

Units of translation adopted in Persian term-formation

Unidades de tradução adotadas na formação terminológica persa

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Abstract: Two trends exist for Persian term-formation. In the first method known as calquing, words are rendered morpheme by morpheme. Thus, the unit of translation (UT) is a morpheme. In the second method known as conceptual equivalent-finding, the definitions of words are considered and the UT is a word. The present study was designed to identify which of the two UTs was more favored in Persian term-formation. To this end, 40 English prefixes were studied in 2354 English words together with their Persian equivalents approved by the Academy of Persian Language and Literature (APLL) as the official term-formation agency in Iran. It was noticed that calquing was more frequent, i.e. morphemes were more frequently considered as UTs. Moreover, strategies of translating prefixes were introduced and examined in both methods. In conceptual method, prefixes were ignored and not translated morpheme by morpheme. However, in calquing, English prefixes were translated into Persian prefixes or lexemes.

Keywords: unit of translation, term-formation, prefix, conceptual equivalent-finding, calquing.

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Resumo: Existem duas tendências para a formação terminológica persa. Na primeira, método conhecido como decalque, palavras são transformadas morfema por morfema. Assim, a Unidade de Tradução (UT) é um morfema. Na segunda, método conhecido como achado-equivalente conceitual, as definições de palavras são consideradas e a UT é uma palavra. O presente estudo foi desenhado para identificar qual das duas UT foi mais favorecida na formação terminológica persa. Para este fim, 40 prefixos em inglês foram estudados em 2324 palavras em inglês e em conjunto com seus equivalentes persas, aprovados pela Academy of Persian Language and Literature (APLL) como agência oficial de formação terminológica persa no Irã. Percebeu-se que o decalque era mais frequente, ou seja, morfemas eram mais frequentemente considerados UTs. Além disso, estratégias de tradução de prefixos foram introduzidas e examinadas em ambos os métodos. No método conceitual, prefixos foram ignorados, e não traduzidos morfema por morfema. No entanto, no decalque, prefixos do inglês foram traduzidos para prefixos do persa ou lexemas.

Palavras-chave: Unidade de Tradução (UT), formação terminológica, prefixo, achado-equivalente conceitual, decalque.

1. Introduction

Term-formation deals with the small components of language known as *terms*. To put it simply, *words* are more general than *terms*. This means that *words* are identical to an umbrella term that embraces *terms* inside. Sager (1990) interprets words as items in the lexicon of a special language, which have general reference and are not specific to any discipline.

Persian term-formation is officially conducted by the Academy of Persian Language and Literature (hence, APLL). APLL was founded in 1935 in Tehran as the only official Persian language academy, authority, and regulatory body in Iran. It aims to conduct academic linguistic researches on Persian language and keep its originality and integrity as the common and official language of Iran. It also attempts to reinforce, develop, and equip Persian language in a way to meet the increasing cultural, scientific, and technical needs in the field of Persian language and literature. More importantly, APLL has the mission to eliminate dispersions among cultural and research centers over Persian language by coordinating linguistic efforts and researches. As such, it monitors and determines some criteria for term-formation to be observed by translators or perhaps lexicographers in confronting new terms.

The term-formation council of APLL is composed of over 60 specialized groups. Within each of these groups, there exist some experts who, along with other members, find equivalents for foreign terms in their special fields such as physics, medicine, etc. Thus, the source words adopted in Persian term-formation belong to different kinds of disciplines. The selected lexical items for the present study are not bound to a special field and include terms from several disciplines. Consequently, it would be much appropriate to use *term* and *term-formation* in our case.

The unit of translation (hence UT) in translating words from English into Persian would either be a morpheme or a word. This means that there are two

UTs considered for translating words: *morphemes* and *words*. Morphemes are either free or bound. Bound morphemes are basically of two kinds: affixes and roots. English language makes ample use of affixes for derivational term-formation. In fact, derivation is the most employed procedure for term-formation in English (YULE 2010). Persian, however, resorts to different procedures for translating such affixes of English words (KHODABAKHSHI 2009). This means that only in some of the words the UT is a morpheme and only some of the prefixes are translated into prefixes in Persian. For translation of other words, a *word* is normally considered the UT. In the present study, we attempted to investigate the translation of English prefixes into Persian by APPL. Different procedures for translating English prefixes are further studied. All this was done to determine which one of the two UTs, namely morpheme and word, is more frequent in Persian term-formation.

