammatical metaphor is particularly useful when making finer analyses, as it is relevant to both whole sentences and the constituents of sentences.

3.1. Lexical density

Lexical density refers to the number of content words in a clause. Content words include nouns, verbs, adjectives, and some adverbs, and exclude function words like pronouns, determiners, conjunctions and most prepositions. Lexical density is a reliable measure for determining whether a text is written or spoken. A distinct difference in average lexical density exists between spoken texts (1.5-2), and written texts (3-6) depending on the level of formality (Halliday 1985: 80). In general, written texts have twice the lexical density of spoken texts (Halliday 1985: 80). Of written texts, the average lexical density of scientific texts is observed to be “around six” (Halliday 1997/2004: 195).

3.2. Grammatical metaphor

As mentioned, the concept of grammatical metaphor is useful when

conducting a detailed analysis as grammatical metaphor not only occurs in the clause rank, but the group rank (e.g. within verbal groups). For instance, using the above examples, the Epithet *brilliant* in *their acting was brilliant* can be transformed to the nominalised *brilliance* as shown in the Theme *the brilliance of their acting*. The metaphoric change tends to exhibit certain patterns in a scientific text, which are summarised in Figure 3 (Halliday 1998/2004: 76). (In Figure 3, function labels such as ‘Relator’ and ‘Circumstance’ are used together with class labels [e.g. ‘conjunction’ and ‘adverb and postpositional phrase’] to give a fuller account of each component.)

In Figure 3, all components including ‘Relator (conjunction)’ and ‘Process (verb)’ tend to display metaphoric moves towards ‘Entity (noun)’ (see numbers 1, 2, 3, 4 in Figure 3), strongly indicating the phenomenon of nominalisation. Also, ‘Relator (conjunction)’, ‘Circumstance (adverb)’ and ‘Process (verb)’ can be construed as if they are ‘Quality (adjective)’ (numbers 5, 6, 7); ‘Relator’

Figure 3. The ‘general drift’ of grammatical metaphor
(Halliday 1998/2004: 76, Figure 3.5 adjusted)

Relator (conjunction)	Circumstance (adverb, preposition, prepositional phrase)	Process (verb)	Quality (adjective)	Entity (noun)	(Modifier)
				11 →	
			1 →		
		2 →			
	3 →				
4 →					
		5 →			
	6 →				
7 →					
	8 →				
9 →					
10 →					
clause complex	Clause	nominal group			

and ‘Circumstance’ can be construed as if they are ‘Process’ (numbers 8, 9); and ‘Relator’ can be construed as if it is ‘Circumstance’ (number 10) (Halliday 1998/2004: 76). Lastly, ‘Modifier’ is a nominal group which is metaphorised to be a modifier inside another nominal group, and it appears as either a Deictic (*Griffith’s*) or Qualifier (*to strength and fracture*) in *Griffith’s energy balance approach to strength and fracture* (Halliday 1998/2004: 77).

Providing examples of how Figure 3 operates, Table 1 below displays the Relator (conjunction) *so* and the Process (verb) *grow* ‘drifting’ towards the Entity (noun). In the first example, the Relator *so* is transformed into the Circumstance (prepositional phrase) *as a result of*, which is then changed into the Process *resulted from* and then the Quality (adjective) *resultant*, and finally into the Entity *the result*. In the second example, the Process *grow* becomes *is increasing* and then this is changed into the Quality *increasing* before finally becoming the Entity *the increase*. These examples, together with Figure 3, which represents the general drift of grammatical metaphor, provide a useful snapshot of some possible metaphoric moves one step at a time.

Table 1. Examples of how ‘general drift’ of grammatical metaphor works (Halliday 1998/2004: 77 adjusted)

Example 1: relator ‘so’		Example
relator: conjunction	Clause complex	(<i>a</i> happened) so (<i>x</i> happened)
10 (minor process in) circumstance: preposition	Clause	(<i>x</i> happened) as a result of (happening <i>a</i>)
9 process: verb	Clause	(happening <i>x</i>) resulted from (happening <i>a</i>)
7 quality: adjective	Nominal group	The resultant (happening of <i>x</i>)...
4 entity: noun	Nominal group	The result (of happening <i>a</i>)...
Example 2: process ‘grow’		Example
process: verb	Clause	(poverty) is increasing
5 quality: adjective	Nominal group	Increasing (poverty)
2 entity: noun	Nominal group	The increase (in poverty)

3.3. Data

In this paper, a total of three sets of texts are used (source texts and their translations): a story carried in the monthly magazine *Guidepost* entitled “Road Ready”, an extract from Chapter 2 of Steven Hawking’s *A Brief History in Time* (the first four pages)⁸, and a part of the Applicant’s Declaration in the “Radiological report on chest x-ray of an applicant for an Australia visa”⁹. The first text is an everyday life story, whereas the second is a scientific text and the third is a government administrative text.

