

# TRANSLATION SHIFTS IN MEDICAL TRANSLATION FROM ENGLISH INTO FARSI

Hajar Khanmohammad<sup>1</sup> PhD, Seyed Muhammed Hussein Mousavinasab<sup>2</sup> MA

## Abstract

The purpose of this study was to conduct a linguistic-based investigation into the frequency of translation shifts in the process of translating medical texts from English into Farsi in Iran. Five books were sampled from five branches or sub-branches of medicine in which a large number of English-into-Farsi translations are done in Iran. Then, two chapters from each of these books were selected. Afterwards, 10% of the sentences of each chapter were sampled and the analysis was conducted on them. On the whole, from among 320 sampled sentences, all the sentences had undergone structural shift, 4.06% had undergone class shift, 5.31% had undergone unit shift, and 7.81% had undergone intra-system shift. In conclusion of this study, considering the features of English and Farsi, the low number of shifts in medical texts suggests that in many cases no translation actually takes place and transliteration is the preferred approach for the erudite terms.

Keywords: translation shift, sample, qualitative survey, analysis

## Introduction

“Translation shifts” are one of the issues which have concerned many scholars. In 1958, presumably for the first time, Vinay and Darbelnet (1995) tried to term the linguistic changes that occurred during translation as “translation procedures”. A decade later Catford (1965) explicitly used the term “Translation Shifts” for the same reference which he defined as ‘departures from formal correspondence in the process of going from the source language (SL) to the target language (TL)’ (2000, p. 141). This method of translation analysis was solely based on linguistics (belonging to the formalism era). He classified linguistic shifts from a very general view as shift of level and shift of category. “Shift of level” was something expressed by grammar in one language and lexis in another and “shift of category” as changes which are only grammatical. The latter was divided into four sub-categories: structural shift, class shift, unit shift and intra-system shift (Catford, 2000, pp. 141-147).

*Structural Shift* mostly involves a shift in the grammatical structure. For example:

English	He referred to hospital	i.e.	subject + verb + preposition + complement
	shifts into ↓		
Farsi	او به بیمارستان مراجعه کرد <i>Ou be bimarestan morajeye kard</i>	i.e.	subject + preposition + complement + verb

On the other hand, whenever a part of speech of the SL, e.g. adverb or noun, changes into another part of speech in the TL, e.g. adverb or verb, a *shift of class* has happened. For example:

English	facial surgery	i.e.	( <u>adjective</u> + noun)
	shifts to ↓		
Farsi	جراحی صورت <i>jarrahi soorat</i>	i.e.	(noun + <u>noun</u> )

In *unit shift* a word of the SL may be translated as morpheme or as clause in the TL or vice versa. For instance, the medical word “prosencephalon” is translated as a phrase, i.e. قسمت جلوی حفره مغزی پیشین در جنین or *ghesmate jeloii hofreh maghzi pishin dar janin*, in Farsi (Hooshmand-Vijeh, 2006). Lastly, *intra-system shift* occurs whenever something is omitted from or added to the translation in the TL, which has no linguistic reason from the SL point of view. For example, most nouns in Farsi do not have any article before them (e.g. مجموعه) while in Latin-descended languages such as Spanish an article exists and must be used (e.g. el cráneo).

Up to now many interesting studies have been done on translation shifts. For instance in a study similar to the present study, Tahershams (2009) investigated the most and the least frequently used translation shifts in the process of translating Holy Quran from Arabic into English. Based on his study which was grounded on Catford’s categorization, Tahershams states that *unit shift* had been the most frequent and *intra-system* shift the least frequent.

In another study, Davies (2006) investigated the shifting of readerships in journalistic translation. Taking an article from the British press and its translation into French as a basis for discussion, this paper examined the ways in which the content of such journalistic texts required adaptation to suit the needs of the target audience. Cyrus (2006) describes an interdisciplinary approach which brings together the fields of corpus linguistics and translation studies. This study presented an ongoing work on the creation of a corpus resource in which translation shifts were explicitly annotated. Their source described in the paper contained English source texts (parliamentary proceedings) and their German translations.

Considering studies conducted on medical translation, Herget and Alegre (2009) have investigated the translation of medical terms from Portuguese into German. Their main focus was to find out what medical translators do in translating erudite terms (words with Greek and Latin origin) between these two languages. In another study, Ouliaei Nia et al (2008) investigated the adequacy and effectiveness of Farsi (contemporary Persian) translations of drug leaflets. Based on their work, the medical texts of the drug leaflets are translatable except for the erudite medical and chemical terms which can be replaced or accompanied by a description or an explanation in parentheses to become understandable for the drug consumers, i.e. the patients.

Investigating English into Farsi translation of medical texts from a linguistic approach is clearly insufficient for understanding the actual process thoroughly. It is clear that for a

thorough understanding of the process of translation between two languages more than one aspect should be investigated. Still, investigating all the aspects together in one study would be very hard and controversial. So it would be more appropriate to take one approach at a time. Moreover, since there are many variables or factors to consider, the investigation can lead to unclear results.