2. Background

The act of translating usually involves choosing one or more UTs. As Shuttleworth and Cowie (1997) suggest, this is done to determine the linguistic level at which the translator wishes to analyze the source text (hence, ST). Scholars have observed UTs at different ranks. In the earlier decades around 1950, structuralists adopted UTs at lower ranks, such as morphemes and mainly, words. From 1960s onward, translators or researchers focused on UT at ranks higher than word, i.e. phrase, clause, sentence, text, and even culture, after the cultural turn. It can be easily noticed that smaller UTs, such as morphemes, have usually been ignored. Translations have rarely remained at lower ranks than words so as to take morphemes into account. As Lehrer (1995) suggests, semantic units such as morphemes are given little attention in term-formation. Vinay and Darbelnet (1995) even reject the notion of words as UTs (quoted in MUNDAY 2008). Moreover, as the researcher

examined the MA and PhD theses in the universities of his country, only few studies had been carried out to consider words or morphemes as the UT.

Nevertheless, a lot of attention is given by terminologists to morphemes, since those are the smallest units of language. In fact, term-formation based on the analysis of morphemes is of paramount significance in the translation of terms and modern Persian term-formation (TAJVIDI 2005). Thus, taking words or morphemes as the UT is indispensable as far as term-formation is concerned simply because there are two ranks observed in term-formation: word and morpheme. Following, some instances are presented even from languages other than Persian to illustrate the importance of morphemes and words as the smallest units of language and the significance of morphological analysis in translating words.

Analysis of morphemes was employed as early as 9th century A.D. by Al-Kindi in his translations of philosophical terminology from Greek into Arabic (BADAWI 1986). He analyzed the derivational structure of Greek words to offer Arabic translations for them and sometimes resorted to other translators to describe the structure of Greek words to him. Whatever his intention from such an analysis, Badawi believes such morphological analysis in translating words is used even today in translating technical terminology. Morphemes are also specifically addressed by Casagrande (1954) in his *linguistic types of translation* (quoted in SHUTTLEWORTH AND COWIE 1997). He defines the aim of this type of translation as identifying and assigning “equivalent meanings to the constituent morphemes of the source language” (94). In linguistic translation, ST segments are rendered sequentially into target language (hence, TL) units and the structural form is of paramount importance.

Based on the foregoing, taking morphemes as UT is fundamental to the study of term-formation strategies, particularly derivation and compounding. Thus, the primary focus of the present research was to find the extent to which morphemes are used as UT in term-formation. The present study is perhaps the first one specifically focusing on UTs adopted in term-formation

since words or morphemes are rarely considered UTs. This demanded a study on the term-formation methods in Persian.

3. Persian term-formation methods and UTs

The present study adopts the strategies offered by the APLL for equivalent-finding. It is remarked in *A Collection of Terms* (TERMINOLOGY DEPARTMENT 2014) that there are two methods to find equivalents for English words:

1. Conceptual equivalent-finding: In this method, the focus is on the definitions and meanings of the English words as a whole, ignoring their structures.

2. Calquing: In the second method, the emphasis is on the structure and the constituents of the English words. In other words, every meaningful unit in the foreign word is replaced by a meaningful unit in Persian.

It is to add that in each of the two methods, term-formation is done through one of the term-formation patterns. In a study conducted by Pasha Abgarmi (2015), the two term-formation methods were examined in detail and strategies for treating English prefixes in Persian term-formation were introduced and investigated.

Tajvidi (2005) calls the above-mentioned second type of equivalent-finding the *analytic-compositional* method and suggests that it has been the most frequent equivalent-finding strategy in the recent decades. He offers this name because in this method, first, the word is analyzed to its morphemes and having found the equivalents of morphemes, they are combined. This method is frequent since both English and Persian languages are analytic. As it was mentioned in the background section, the analytic-compositional method has a long history in term-formation.