The three texts and their translations are analysed in the following way. First, the two texts “Road Ready” (hereafter called ‘the story text’) and *A Brief History in Time* (hereafter called ‘the scientific text’) are compared in order to identify the differences with respect to writtenness and spokenness. The reason the story text is compared with the scientific text is to have a better understanding of where the latter is located within a range of written texts. The story text is considered to be located at a far end on the continuum of writtenness, closer to spoken texts with respect to lexical density and, in particular, grammatical metaphor, as shown below. With respect to grammatical metaphor, the two texts are analysed in terms of how metaphorical, or how demetaphorised or congruent they are (based on Figure 3 above). Second, the grammatical metaphors in the two source texts and their respective translations are compared. Third, the published translation in Korean of the scientific text is compared with translations produced by ten trainee translators (who enrolled in the T&I programs at Macquarie University and the University of New South Wales, Sydney in the second semester of 2012) to help develop some lessons for the latter from the former in rendering the favourite clause type. Finally, the applicant’s declaration text is critically analysed along with students’ translations, and an alternative to the student translations is suggested, which is rendered taking the target readership into consideration.

⁸ The reason this specific part of *A Brief History in Time* is chosen is that by this stage the text has developed a certain degree of reasoning, but the concepts are not yet considered too difficult to understand for non-expert readers including the author.

⁹ The text can be found on <http://www.immi.gov.au/allforms/pdf/160.pdf>

4. Discussion

As a result of analysing the extracts from the story text and the scientific text using the method presented above, the two texts show a significant difference with respect to utilising grammatical metaphor. Although both texts display little difference in the number of clauses per sentence and a smaller gap in lexical density than would reasonably be expected of the two different text types, they show a noticeable difference in the number of items employing grammatical metaphor. These findings support the interpretation that, as a popular science book, the scientific text attempts to employ less complex sentence structure and lower lexical density, while still maintaining a high level of grammatical metaphor, which is the hallmark of a scientific text.

When comparing the two texts and their respective translations that were rendered by professional translators¹⁰, the story text and its translation show a high similarity in the way clauses are combined (the number of clauses per sentence is almost identical) and also in the number of cases of grammatical metaphor, while the scientific text and its translation display both similarities and differences. The scientific text and its translation display a similar number of grammatical metaphors, but the two are different in the way they utilise subtypes of grammatical metaphor. Specifically, it will be noted that the 'translation shifts' allow us to highlight differences between the ST and the TT in the way grammatical resources are used to develop reasoning in a scientific text (Popović 1970). This will be detailed below.

In comparison with the published translation, most of the trainees in their translations of the scientific text fall short of making translation shifts in rendering the favourite clause type. Their inability to render the favourite clause type successfully is also displayed in their translations of the extract of the visa application text (hereafter called 'the visa text'). Although it is a general language text, the visa text contains a heavily metaphorised part (which uses the favourite clause type), making it difficult for trainee translators to analyse and translate. Thus, we can say that the favourite clause type poses a significant translation challenge for trainee translators in both the special language translation and general language translation settings.

¹⁰ The translator of the scientific text is also an expert on the subject area. He is considered a professional translator in this paper because he has published his translations of a multiple number of books in the field.

4.1. *Story text vs. scientific text: STs*

As noted in the method and data sections, two criteria are adopted to determine the writtenness/spokenness of the story text and the scientific text: the first being lexical density and the second, grammatical metaphor. As can be seen in Table 2, the lexical density of the story text and the scientific text is 2.81 and 4.86, respectively, with a difference of around 2. Taking into account the typical range of lexical density (1.5-2 for a spoken text; 3-6 for a written text), the story text exceeds the typical range while the scientific text is located near the middle. In particular, the latter means that the scientific text does not stand high on the scale of formality for a special language text like a scientific text, whose typical lexical density is, as mentioned, around six (Halliday 1997/2004: 195).

The reason for a high lexical density of the story text and the lower-than-expected standing of the scientific text seems to be associated with register, particularly the mode of language. With respect to the story text, while most story texts may be regarded as 'spoken', this text, although containing features of spoken language, is nonetheless written to be read. It is this that causes it to be positioned between the typical range of spoken texts (1.5-2) and written texts (3-6). Meanwhile, the scientific text is written as "a popular book about space and time" for people without a specialised knowledge of science to understand (Hawking 1988: vii). The intention of the scientific text seems to be reflected in sentence structure. For example, some sentences (or clause complexes) are composed of five or even six clauses unlike in a typical scientific text where one-clause sentences are common. To better understand the atypical features just discussed, a more precise tool is needed in order to distinguish between the two texts.