In order to make sense of what actually happens in the process of translation one must confine or stable most variables. Then choose one variable and perform the study on it. In our case, we faced many variables and approaches which could have been considered in investigating the process of translating medical texts from English into Farsi (e.g. the nature of academic discourse in the medical discipline, density of information load in medical texts, the specific textual strategies employed in the discipline, etc.). However, of all the available approaches, we chose basic linguistics which was more grounded and more basic than the others since the study of translating medical texts from English into Farsi is still a road uncharted.

Moreover, to our knowledge, there are still studies in the Middle-East, Asia, and Eastern Europe which use a sole linguistic approach for structural analysis of the translations, especially in translation technology. For instance, Klaudy (2010) has used only Catford's structural shifts, esp. change in word-order, to investigate how the order of the components of the sentence will change in translation into and from Hungarian. In another study, Ahrenberg (2007) has focused on Catford's categorization in machine translation.

Hence, the primary focus of this study was to conduct a study in order to find out the frequency of different kinds of linguistic translation shifts (i.e. structural shifts, class shifts, unit shifts, and intra-system shifts) that occurred in the process of translating different kinds of medical texts from English into Farsi in Iran.

## Method

This was a conceptual qualitative survey. The design of the study was as follows: firstly, a definition of “translation shifts” and “medical texts” was given. In this study a medical text was defined as ‘any portion of writing which is concerned about maintaining and restoring health by the prevention and treatment of the illness.’ Then based on an existing thorough classification of the field of medicine, 5 branches or sub-branches, in which a large number of English-into-Farsi translations are done (according to the existing statistics of the Ministry of Culture and Islamic Guidance in Iran), were selected. Next, one book in each of these branches was chosen. Since most of the sampled books were more than 1000 pages, only two chapters were selected randomly. Afterwards, 10% of the text from each chapter was sampled (the very first and last paragraphs, non-randomly and three paragraphs from the middle, randomly) and the analysis was conducted on them (total of 320 sentences). All of the chosen books had been translated after 2007. This time-period was taken due to the fact that from time to time and by the change of generations, the dominant approach of translators might also change. The analysis was based on the Catford’s linguistic categorization of translation shifts.

The five sampled books of this study were Schwartz’s Principles of Surgery (2009), Harrison’s Principles of Internal Medicine (2008), Jawetz, Melnick, & Adelberg’s Medical Microbiology (2007), Cellular and Molecular Immunology (2009) and Cecil’s Essentials of Medicine (2007) and their Farsi translations.

## Result

The results of this study demonstrate that the most frequent kind of translation shift based on Catford's linguistic categorization in translating medical texts from English into Farsi in Iran is the structural shift which had occurred in all of the sampled sentences. The least frequent translation shift was the class shift which had occurred in less than 5% of the sampled sentences. Of course, Schwartz's Principles of Surgery (2009) and Cecil's Essentials of Medicine (2007) were the only exceptions in which the frequency of unit shift was less than the class shift. The frequencies and percentages of each translation shift in each chapter are given in Tables 1 and 2.

**Table 1: The frequency of sentences which had undergone each kind of shift in the sample texts of the study**

	Structural*	Class	Unit	Intra-system
Schwartz's Principles of Surgery	68	6	2	8
Harrison's Principles of Internal Medicine	65	3	5	9
Jawetz, Melnick, & Adelberg's Medical Microbiology	63	0	4	5
Cellular and Molecular Immunology	55	1	4	2
Cecil Essentials of Medicine	69	3	2	1
<b>Total</b>	<b>320</b>	<b>13</b>	<b>17</b>	<b>25</b>

\* Note: All of the studied sentences had undergone some kind of structural shift, so the frequency of sentences which have undergone structural shifts was equal to the number of studied sentences in each book.

On the whole from 320 sampled sentences, all sentences had undergone structural shift, 4.06% had undergone class shift, 5.31% had undergone unit shift, and 7.81% had undergone intra-system shift. Therefore, the rank of the four translation shifts based on frequency would be: (1) structural shift, (2) intra-system shift, (3) unit shift and (4) class shift.

**Table 2: The percentage of four types of shifts in the sampled sentences of the study**

	Structural*	Class**	Unit**	Intra-system**
Schwartz's Principles of Surgery	All	8.82%	2.94%	11.76%
Harrison's Principles of Internal Medicine	All	4.61%	7.69%	13.84%
Jawetz, Melnick, & Adelberg's Medical Microbiology	All	0.00%	6.34%	7.93%
Cellular and Molecular Immunology	All	1.81%	7.27%	3.63%
Cecil Essentials of Medicine	All	4.34%	2.89%	1.44%
Total	100%	4.06%	5.31%	7.81%

\* The reason why the percentages of structural shifts for each book are 100% is due to the fact that all the studied sentences had undergone some kind of structural shift.