Considering the UT, it could be concluded that in the first method, the UT is a word since the meaning of the whole word is taken into account and the constituents are ignored. In the second method, the UT is a morpheme because the meaningful units of words (stated in the definition of calquing) are known as morphemes. Morphemes can, in turn, be rendered in two manners:

1. The source language (hence, SL) morphemes including prefixes may be rendered into lexemes in the TL. In this condition, it so appears that the TL words will most probably be compounds because the roots of words are also translated into lexemes mostly. In some cases, TL words might even be synthetic compounds.

2. The SL morphemes including affixes may be similarly translated into affixes in the TL. In this case, the TL words will normally be derivational.

Thus, it can be summarized that there are two UTs considered in term-formation namely words and morphemes. In the former (called conceptual method), the focus is on the meaning of the whole word. In the latter type (called calquing), there are two outcomes for SL morphemes (prefixes in this study): being rendered into affixes (leading to derivatives) or lexemes (leading to compounds).

There is not a single criterion to distinguish affixes (prefixes in this study) from lexemes. Scholars have different views in this regard. However, in the present article, the viewpoint of Kalbasi (2008) was adopted as one of the modern definitions. According to her, prefixes are bound morphemes that precede bases and cannot be used independently. In other words, they should always be attached to other words or bases. On the other hand, lexemes can be used independently and do not need to be attached to other words or bases. For instance, *فرا* is considered a prefix since it cannot be used alone, but *برون* is regarded as a lexeme since it can be used independently without being attached to other bases (see table 2).

4. Treating prefixes in term-formation

As the focus of the current study, the researcher aims to find the ways terminologists treat prefixes in their translations of English terms. Based on the kinds of term-formation methods discussed above, it can be concluded that prefixes can be treated in three manners:

1. Prefix into Prefix: They may be translated into a prefix in Persian and the output would be a derivative. An example may be *progression* translated into *پیشروی* (going forward).
2. Prefix into Lexeme: They may be translated into Persian as a Lexeme. Thus, the output would mostly be a compound. An example is *projection* translated into *بیرون‌فکنی* (throwing outside).
3. Ignoring Prefix (Focus on Function): The prefix may be ignored. Here, the focus would be on the function of the source word. Since the whole word rather than its constituents is observed here, the UT in this method is a word. An example may be *projectile* translated into *پرتابه* (something that is thrown). Borrowing English words is also a case of ignoring prefixes. An example may be *prostate* translated into *پروستات* (/prosta:t/).

5. Corpus of the study

The present study used a general bilingual parallel *corpus* comprising an English element and a Persian one. English terms were listed next to their Persian equivalents. All the words with the specified prefixes were included and no randomization was applied in selecting them. The entries in the books follow an alphabetic order in both Persian and English. Since our ST is the collection of English words, the part alphabetized in English was adopted. The

corpus of the study comprised all the eleven volumes of the book *A Collection of Terms: approved by the Academy of Persian Language and Literature* published by APLL from 2004 to 2014.

Term-formation is officially conducted by the APLL in Iran. Thus, the above-mentioned book was selected as the *corpus* of study. Furthermore, we attempted to study the recent status of Persian term-formation. The chosen *corpus* is frequently updated and newer terms are continuously added to it through years. Perhaps, it would not be an exaggeration to call it the most up-to-date corpus of Persian equivalents offered for English terms. Some of the words in this corpus are not found in popular dictionaries or even on the Internet. Even when they are found, newer senses of them are not included. Instances might be the word *off-peak hours* meaning *فرایم* or *MMS* translated into *زمان سبکی*.

Moreover, a digital *corpus* was also used beside the books. This digital *corpus* comprised all the eleven volumes of the books online. This *corpus* is accessible at: <http://www.persianacademy.ir/fa/word/default.aspx>.

6. Procedures for data collection

The present study was conducted on words or to be exact, terms, and the equivalents offered for them by APLL. Every word in the *corpus* containing the specified prefixes constituted the data for the study. Thus, 40 prefixes were examined, their list being extracted from *English word-formation processes* (LIEBER 2005). There are, for sure, many prefixes in English, but examining all of them were beyond the scope of the present study. Moreover, the 40 extracted prefixes were among the most common prefixes in English (see LEHRER 1995; BAUER 1983). They are given in alphabetical order in table 1.