Table 2. Lexical density of the STs

	Number of clauses	Number of content words	Lexical density (content words/clause)
Story text	54	152	2.81
Scientific text	110	535	4.86
Difference			2.05

As noted, a more elaborate analysis of the degree of writtenness of a text is possible when we focus on grammatical metaphor. While the scientific text has relatively low lexical density for a scientific text, it contains many more grammatical metaphors than the story text. In Table 3, grammatical metaphor is divided into two subcategories: 'pure' and 'extended'. In this paper, the former refers to grammatical metaphor in a stricter sense as set forth in Figure 3 (e.g. the transformation of adjective to noun, conjunction to verb)¹¹, while the latter refers to a broadened concept of grammatical metaphor or nominalised clauses¹². The reason nominalised clauses are included and treated separately is because there are many of them in this paper and the TT shows a distinct preference for the 'extended' subcategory.

In Table 3, we see that the scientific text uses grammatical metaphor 3.7 times more than the story text. Of particular interest is the subcategory of pure grammatical metaphor, which appears 11 times more frequently in the scientific

Table 3. Grammatical metaphor of the STs

	Subcategories		
	Pure	Extended	
Story text	1	5	
Scientific text	11	11	
Difference (times)	11	5.5	
Total difference (times)			3.7

¹¹ One example of 'pure' grammatical metaphor in the scientific text is a sentence taken from the beginning of Chapter 2 (*Our present ideas about the motion of bodies date back to Galileo and Newton*). This is the favourite clause type: a clause simplex composed of a nominal group (*Our present ideas... bodies*) followed by a verbal group (*date back to*) and a nominal group (*Galileo and Newton*). In the first nominal group, there are two instances of grammatical metaphor: one is *our present ideas* which can be unpacked as *we now have ideas* (*we* → *our* [entity → modifier]; *now* → *present* [circumstance → quality] and the other is *motion of bodies* which can be transformed into more congruent *bodies move* (*move* → *motion* [process → entity]).

¹² A nominalised clause typically construes an embedded clause that modifies a nominal group (e.g. *Every morning I see the girl [[who goes for a walk]]*), or serves as a Participant (subject or object) in a relational clause (e.g. *Going for a walk every morning is good for your health*).

text when the same number of words from the two texts are compared¹³. This significant difference indicates that, despite being a part of a popular science monograph, the scientific text's use of grammatical metaphor sets it apart from the story text. These findings are indicative of scientific texts in general, whose reasoning is frequently driven by grammatical metaphor.

4.2. Story text vs. scientific text: comparison between STs and TTs

The two source texts are now better understood in terms of register (mode of language); and in particular it has been ascertained that the scientific text utilises a favourite clause type that is not present in the story text. What is interesting about the translations of the two source texts discussed above is that the TTs produced by professional translators display a different inclination for the subcategories of grammatical metaphor ('pure' vs. 'extended'). Specifically, the translator of the story text favours the subcategory of 'pure' grammatical metaphor over the 'extended' subcategory, whereas the translator of the scientific text favours the 'extended' subcategory. In the story text (Table 4), the TT is almost identical to the ST with respect to the number of sentences (36 vs. 37) and clauses (54 vs. 55), but it contains five times the number of pure grammatical metaphors (5 vs. 1). Of the five items, four are Sino-Korean words (borrowed Chinese characters) (e.g. *I need to get that checked out* → 점검을 받

Table 4. Comparison between the ST and the TT with respect to the use of grammatical metaphor: story text

	Sentences	Clauses	Grammatical metaphor		Total (gram. metaphor)
			Pure	Extended	
ST	36	54	1	5	6
TT	37	55	5	6	11

¹³ This shorter extract from the scientific text is only used in this part of the subsection where the two texts are compared specifically with respect to the number of grammatical metaphors used. In the rest of the paper the first four pages of the book are analysed as indicated in 3.3.

Table 5. Comparison between the ST and the TT with respect to the use of grammatical metaphor: scientific text

	Sentences	Clauses	Grammatical metaphor		Total (gram. metaphor)
			Pure	Extended	
ST	<u>49</u>	110	38	16	54
TT	53	<u>90</u>	23	30	53

아 봐야겠어 *I need to receive an inspection*). This “metaphoric shift into another tongue” is found in many languages including Korean to be “typical of the technicalizing process” (Halliday 1998/2004: 64).