\*\* These percentages indicate that of all the studied sentences, the given percentages had undergone the type of mentioned shift. In this case a sentence might have undergone three types of shifts while another only a structural shift. So these data have overlap should not be summed together.

## Discussion

The basis of the analysis of this study was the existence of any of the mentioned shifts according to Catford's linguistic categorization in the sampled sentences. However, the number of times in which a kind of shift had occurred in a sentence was not the concern of this work. For instance, we sought to find out whether a 'class shift' exists in a sentence or not. But the fact that there was one class shift or more than one in a sentence was irrelevant to our end.

One of the things that some scholars miss out about the 'structural shifts' is that whenever the place of the components of a sentence change during translation, such a shift occurs. As it is known, every language has sentences that include a subject (S), an object (O), and a verb (V), although some sentences lack all three. Languages have been classified according to the basic or most common order in which these occur in sentences. There are six possible orders, i.e. SOV, SVO, VSO, VOS, OVS, and OSV, permitting six possible language types which all exist in the real world (Fromkin, Rodman & Hyams, 2003). English is an example of SVO class and Farsi an example of SOV class.

Whenever translation takes place between two languages of different classes, a structural shift occurs. So presumably we can state that nearly all translated sentences of all kinds of texts from English into Farsi undergo at least one kind of structural shift. In other words, this was a foregone assumption from the start which was approved by the empirical data.

**Table 3: Instances of class shifts in translating medical texts from English into Farsi**

English		Form	Shift	Farsi	Form
1	Plastic Surgery	( <u>adjective</u> + noun)	(adj) into (n)	جراحی پلاستیک Jarrahi pelastic	(noun + <u>noun</u> )
2	Teratogen Effect	( <u>noun</u> + noun)	(n) into (adj)	تأثیر تراژوژنی Tasire teratogeni	(noun + <u>adjective</u> )
3	Septation	(noun)	(n) into (v)	دیواره دار شدن Divaredar shodan	(verb)
4	Longitudinal	(adj)	(adj) into (adv)	به طور طولی Be tore tooli	(adverb)
5	Superficially	(adv)	(adv) into (adj)	سطحی Sathi	(adj)

Note: Examples 4 and 5 are capable of non-class-shift transfer from English into Farsi. However, in the sampled texts of this study there were instances where these shifts had actually occurred

In this study few class shifts were observed. This is probably due to the fact that Farsi and English are very much capable of producing the same concepts in the same forms (noun,

adjective, adverb and verb). So when one concept is given in the form of noun in English, it can most probably be transferred as a noun into Farsi too. However, there were cases in which these forms had undergone class shift in translating from English into Farsi. Some of the instances have been demonstrated in Table 3.

The reason why in the sampled translations, the number of unit shifts was so few was that the translators had mostly transliterated the erudite medical terms into the TL and actually no translation had taken place. Even in cases where Farsi equivalents existed, transliteration had been the preferred method. For example, the word ‘ankylosis’ has a Farsi equivalent of ‘شدن غیرطبیعی مفصل’ or *mohkam shodaneh gheyre tabii mafsal* (Hooshmand-Vijeh, 2006). If an actual translation takes place for this word, it will result in a unit shift (i.e. a word becomes a phrase). However, in many cases the translators had used the transliteration which is ‘آنکیلوز’ (i.e. ankylosis pronounced like French), even though the Farsi equivalent is comprehensible enough. Other examples could be the words ‘mesial’ and ‘microgenia’ which have phrasal Farsi equivalents which are ‘واقع شده در مرکز’ or *vaghe shode dar markaz* and ‘کوچکی غیرعادی چانه’ or *koochekiye gheire adi chane*.

In case of intra-system shifts, most of the cases had occurred for the sake of fluency. Although Farsi and English share a common lingual ancestor, Farsi is more expressive and exploitative than English. In this sense you need to make explicit many of the implicit concepts of an English sentence in order to make it fluent enough in Farsi. Consequently, the results of this study show that beside structural shifts which occur in approximately every translated sentence, few linguistic translation shifts occur in the process of translating English medical texts into Farsi.

One interesting secondary result of this study was that there were very few instances in which a long SL sentence had been broken in two. In other words, almost each sentence of the SL text, no matter how long it was, had been transferred as a sentence into the TL text. Maybe one of the reasons for this finding is that Farsi and English are both Indo-European languages (i.e. languages with similar features). Hence they can provide the same amount of content in the same unit size.

Another secondary finding was the unnecessary changes and bad translations of some sentences. By unnecessary changes, the researchers mean the changes without which, the semi-word-for-word or meaning-based translation would have been acceptable. We can take the translation of the word ‘tolerance’ in the translation of Cellular and Molecular Immunology (2009) as an example. Although this concept remains the same in the whole book, the translators translate it differently every time they encounter it! Once they translate it as ‘تحمل’ or *tahamol*, then as ‘مقاومت’ or *moghavemat* and in many cases as ‘تولرانس’ or *tolerance* (pronounced like French). The reason behind such attitude is unclear, but one can be that the translator(s)/editor(s) had had no focus over the work at hand.