The first step in data collection was to determine what English prefixes were to be analyzed in the study. Having extracted the list of prefixes, English words containing the specified prefixes were manually extracted from the *corpus* and categorized under each prefix. The equivalents offered by APLL for the selected words were also extracted from the same *corpus*. English words and their Persian equivalents were tabulated to make their comparison easier. The online *corpus* (the APLL official website tool) was used as an instrument to search prefixes in the *corpus* and yield concise results. Over 2354 words with the specified prefixes were found. The words were then extracted and classified in Microsoft Excel 2013. The frequencies of the prefixes in the *corpus* are given in table 1.

Prefix	Frequency	Prefix	Frequency	Prefix	Frequency
01. after-	36	15. extra-	65	29. pre-	671
02. ante-	105	16. fore-	390	30. pro-	1206
03. anti-	283	17. hyper-	72	31. pseudo-	37
04. arch-	240	18. inter-	580	32. retro-	41
05. auto-	173	19. meta-	145	33. semi-	98
06. back-	199	20. micro-	171	34. sub-	308
07. bi-	1433	21. mis-	273	35. super-	148
08. by-	102	22. multi-	167	36. supra-	26
09. circum-	10	23. non-	230	37. trans-	564
10. counter-	131	24. off-	224	38. un-	238
11. dis-	779	25. on-	64	39. under-	100
12. down-	94	26. out-	306	40. up-	73
13. en-	426	27. over-	375		
14. ex-	278	28. post-	206		

Table 1 - Frequency of extracted prefixes

7. Data classification

Cells of the tables had to be highlighted in order to group words. As it was mentioned, prefixes were treated in three manners in offering Persian equivalents for English words, namely prefix into prefix, prefix into lexeme, and ignoring prefix. When conceptual equivalent-finding method is used (i.e. when UT is a word), the English prefixes are not translated separately. In these cases, the prefixes are ignored and no equivalents are identifiable for them. However, when calquing method is adopted (i.e. when UT is a morpheme), the prefixes are rendered into either prefixes or lexemes in Persian.

Highlighting was applied at this stage with multiple colors. Several colors were used to highlight words where the English prefix was translated into different prefixes in Persian. Other colors were also used to highlight instances of translating English prefixes into Persian lexemes. Finally, another color was employed to distinguish cases of conceptual equivalent-finding.

Following, a sample is presented of the way collected data were classified. The prefix *extra-* is selected as an instance (see table 2).

SL Term	TL Equivalent	Prefix Equivalent
<u>extragalactic</u> radiation	تابش فراکهکشانی	Prefix
<u>extrasensory</u> perception	ادراک فراحسی	Prefix
<u>extraordinary</u> ray	پرتو غیرعادی	Prefix
<u>extra</u> run	برنامه اضافی	Lexeme
<u>extra</u> chromosomal inheritance	وراثت بیرون‌فامتنی	Lexeme
<u>extracellular</u>	بیرون‌بایخته‌ای	Lexeme
<u>extracronal</u> retainer	نگهدارنده بیرون‌تاجی	Lexeme
<u>extramusical</u>	بیرون‌موسیقایی	Lexeme
<u>extranet</u>	بیرون‌نت	Lexeme
<u>extranuclear</u> inheritance	وراثت بیرون‌هسته‌ای	Lexeme
<u>extraoral</u> orthodontic appliance	بست آرتاندانی بیرون‌دهانی	Lexeme

SL Term	TL Equivalent	Prefix Equivalent
<u>extratropical</u> cyclone	چرخند بیرون‌حاره‌ای	Lexeme
<u>extra</u> version	بیرون‌گرایی	Lexeme
trend <u>extra</u> polation	بیرون‌یابی روند	Lexeme
<u>extra</u> load tyre	تایر یُربار	Lexeme
<u>extra</u> virgin olive oil	روغن‌زیتون بکر ممتاز	Lexeme
<u>extra</u> -alveolar crown	تاج بالینی	Ignored
<u>extragalactic</u> distance scale	نردبان فاصله	Ignored
<u>extra</u> hepatic bile duct carcinoma	پوش‌چنگار زردابراه	Ignored
<u>extra</u> ordinary felling	برش اضطراری	Ignored
<u>extra</u> systole	ضربان پیش‌رس	Ignored

Table 2 - A data classification sheet sample

It is noted that the prefix *extra-* is used in 21 words, but treated differently in each of them. The *prefix equivalent* column indicates how the prefix is treated in each word. When calquing method was adopted and the UT was a morpheme, the prefixes were translated into prefixes or lexemes. When the conceptual method was adopted, the UT was a word and the prefixes were ignored. The prefixes in highlighted cells are translated similarly.