However, the number of cases with pure grammatical metaphors in the story texts is not large enough to be considered significant (6 items in the ST and 11 in the TT) (Table 4), when compared with the number of grammatical metaphors used in the scientific texts. In the scientific texts (Table 5), grammatical metaphors occurs 54 times (out of 110 clauses, or 49%) in the ST, and 53 times (out of 90 clauses, or 59%) in the TT, which can be interpreted as approximately every second clause involving grammatical metaphor. Thus, grammatical metaphor is considered to be the defining characteristic of a scientific text not only in the ST but in the TT¹⁴.

As noted, the scientific text has a high number of grammatical metaphors in both the ST and the TT, and the ST and the TT show different preferences in subcategories. In Table 5, the ST favours the pure subcategory and the TT has more cases of the extended subcategory. What is noteworthy is that the TT’s preference for extended grammatical metaphors (ST: 16, TT: 30) may have led to a decline in the number of clauses (ST: 110, TT: 90). In other words, these figures can be explained by arguing that the smaller number of clauses may have been obtained through the extensive use of nominalised clauses. As

¹⁴ Some may argue that the large difference in the use of grammatical metaphor between the TT of the story text and the TT of the scientific text derives from the different writing styles of the translators, not from the different text types. However, this argument is not convincing because the two source texts themselves exhibit a significant difference in the number of grammatical metaphors used (Table 4 and Table 5). The story text does not have many metaphors, while the scientific text contains a significant number of them. It should also be stressed that the translator of the scientific text renders the pure metaphor subtype as the extended subtype.

a result, the nominalised clauses seem to have raised the TT's total number of grammatical metaphors to 53, which is similar to the ST's 54.

Example 1 shows an instance of how, in the scientific text, clauses in a clause complex in the ST are nominalised in the TT. The TT renders a clause complex composed of five clauses as a clause simplex. The two clauses ... *Aristotle*, || *who said* (C1 and C2 in the ST) are translated as a nominal group (*Aristotle's remarks*) in the TT, and the last three clauses (C3, C4 and C5 in the ST: content of *who said*) are rendered as embedded clauses pre-modifying the nominal group *Aristotle's remarks*. What can be deduced from the example is that, while the ST favours the pure subcategory of grammatical metaphor, the TT prefers the more loose nominalised clauses which, though embedded, still contain clause(s)¹⁵.

Example 1.

*S	C	ST	TT
2	1	Before them people believed Aristotle,	그 이전에는 [[물체의 자연스러운 상태는 정지하고 있는 상태며, 힘이나 충격을 받을 때에만 운동이 일어난다는]] 아리스토텔레스의 말을 믿었다. Before them, (people) believed Aristotle's <u>remarks</u> [[that the natural state of a body was a state of stopping, and that the movement occurred only when (it) received a force or impulse]].
	2	who said	-
	3	that the natural state of a body was to be at rest	-
	4	and that it moved	-
	5	only if driven by a force or impulse.	-

* S refers to Sentence, while C refers to Clause

¹⁵ In principle, this interpretation is consistent with the observation that the TT (Korean) typically depends more on verbal groups (thus clauses) to develop a text than the source language (English). However, the analysis in this study argues that these clauses should include nominalised clauses (c.f. Lee 2009: 36-37).

As discussed above, the TT's higher number in the nominalised clause subcategory seems to have motivated the decline in the number of clauses in the translation. Related to this, the drop in the number of clauses in the TT is also at odds with its increased number of sentences; in more detail, the number of clauses in the TT is lower than in the ST, but in the same comparison the number of sentences is higher (from 49 in the ST to 53 in the TT). The variance appears to be partially related to the translator's rendering of the favourite clause type in the ST ¹⁶, which will be explained below.

In Example 2, the ST has two instances of the favourite clause type (ST: S45, S48). Both comprise a nominal group (*The lack of an absolute standard of rest*, *The nonexistence of absolute rest*) followed by a verbal group (*meant*) and a nominal group (e.g. *that one could not...*). Of the two instances, the first plays a dual role: coming at the beginning of a new paragraph, it provides a summary of the previous idea (*there is no absolute standard of rest*) and also functions as a departure point for the next idea. Because of the greater complexity of its function, the discussion below will focus on the first instance.

In the first instance (ST: S45 in Example 2), the Theme is encoded in the pure subcategory *The lack of an absolute standard of rest* in the ST, while in the TT the Theme is de-metaphorised and rendered congruently in a separate sentence (*That is, an absolute standard of the state of rest does not exist*). This results in a clause complex in the TT, which is composed of two clauses (TT: S47, S48). What is conspicuous here is the way the TT divides the paragraphs. Unlike in the ST where the favourite clause type functions as the opening sentence of a new paragraph, the TT takes the favourite clause type and includes it in the previous paragraph. In doing this, the TT also adds

an adverbial (Circumstance) ≙ *that is* to the beginning of the newly created sentence in the following paragraph (S47 in the TT) which functions as a cohesive link that connects to the preceding paragraph. In addition, the TT shifts the verbal group *meant* to the conjunctive *As a result* in the next sentence (S48 in the TT). Thus, the TT employs the favourite clause type as part of the conclusion of the preceding paragraph, and in this process the clause type is rendered in two sentences in the TT.