Moreover, the phenomenon of SL text deletion had been very common in these sampled works. Some of the most overt deletions had consequences in the change of meaning. For example, consider a sentence from chapter 56 of Cecil Essentials of Medicine (2007):

SL sentence	More than 173,000 new cases of lung cancer <u>are estimated to have occurred in 2005</u> , and <u>more than</u> 163,000 deaths occur each year
-------------	--



	from lung cancer.
TL sentence	در ایالات متّحده سالانه بیش از 173,000 مورد جدید سرطان ریه و تقریباً 163,000 مرگ ناشی از این سرطان بروز می کند.
Back translation	In United States more than 173,000 new cases of lung cancer and <u>about</u> 163,000 deaths due to this cancer occur.

As it is evident, the parts which have been underlined in the above SL sentence have been omitted from the TL text with no linguistic reason. The SL phrase ‘more than’ has changed into ‘about’ in the TL and the year indication which is ‘in 2005’ has been deleted from the TL text again without any reason. Of course, the mentioned deletions of this example are not as important as the deletions of the next example which is from chapter 22 of Jawetz, Melnick, & Adelberg's Medical Microbiology (2007):

SL sentence	Penicillin <u>G</u> remains the drug of choice <u>for treatment</u> of anaerobic infections that do not involve $\beta$ -lactamase-producing bacteroides and <i>Prevotella</i> species.
TL sentence	پنی سیلین به عنوان داروی انتخابی عفونت های بی هوازی گونه های باکتریویدس و پرووتلا که بتالاکتاماز تولید نمی کنند محسوب می شود.
Back translation	Penicillin is considered as the drug of choice for anaerobic infections, which do not produce $\beta$ -lactamase-producing bacteroides and <i>Prevotella</i> species.

As the above example demonstrates, the underlined parts, which are type of penicillin and the phrase ‘for treatment’, have been deleted from the text with no linguistic or even medical reason. To make the matter worse, it is interesting to know that the type of penicillin has been omitted in the whole TL text of this chapter of Jawetz, Melnick, & Adelberg's Medical Microbiology (2007). This makes one wonder that maybe there was a reason that penicillin *type G* has been explicitly mentioned in the SL text.

Of course, the deletions are not confined to words or phrases and as the below example from chapter 203 of Harrison's Principles of Internal Medicine (2008) shows, there are few instances in which part of the sentence or even the whole sentence has been omitted with no linguistic or medical reason. Again, the reasons behind such deletions are unclear. Still one thing is for sure and that is some of these deletions can have an impact on the meaning of the text which can result in incomplete medical knowledge.

SL sentence	<u>Although there are promising new control and research initiatives,</u> malaria remains today, as it has been for centuries, a heavy burden on tropical communities, a threat to non-endemic countries, and a danger to travelers.
TL sentence	مالاریا همانند قرون گذشته به صورت مشکلی بزرگ برای کشورهای مناطق گرمسیری، تهدیدی برای کشورهای غیراندمیک و خطری برای مسافران، باقی مانده است.
Back translation	Malaria, just like the past centuries, is still a big problem for tropical countries, a threat to non-endemic countries, and a danger to

	travelers.
--	------------

Added to the previously mentioned problems is the lack of good writing. Although there were some chapters which had good typographical features in our sampling, in many other chapters whenever a comma or other typographical features were needed, some translations lacked it. To have a better image of what this means, suppose that a page of this article be without any punctuations plus a few typographical errors! From the five sampled books, the studied translations of Jawetz, Melnick, & Adelberg's Medical Microbiology (2007) and Cecil Essentials of Medicine (2007) were the least fluent in this respect with many typographical errors. Most probably this carelessness in writing is the result of publishers' competition for publishing and distributing the books to the market as soon as possible without much care about the quality of the work. In some cases, it seems as if they have published the translation draft itself. This problem makes understanding the translated text a real struggle.

The resistance to translate many of the erudite words of medicine (even the ones which have common Farsi equivalents), lack of much linguistic shifts and the one-to-one SL-into-TL correspondence of many of the words and sentences of some of these sampled texts, plus the fact that these 1000-page books have been translated in a very short time to be released as soon as possible to the market, has led the researchers to believe that, probably, the actual translation has been done by some machine at least in some cases and then a proofread and revision has been conducted on the results. In some of the sampled sentences the very primary features of a fluent Farsi translation were lacking and instead the TL components had nearly a one-to-one or as to say *strict* word-for-word correspondence.

## Conclusion

This study set out to investigate the frequency of different kinds of linguistic translation shifts (i.e. structural shifts, class shifts, unit shifts, and intra-system shifts) based on the work by Catford that occur in the process of translating different kinds of medical texts from English into Farsi (contemporary Persian) in Iran (modern Persia). Of the four kinds of linguistic shifts, apart from the structural shifts which were theoretically expected to occur in every sentence, intra-system shifts were the most frequent and class shift the least frequent. Here the most important point is the fact that there is a huge difference between the frequencies of structural shifts (100%) and the small percentage of the rest of the analyzed shifts (8%, 6% and 4%). In spite of what was expected prior to conducting this study, since most of the erudite terms had been transliterated, not translated, the number of unit shifts was few. This shows that using Catford's structural analysis is not sufficient for evaluating the medical translations from English into Farsi.

The high number of translational errors encountered in the sampled texts of this study demonstrates the big lack we face in this specialty of translation at least in Iran. It seems that many of the translators of medical books, even the popular and academic ones, do not have the required knowledge for conducting a translation. Being a good doctor does not mean that one is a good translator. In order to translate, one must, at least, have a sufficient knowledge of the principles of this specialty of translation in addition to the knowledge of medicine. Otherwise his/her work will result in works such as the sampled famous books of this study.

Finally, it is recommended that further studies be conducted to find out whether the translation of medical texts will involve other/more/fewer shifts than the translation of other genres. Also, investigating the nature of academic discourse in the medical discipline in the two languages of English and Farsi can be valuable for future researches.

## Appendix 1

Few of the SL sampled sentences of Schwartz's Principles of Surgery (2009) and their TL counterparts are listed. The sentences are in the order which they appear in the text and are from chapters 27 and 30.

1	SL sentence	The procedures described later use the laparoscopic approach as the default or typical approach.
	TL sentence	روش هایی که بعداً شرح داده می شوند، در صورتی که تصمیم دیگری اتخاذ نگردد، از رویکرد لاپاراسکوپیک استفاده می کنند (به عنوان رویکرد معمول).
	Back translation	The methods which will be described later, if no other decision is made, will use laparoscopy (as the typical approach)
2	SL sentence	The latter technique has been clearly shown to decrease the incidence and seriousness of anastomotic leaks postoperatively.
	TL sentence	تکنیک آخر به وضوح باعث کاهش بروز و شدت نشت آناستوموز پس از عمل می گردد.
	Back translation	The last technique will clearly result in the decrease of incidence and anastomotic seriousness leaks postoperatively.
3	SL sentence	<u>A retrocecal appendix may cause principally flank or back pain</u> ; a pelvic appendix, principally suprapubic pain; and a retroileal appendix, testicular pain, presumably from irritation of the spermatic artery and ureter.
	TL sentence	یک آپاندیس لگنی عمدتاً موجب درد فوق عانه ای و آپاندیس خلف ایلومی، احتمالاً به علت تحریک شریان اسپرماتیک و حالب، ممکن است موجب درد بیضه شود
	Back translation	[the first phrase is missing in translation] A pelvic appendix will occasionally lead to suprapubic pain and a retroileal appendix, probably because of stimulation of the spermatic artery and ureter, may result in testicular pain.
4	SL sentence	Recent studies suggest that, in selected patients, observation and antibiotic therapy alone may be an appropriate treatment for acute appendicitis.
	TL sentence	مطالعات اخیر مطرح کرده که تحت نظر گرفتن و درمان آنتی بیوتیکی در بیماران منتخب، به تنهایی می تواند درمان مناسبی برای آپاندیسیت حاد باشد.
	Back translation	Recent studies have mentioned that supervision and antibiotic therapy in selected patients, alone may be an appropriate treatment for acute appendicitis.
5	SL sentence	The management of appendiceal lymphoma confined to the appendix is appendectomy.
	TL sentence	درمان لنفوم آپاندیس محدود به این عضو برداشتن آپاندیس است.
	Back translation	Treatment of appendiceal lymphoma confined to this organ is appendectomy.

## Appendix 2

Few of the SL sampled sentences of Harrison's Principles of Internal Medicine (2008) and their TL counterparts are listed. The sentences are in the order which they appear in the text and are from chapters 189 and 203.