¹⁶ Other things responsible for the higher number of sentences in the TT include the presence, in the ST, of punctuation marks (colons) and the fact that the ST's sentences are packed with information. Sentences with such features are often divided into multiple sentences in the translation.

Example 1.

S	C	ST	S	C	TT
44		So there is no way to tell [[whether it is the train or the earth that is moving]].	46		그러므로 [[움직이는 것이 기차인 지 지구인지를 분간할]] 방법이 없 는 셈이다. So there is no way [[to tell whether it is the train or the earth that is moving]].
45		* [[The lack of an absolute standard of rest]] meant [[that one could not determine whether two events that took place at different times occurred in the same position in space]].	47		즉 정지 상태의 절대적 기준이 없다. <u>That is</u> , an absolute standard of the state of rest does not exist.
			48		<u>그 결과</u> [[서로 다른 시각에 일어 나는 2 개의 사건이 동일한 장소에 서 일어났는지, 아니면 서로 다른 장소에서 일어났는지]]를 판가름할 수 없게 된다. <u>As a result</u> , (one) could not determine [[whether two events that took place at different times occurred in the same place, or at different places]].
46	1	For example, suppose our PingPong ball on the train bounces straight up and down,	49		¹⁷ 예를 들어 [[기차 속에서 탁구 공이 수직 방향으로 탁구대를 튕기 는]] 경우를 상상해보자. For example, imagine the case [[where a pingong ball on the train bounces vertically]].
	2	hitting the table twice on the same spot one second apart.	50	1	탁구공이 탁구대의 같은 곳을 1 초 사이를 두고 두 번 튕겼다면 If the ball hit the table twice on the same spot one second apart, -

¹⁷ Unlike in the ST where the favourite clause type appears at the beginning of the paragraph and is both the conclusion of the previous paragraph and the departure for the current paragraph, in the TT, the translator uses the same information purely as a conclusion.

S	C	ST	S	C	TT
47	1	To someone on the track, the two bounces would seem to take place about forty meters apart,		2	철로변에 서 있는 사람이 볼 때 When someone standing on the track sees,
				3	[[탁구공이 두 번 튕긴] 자리는 약 100m 나 서로 떨어져 있을 것이다. the places [[the ball hit twice]] would be about as far as 100m
	2	because the train would have traveled that far down the track between the bounces.	51	1	왜냐하면 공이 두 번 튕기는 동안 (1 초)에 while the ball hit twice (one second)
				2	기차가 그만큼 달렸기 때문이다. Because the train would have run that far
48	1	The nonexistence of absolute rest therefore meant [[that one could not give an event an absolute position in space]],	52	1	따라서 절대적인 정지상태가 존재 하지 않으면, Therefore, if an absolute state of rest does not exist,
				2	아리스토텔레스가 믿었던 것처럼 as Aristotle had believed
	2	as Aristotle had believed.		3	하나의 사건에 대해서 공간에서의 절대적 위치를 줄 수 없게 된다. (one) could not given an event an absolute position in space.

* |||| refers to the beginning of a paragraph

Moreover, the structural divergence in the TT carries on through the next several sentences. In the translation, the example part of the ST (*For example, ...* in S46-1) constitutes the beginning of a new paragraph in the TT (S49). In the rest of the passage, the second part of the sentence (*hitting the table twice ...* in S46-2) is cut and formed into another sentence together with S47-1 (ST) in the TT. Like a falling domino, S47-2 (ST) is rendered as yet another sentence in the TT. We can see that these modifications result in the addition of two sentences in this short passage. Importantly, although in the translation the

favourite clause type is divided into two sentences and placed in the previous paragraph, its function does not seem to be lost.

In the TT, it has been found that the reduced number of clauses is associated with a high number of nominalised clauses, while the increased number of sentences is connected with the different structuring of the favourite clause type. Further, the rise in the number of sentences seems to have brought about a significant translation shift at the paragraph level, though the fundamental function of the favourite clause type is retained. While the shift at the paragraph level is not necessarily the only way of rendering the favourite clause type, maintaining its function (providing a summary of the previous idea and a departure point for the next), as demonstrated by the professional translator, is important. Building on what has just been discussed, the next section deals with how trainee translators rendered the favourite clause type in the same scientific text. It then considers an extract from the visa text.