1	SL sentence	In addition, few agents are regularly spread among humans by arthropods.
	TL sentence	علاوه بر این، تعداد اندکی از ویروس‌ها توسط بندپایان بین انسان‌ها منتشر می‌شوند.
	Back translation	In addition, few viruses are regularly spread by arthropods among humans.
2	SL sentence	Information on a virus's membership in a family or genus is enlightening with regard to maintenance strategies, sensitivity to antiviral agents, and some aspects of pathogenesis but does not necessarily predict which clinical syndromes (if any) the virus will cause in humans.
	TL sentence	اطلاعات مربوط به عضویت در یک خانواده یا گونه با توجه به روش‌های حفظ و نگهداری، حساسیت به ضدویروس‌ها و بعضی از وجوه پاتوژنیک آنها، رو به فزونی است، ولی لزوماً نوع سندروم‌های بالینی ایجاد شده توسط ویروس در انسان را پیش‌بینی نمی‌کند.
	Back translation	Information about membership in a family or kind is increasing with maintenance strategies, sensitivity to anti-viruses, and some aspects of pathogenesis but does not necessarily predict the clinical syndromes in humans.
3	SL sentence	All the viral encephalitides discussed in this section have a similar pathogenesis as far as is known.
	TL sentence	تمامی موارد آنسفالیت ویروسی در این فصل مورد بحث قرار گرفتند و همه دارای پاتوژنز مشابه شناخته شده هستند.
	Back translation	All kinds of viral encephalitides have been discussed in this chapter and have a known similar pathogenesis.
4	SL sentence	It is an occasional accompaniment of infection due to mumps virus, enteroviruses, herpesviruses, and adenoviruses.
	TL sentence	آرتریت همچنین از علائم نادر عفونت‌های ایجاد شده با ویروس اورین، انتروویروس‌ها، هرپس‌ویروس‌ها و آدنوویروس‌ها است.
	Back translation	Arthritis is a rare symptom of infection due to mumps virus, enteroviruses, herpesviruses, and adenoviruses.
5	SL sentence	<u>Although there are promising new control and research initiatives</u> , malaria remains today, as it has been for centuries, a heavy burden on tropical communities, a threat to non-endemic countries, and a danger to travelers
	TL sentence	مالاریا همانند قرون گذشته به صورت مشکلی بزرگ برای کشورهای مناطق گرمسیری، تهدیدی برای کشورهای غیراندمیک و خطری برای مسافران، باقی مانده است.
	Back translation	[the first phrase is missing in translation] Malaria, just like the past centuries, is still a big problem for tropical countries, a threat to non-endemic countries, and a danger to travelers.

### Appendix 3

Few of the SL sampled sentences of Jawetz, Melnick, & Adelberg's Medical Microbiology (2007) and their TL counterparts are listed. The sentences are in the order which they appear in the text and are from chapters 22 and 24.

1	SL sentence	The infections are often polymicrobial –that is, the anaerobic bacteria are found in mixed infections with other anaerobes, facultative anaerobes, and aerobes.
	TL sentence	این عفونت‌ها در اغلب موارد چند میکروبی هستند. عفونت چند میکروبی عبارت است از: باکتری‌های بی‌هوازی همراه با سایر باکتری‌های بی‌هوازی، بی‌هوازی اختیاری و هوازی.
	Back translation	These infections are in most cases polymicrobial. Polymicrobial infection includes: the anaerobic bacteria mixed with other anaerobes, facultative anaerobes, and aerobes.
2	SL sentence	Some <i>Actinomyces</i> species are oxygen-tolerant (aerotolerant) and grow in the presence of air.
	TL sentence	بعضی از گونه‌های اکتینومایسسز، اکسیژن را تحمل نموده (تحمل کننده هوا) در حضور هوا رشد می‌نمایند.
	Back translation	Some <i>Actinomyces</i> species can tolerate oxygen (tolerating air) and grow in the presence of air.
3	SL sentence	The toxins are heatlabile, so properly heated does not transmit botulism.
	TL sentence	توکسین‌ها به حرارت حساس بوده بنابراین غذایی که اندازه کافی حرارت دیده باشد موجب بوتولیسم نمی‌گردد.
	Back translation	Toxins are sensitive to heat, that is why food that is heated properly does not cause botulism.
4	SL sentence	Penicillin <u>G</u> remains the drug of choice for treatment of anaerobic infections that do not involve $\beta$ -lactamase-producing bacteroides and <i>Prevotella</i> species.
	TL sentence	پنی‌سیلین به عنوان داروی انتخابی عفونت‌های بی‌هوازی گونه‌های باکتریویدس و پرووتلا که بتالاکتاماز تولید نمی‌کنند محسوب می‌شود.
	Back translation	Penicillin is considered as the drug of choice for anaerobic infections, which do not produce $\beta$ -lactamase-producing bacteroides and <i>Prevotella</i> species.
5	SL sentence	This should include a complete skin examination and an examination of the peripheral nervous system.
	TL sentence	برای این منظور می‌باید آزمایش پوستی و آزمایش سیستم حسی محیطی به عمل آید.
	Back translation	For this reason it is necessary that a skin examination and an examination of the peripheral nervous system be done.

## Appendix 4

Few of the SL sampled sentences of Cellular and Molecular Immunology (2009) and their TL counterparts are listed. The sentences are in the order which they appear in the text and are from chapters 11 and 13.

1	SL sentence	When specific lymphocytes encounter antigens, the lymphocytes may be activated, leading to immune responses, or the cells may be inactivated or eliminated, leading to tolerance.
	TL sentence	هنگامی که لنفوسیت‌های اختصاصی با آنتی ژن‌ها برخورد می‌کنند ممکن است فعال شده، پاسخ ایمنی ایجاد کنند، یا غیرفعال شده و حذف شوند که منجر به تحمل می‌گردد.
	Back translation	When specific lymphocytes encounter antigens, they may be activated and trigger immune responses, or they may be inactivated or eliminated, leading to tolerance.
2	SL sentence	Immunologists have also developed experimental models for studying tolerance in CD4 <sup>+</sup> T cells that have proved to be quite informative.
	TL sentence	ایمونولوژیست‌ها، نیز بسیاری از مدل‌های آزمایشگاهی را برای بررسی مکانیسم‌های تحمل در سلول‌های CD4 <sup>+</sup> T ایجاد کرده‌اند. این سیستم‌ها، اطلاعات فراوانی را در مورد تولرانس سلول‌های CD4 <sup>+</sup> T فراهم کرده‌اند.
	Back translation	Immunologists also have developed many experimental models for studying tolerance mechanisms in CD4 <sup>+</sup> T cells. These systems have given much information about the tolerance of CD4 <sup>+</sup> T cells.
3	SL sentence	Another mechanism for regulating adaptive immune responses was proposed by Neils Jerne in the 1970s as the network hypothesis.
	TL sentence	مکانیسم تنظیمی دیگر برای پاسخ‌های ایمنی اختصاصی، توسط نیلز یرن در دهه 1970 تحت عنوان «فرضیه شبکه ایدیوتایپی» مطرح شد.
	Back translation	Another regulating mechanism for specific immune responses was proposed by Neils Jerne in the 1970s as the idiotypic network hypothesis.
4	SL sentence	The basic tenet of the network hypothesis is that complementary interactions involving idiotypes and anti-idiotypes reach a steady state at which the immune system is at homeostasis.
	TL sentence	اصل پایه فرضیه شبکه ایدیوتایپها و آنتی ایدیوتایپها به حالت ثابتی می‌رسد که در آن سیستم ایمنی در حال تعادل است.
	Back translation	The basic principle of the idiotypic network hypothesis and anti-idiotypes reaches a steady state at which the immune system is in a balance.
5	SL sentence	The maintenance of memory T cells is dependent on cytokines that are constitutively present in tissues, and that support low-level proliferative activity.
	TL sentence	حفظ سلول‌های T خاطره‌ای وابسته به سایتوگاین‌هایی است که در بافت‌ها همیشه حضور دارند و فعالیت تکثیری کم آنها را پشتیبانی می‌کنند.
	Back translation	Maintenance of remembrance T cells is dependent on cytokines that are always present in tissues and support their low-level proliferative activity.

## Appendix 5

Few of the SL sampled sentences of Cecil Essentials of Medicine (2007) and their TL counterparts are listed. The sentences are in the order which they appear in the text and are from chapters 56 and 64.

1	SL sentence	More than 173,000 new cases of lung cancer <u>are estimated to</u> have occurred <u>in 2005</u> , and <u>more than</u> 163,000 deaths occur each year from lung cancer.
	TL sentence	در ایالات متّحده سالانه بیش از 173,000 مورد جدید سرطان ریه و تقریباً 163,000 مرگ ناشی از این سرطان بروز می کند.
	Back translation	In United States more than 173,000 new cases of lung cancer and <u>about</u> 163,000 deaths due to this cancer occur.
2	SL sentence	Occasionally, <u>patients with</u> colon and rectal cancers are asymptomatic until the tumor totally obstructs the bowel or perforates the peritoneal cavity.
	TL sentence	گاهی سرطان های کولون و راست روده تا انسداد کامل روده یا سوراخ شدن حفره صفاقی، بدون علامت هستند.
	Back translation	Sometimes colon and rectal cancers are asymptomatic until total bowel obstruction or peritoneal cavity perforation.
3	SL sentence	Ductal carcinoma in situ (DCIS), or intra-ductal carcinomas, is increasing in frequency, most likely because of increased mammographic screening.
	TL sentence	شیوع کارسینوم در جای مجرا (DCIS یا کارسینوم داخل مجرا) در حال افزایش است، که احتمالاً دلیل آن افزایش غربالگری ماموگرافیک است.
	Back translation	Ductal carcinoma in situ (DCIS or intra-ductal carcinomas) is increasing, and its reason is probably because of increased screening by mammography.
4	SL sentence	The cavernous sinus borders laterally on the pituitary gland.
	TL sentence	سینوس کاورنو که حاوی شریان های کاروتید و اعصاب جمجمه ای III، IV و VI است در طرفین هیپوفیز قرار دارد.
	Back translation	Cavernous sinus, which includes carotid arteries and cranial nerves III, IV and VI, is laterally on the pituitary gland.
5	SL sentence	In women, the ovulatory LH surge results in rupture of the follicle <u>and then</u> <u>luteinization</u> .
	TL sentence	در زنان، LH در زمان تخمک گذاری و پس از آن در زمان تشکیل جسم زرد به اوج می رسد.
	Back translation	In women, LH at the time of ovulation and after that in rupture of the follicle maximizes.