4.3. Trainee translators' rendering of the favourite clause type: the scientific text and the visa text

As just mentioned, in the translation of the scientific text rendered by the professional translator, the favourite clause type experiences a major translation shift in structure, but the main function of the favourite clause type is maintained. This section examines how trainee translators rendered the favourite clause type in two texts. With respect to the scientific text, most trainee translators rendered the favourite clause type congruently, but none were successful in rendering it as a summary of the earlier idea. This indicates that the trainee translators may have rendered part of the grammatical metaphor intuitively, while falling short of understanding the role of the favourite clause type in a scientific text. Meanwhile, the visa text presents a different kind of translation issue: the favourite clause type is used with no apparent function in the source text (e.g. developing a text as shown in the scientific text). The favourite clause type in the administration text seems to have posed some different challenges for the trainees. In their translations, most of the ST structure was retained (i.e. the pure grammatical metaphor). However it is possible that the retained pure grammatical metaphor may prove difficult for the Korean readers.

4.3.1. Trainee translators' rendering of the favourite clause type in the scientific text

In the scientific text, all ten trainee translators rendered the Theme of the favourite clause type congruently in a nominalised clause, while retaining the clause type itself as the structure of the whole sentence (also, they retained the paragraphing of the ST). In the Theme part of the sentence, the trainees translated the nominal group in the ST (*lack of an absolute standard*) as a clause (절대적인 기준이 없다 *an absolute standard does not exist*), where the noun *lack*

was rendered as the verb 없다 (*does not exist*) and the nominal group *an absolute standard* became the Subject. As far as the Theme is concerned, there is little difference between the translations of the trainees and the published translation.

However, none of the trainees unpacked the overall structure of the favourite clause type (the first nominal group [Theme] + the verbal group + the second nominal group), and in the process the whole sentence seemed to end up being disconnected from the earlier point in the passage. Below is a typical example of the trainees' translations. In this translation, pure grammatical metaphor within the Theme is rendered congruently as a nominalised clause¹⁸ (절대적

인 기준이 없다 *an absolute standard does not exist*), but the outer structure of the

sentence remains the same ([[...없다는]] 것은 [[...없음]]을 의미한다 [[*That ... does not exist*]] means [[*that once could not ...*]]). It would be premature to judge as erroneous in itself the retention of the structure of the favourite clause type, but it is certain that the TT fails to connect the favourite clause type to the previous idea.

An example of student translations and its back translation :

∅ [[정지상태에 대한 절대적인 기준이 없다는 것]]은 [[서로 다른 시점에 발생한 두 사건이 동일한 위치에서 발생했는지 여부를 결정할 수 없음]]을 의미한다.

∅ [[*That an absolute standard concerning the state of rest does not exist*]] means [[*that one could not determine whether or not two events [that took place at different times] occurred in the same position*]].

¹⁸ The second nominal group is a nominalised clause in the ST, which is rendered as it is in the TT. So the translation of the favourite clause type still constitutes a nominal group followed by a verbal group and then another nominal group.

Translating grammatical metaphor in a scientific text: **29**
Implications of understanding 'favourite clause type' for translator training

One possible reason for this failure could be the Deitic (determiner) *the* in the Theme *The lack of an absolute standard of rest* in the ST that is omitted in the student translation¹⁹. This omission can be remedied by adding a linking

device such as 이와 같이 *like this* or 이처럼 *thus*.

Still, the linking device may be merely a partial solution which falls short of being explicit enough to indicate the logic between the passages before and after the favourite clause type. To indicate the logic more clearly, the global structure of the favourite clause type should be reconstructed congruently, for instance, as shown in the published translation or in the Example below²⁰. The significance of the above discussion is that the TT's partial unpacking of the favourite clause type fails to maintain the impact the ST intends. The TT should unpack the entire favourite clause type (including the Theme part).

The following is an example of translation in which the favourite clause type is reconstructed more congruently in a clause complex.

An example of student translations and its back translation :

이처럼, 정지상태에 대한 절대적인 기준이 없기때문에, || 서로 다른 시점에 발생한
두 사건이 동일한 위치에서 발생했는지 여부를 결정할 수 없게 된다.

Thus, as an absolute standard concerning the state of rest does not exist, one could not determine whether or not two events [[that took place at different times]] occurred in the same position.

4.3.2. Trainee translators' translation of the favourite clause type in the visa text

While a majority of the students also only unpacked a part of the favourite clause type in the visa text, what sets the text apart from the scientific text is the purpose of the favourite clause type within it. Interestingly, unlike in scientific texts, the favourite clause type in the visa text has no function in terms of “complex conceptual structure or [the] thread of logical argument” (Halliday

¹⁹ Interestingly, all students omitted the determiner *the* in their translations.

²⁰ In addition to the two translations, there may be other ways of rendering the favourite clause type.

1989/2004: 179). Rather, it seems to be used, as in many other forms of adult writing, to give the discourse “a spurious air of being rational and objective” (Halliday 1989/2004: 179). The non-essential use of grammatical metaphor may lead to a problem in understanding on the part of the ST readers, which include the translator, and ultimately the TT readers. The sentence in question is encoded in the typical form of the favourite clause type: the first nominal group (*The reasons for this release of information*), a verbal group with a relational function (*may include, but are not limited to,*) and the second nominal group (*investigation of ...*). The second nominal group in particular is packed with grammatical metaphor, containing four items of the pure subcategory which are numbered and underlined below.

The reasons for this release of information may include, but are not limited to, 1) investigation of inconsistencies between the Radiologist and/or Panel doctor's examination and a subsequent health assessment, 2) investigation of a complaint against the Radiologist or Panel doctor or 3) follow up with the Radiologist or Panel doctor 4) of adverse audit results.

The favourite clause type may be rephrased as below in a more congruent version.

We have released the information because there may be a need to investigate 1) if the Radiologist and/or Panel doctor's examination is not consistent with a subsequent health assessment, 2) if the Radiologist and/or Panel doctor receives a complaint, or 3) if the Radiologist or Panel doctor needs to be followed up 4) if audit results are adverse. However, these may not be the only reasons why we release the information.

In all ten student translations, the highly nominalised sentences caused the students to be confused about the sentence structure in one way or another (Table 6). In particular, they had problems understanding A) the overall structure of the grammatical metaphor, B) the distinction in structure between the second and third metaphorised items in the second nominal group, and C) the third and fourth metaphorised items in the second nominal group (Table 6). In Table 6 we can see that 47% of the translations failed to get the structure right for each of the three chunks of the sentence (six students for segment A, three students for segment B and five students for segment C). The structure

of segments B) and C) (the second nominal group) were mistranslated by most students. This will be investigated more closely below.

Table 6. Specific segments of the visa text which caused the students confusion regarding the use of grammatical metaphor

A) Overall structure of the grammatical metaphor	B) Structure of 2) and 3) of the second group	C) Structure of 3) and 4) of the second nominal group	Average
“but are not limited to” omitted or unnatural rendering		Translation errors caused by the ambiguous <i>of in of adverse audit results</i> in 3)	
6 (60%)	3 (30%)	5 (50%)	47%

For the second nominal group, a majority of the students rendered the grammatical metaphors as they found them (translating metaphor in the ST as metaphor in the TT). In particular, all of them either omitted the forth metaphor (*of adverse audit results ...*) (one student) or rendered it as structurally ambiguous as in the ST (nine students) (Table 7). This will be further investigated below (Table 8). Such non-congruent translation may result in a translation which does not read well in the target language (Korean), which, as mentioned, tends to develop a text more congruently (c.f. Lee 2009: 36-37). Furthermore, the translation may not be very reader-friendly, which is problematic for a document whose function is to provide clear instructions.

Table 7. Students' handling of individual items of grammatical metaphor in the second nominal group of the visa text

	As is	Congruent	Omitted
1) investigation of inconsistencies	7	3	
2) investigation of a complaint	7	3	
3-1) follow up with	5	5	
3-2) of adverse audit results.	9	0	1

As noted, most students produced obscure translations of the forth metaphor (*of adverse audit results* ...). In particular, they struggled with the relationship between the preposition *of* and the nominal group *adverse audit results*. Some of them unpacked the metaphor into a postpositional phrase or an embedded clause, but their translations were still either vague or erroneous. For example

(Table 8), the postpositional phrase used in one of the translations (부정적인 검사 결과에 따른 *following negative checkup results*) does not seem to clarify

its relationship with the previous metaphor *follow up with the Radiologist or Panel doctor*, while the embedded clause in another translation ([[불리한 검진을 한]] *[[who conducted an adverse checkup]]*) ends up having a wrong agent (*the Radiologist or Panel doctor*)²¹. Altogether, the reproduction of the ST's excessive use of grammatical metaphor in the TTs has caused the latter to be inaccurate.