## References

- ABBAS, Abul K., LICHTMAN, Andrew H., & PILLAI, Shiv (2009). *Cellular and Molecular Immunology* (6<sup>th</sup> Ed). Philadelphia, US: Saunders Elsevier.
- AHRENBERG, Lars (2007). LINES: An English-Swedish Parallel Treebank In J. Nivre, H.-J. Kaalep, K. Muischnek, & M. Koit (Ed.), *NODALIDA 2007 Conference proceedings*, (pp. 270-273).
- ANDREOLI, Thomas E., CARPENTER, Charles C., GRIGGS, Robert C., & BENJAMIN, Ivor (2007). *Cecil Essentials of Medicine* (7th ed.). Philadelphia, USA: Saunders Elsevier.
- BROOKS, George, CARROLL, Karen C., BUTAL, Janet & MORSE, Stephen (2007). *Jawetz, Melnick, & Adelberg's Medical Microbiology* (24th ed.). New York, USA: McGraw-Hill Medical.
- BRUNICARDI, F. Charles, ANDERSEN, Dana K., BILLIAR, Timothy R., DUNN, David L., HUNTER, John G., MATTHEWS, Jeffrey B., & POLLOCK, Raphael E. (EDS.). (2009). *Schwartz's Principles of Surgery* (9<sup>th</sup> ed.). New York, USA: McGraw-Hill Professional.
- CATFORD, John C. (1965). *A Linguistic Theory of Translation*. London: Oxford University Press.
- CATFORD, John C. (2000). A Linguistic Theory of Translation. In L. Venuti (Ed.), *The Translation Studies Reader* (1st ed., pp. 141-147). New York: Routledge.
- CYRUS, Lea (2006). Building a resource for studying translation shifts. *Proceedings of LREC 2006*, (pp. 1240-1245). Genoa.
- DAVIES, Eirlys E. (2006). Shifting Readerships in Journalistic Translation. *Perspectives: Studies in Translatology*, 14(2), 83-98.
- FAUCI, Anthony S., BRAUNWALD, Eugene, KASPER, Dennis L., HAUSER, Stephen L., LONGO, Dan L., JAMESON, J. Larry, & LOSCALZO, Joseph (EDS.). (2008). *Harrison's Principles of Internal Medicine* (17th ed.). New York, USA: McGraw-Hill Professional.
- FROMKIN, Victoria, RODMAN, Robert & HYAMS, Nina (2003). *An Introduction to Language* (7th ed.). Boston, USA: Heinle, a part of Thomson Corporation.
- HERGET, Katrin, & ALEGRE, Teresa (2009, JULY). Translation of Medical Terms. *Translation Journal*, 13(3), <http://translationjournal.net/journal/49medical1.htm>
- HOOSHMAND-VIJEH, Mohammed (2006). *Dorland's Illustrated Medical Dictionary (English to Persian)* (2nd ed.). Tehran: Farhang Moaser
- KLAUDY, K. (2010). Optional word-order shifts in translation into and from Hungarian. *Studia Slavica*, 55(2), 307-318.
- OULIAEI NIA, Helen, CHANGIZ, Tahereh, & SADAT HOSSEINI, Tayabeh (2008). *Articles: A Study of the Adequacy and Effectiveness of Persian Translations of Drug Leaflets*. Retrieved July 4, 2010, from Translation Directory Web Site: <http://www.translationdirectory.com>
- TAHERSHAMS, Mehdi (2009). *Frequency of Catford's category shift applied in English translations of the Holy Quran: A case study on Sura Maryam*. MA Thesis. Tehran: Islamic Azad University - South Tehran Branch.
- VINAY, Jean-Paul, & DARBELNET, Jean (1995). *Comparative Stylistics of French and English: A Methodology for Translation*. (J. Sager, & M. J. Hamel, Trans.) Philadelphia: John Benjamins

Hajar Khanmohammad<sup>1</sup> PhD, Email: [fer987295kia@yahoo.com](mailto:fer987295kia@yahoo.com)

Seyed Muhammed Hussein Mousavinasab<sup>2</sup> MA, Email: [smhmnt@yahoo.com](mailto:smhmnt@yahoo.com) (corresponding author)

<sup>1</sup> Assistant Professor, English Language Department, Faculty of Foreign Languages, Islamic Azad University – Central Tehran Branch, Tehran, Iran

<sup>2</sup> Master of Translation Studies, Faculty of Persian Literature and Foreign Languages, Islamic Azad University – South Tehran Branch, Tehran, Iran

In SKASE Journal of Translation and Interpretation [online]. 2014, vol. 7, no. 1 [cit. 2014-29-12]. Available online <[http://www.skase.sk/Volumes/JTI08/pdf\\_doc/06.pdf](http://www.skase.sk/Volumes/JTI08/pdf_doc/06.pdf)>. ISSN 1336-7811