Table 8. Students' translations of Item 4) of adverse audit results

Items	nominal group → nominal group	nominal group → postpositional phrase	nominal group → embedded clause
No. of students	2	5	2
Examples	e.g. 불리한 검사보고서를 adverse checkup reports	e.g. 부정적인 검사 결과에 따른 following negative checkup results	e.g. [[불리한 검진을 한]] [[who conducted an adverse checkup]] –

Below is a suggested translation (not necessarily a model translation), where all four metaphors are rendered as clauses (we need to investigate if A and B are not consistent; we need to investigate if A or B receive a complaint; we need to follow up... ; if audit results are...). By rendering the metaphors congruently in clauses, the sentence will be more explicit (Steiner 2002: 219) and easier to read. Ease of processing is important particularly for texts targeting the general

²¹ The nominal form of the grammatical metaphor (*of adverse audit results*) also seems to have contributed to the error in rendering the word 'audit'. In the ST, audit refers to a professional audit, not medical examinations.

public, where the readers are visa applicants who need to quickly read and understand the text to fill out the form.

A suggested translation and its back translation:

이러한 정보공개 사유²²로 아래의 내용이 포함될 수 있습니다. 방사선 전문의나 지 정의의 검진과, 차후 건강검진 결과가 일치하지 않는 경우 조사를 하거나, 방사선 전문의나 지정의에 대한 불만사항이 제기된 경우 조사를 하거나, 본 진단과 관련하여 문제가 있다고 점검 결과가 나올 경우 해당 방사선이나 정부지정 의사에 대해 후속조치를 할 수 있습니다. 이외의 다른 이유로도 정보가 공개될 수 있습니다.

The reasons for this release of information may include the following. (We need to investigate 1) if the Radiologist and/or Panel doctor's examination is not consistent with a subsequent health assessment, (we need to) investigate 2) if the Radiologist or Panel doctor receives a complaint, or 3) (we need to) follow up with the Radiologist or Panel doctor 3-1) if audit results are adverse. The information may also be released for other reasons than the above.

5. Conclusion

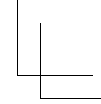
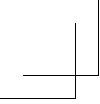
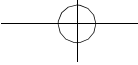
Drawing on SFL, and with reference in particular to extracts from a scientific text and a visa application form, this paper has examined what has been referred to as the “favourite clause type” in scientific texts. This clause type functions prototypically to summarise the previous idea that has been discussed and to provide a departure point for the next idea. To begin, the extract from a scientific text was compared with a story text to help identify the favourite clause type and clarify its use of grammatical metaphor (which occurs when one grammatical structure is replaced by another). Next, it was identified that the ST of the scientific text favoured the use of ‘pure grammatical metaphor’, while

²² The Theme part may be translated more congruently (ex. [[정보를 공개하는]] 이유는 ...the reasons [[we release the information]]...)

its translation favoured 'nominalised clauses'. This different preference indicates the different grammatical resources with respect to logical meaning that are available as well as the different ways of developing reasoning in a scientific text between the source language (English) and the target language (Korean). Importantly, it was found that the translation of the scientific text made a translation shift in the paragraph level, but nonetheless retained the overall function of the favourite clause type. Student translations of the same text were found to have fallen short in replicating this difference, which seems to stem from the students' inability to grasp how the favourite clause type functions in the development of a scientific text. The students' lack of understanding was also displayed when translating a non-scientific text. Specifically, the students struggled when the text (a visa application form) made heavy use of grammatical metaphor (in the favourite clause type) without actually developing an argument. Most students rendered the grammatical metaphor just as they found it in the ST, producing difficult-to-read translations. In an attempt to remedy the reader-unfriendly translation, this paper suggests a congruent translation of grammatical metaphor when it appears in the favourite clause type in a general language text.

Understanding the roles of favourite clause type and grammatical metaphor in a scientific text is important for translators for two reasons. First, the favourite clause type is now used in many other special language texts as well as in most adult writing in English (e.g. the above visa text). The former (e.g. scientific, legal, economic and medical texts) fall into the category of special language translation whereas the latter belongs to general language translation (including community translation), and both of them are the object of institutional translation programs. Second, the ST and the TT may rely on different grammatical resources when utilising grammatical metaphor in the unfolding of a text. In the language pair of English and Korean, the former is identified in this paper as depending more on pure grammatical metaphor while the latter uses more nominalised clauses. With these reasons in mind, I argue that being aware of the different grammatical resources used in the two languages when translating a scientific text, and trying to narrow the gap between these resources, is vital in translation, in particular because such an approach will be useful when translating other types of special and general language texts.

However, the amount of data used in this paper is not sufficient to generalise all the findings. More source texts across various types of special language texts



and their translations (rendered, if possible, by both professional and student translators) are desirable in a future project. Also, an in-depth analysis of how scientific and other special language texts develop reasoning in Korean would be beneficial because, in comparison with English, little research (frankly, almost none) on this topic has been conducted. I hope this paper can serve as a departure point for future investigations into how grammatical metaphor is used in special language translation (as well as general language translation), an area of translation that is under-researched, notwithstanding its extensive presence in translation practice.

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