For instance, the word *extragalactic radiation* is translated into تابش فراکهکشانی (belonging to over the galaxy) where the prefix *extra-* is translated into the prefix فرا- (over). The word *extranet* is translated into بیرون‌نت (outside the net) where *extra-* is translated into the lexeme بیرون (outside). Finally, *extraordinary felling* is translated into برش اضطراری (emergency cutting) where the word اضطراری (emergency) is offered as an equivalent for *extraordinary*, but no separate equivalent can be spotted for the prefix *extra-*.

8. Results

In the present study, the frequency of the two UTs, namely morpheme and word in Persian term-formation, was investigated. Following, the results are provided and the frequencies are calculated for both methods. The results are presented in two manners, general and detailed. The former indicates the sum of results for all 40 prefixes. However, the detailed results examine prefixes one by one, showing the *mode* (most frequent results) for them.

First, calquing, or analytic-compositional method, is finding equivalents for the constituting morphemes of words. In other words, the UT is a morpheme in this equivalent-finding method. In the present research, prefixes were studied as a subtype of morphemes. It was noted that English prefixes could be translated into either prefixes or lexemes in Persian. The results for each of them are presented in table 3.

TL SL	Prefix				Sum	Lexeme								Sum
	Eq ¹	f ²	Eq	f		Eq	f	Eq	f	Eq	f	Eq	f	
1. after-	پس	13	باز	1	14	تکمیلی	1	دوم	1	پیشاپسین	1	بعد	1	4
2. ante-	پیش	3	پیشا	3	7									0
	پار	1												
3. anti-	پاد	55	ضد	23	85	بُر	3	کاه	1	گیر	1	کژ	1	8
	نا	6	وا	1		ستیز	1	زدا	1					
4. arch-					0	مجمع	1	پر	1					2
5. auto-					0	خود	48	برجا	2	خود	1			51
6. back-	پس	18	وا	3	23	برگشت	7	پشت	6	عقب	4	پشت	2	23
	پیش	1	باز	1		برگردان	1	وارون	1	پشتیبان	1	ته	1	
7. bi-					0	دو	52	دوگانه	2	نیم	1			55
8. by-					0	ضمنی	1	جنبی	1	کنار	1	جانبی	1	5

¹ The abbreviation *Eq* stands for *equivalent* in all tables.

² The abbreviation *f* stands for *frequency* in all tables.

					1	میان دوره‌های								
9. circum-	پیرا	1			1	دور	1						1	
10. counter-	پاد	15	ضد	9	27	عکس	2	نقض	1	زدایی	1	وارون	1	
	دگر	2	نا	1		مخالف	1	خلاف	1					7
11. dis-	نا	16	بی	2	23	زدایی	4	سلب	1	کم	1	خواه	1	
	وا	2	دژ	1		گسیختگی	1	باخته	1	کژ	1			10
	فرو	1	دگر	1										
12. down-	فرو	13			14	پابین	5	سو	2	راست	1	خواب	1	
	پیش	1				پابین	1	زوج	1	آکار	1	پابه	1	14
						افتاده	1							
13. en-	در	1			1	سازی	4	گزاری	2	در	2	بندی	2	
						کردن	1	دهی	1	انداز	1			13
14. ex-	دگر	1	بر	1	4	برون	21	ده	1	زدایی	1	برداری	1	
	فرا	1	وا	1		زا	1							25
15. extra-	فرا	2	غیر	1	3	برون	10	پر	1	ممتاز	1	اضافی	1	13
16. fore-	پیش	10	پیشا	1	11	آینده	2	پیشین	1	جلو	1	جلو	1	5
17. hyper-	بیش	11	ابر	3	19	پر	6	برین	2	افراطی	1	دور	1	
	فوق	3	فرا	2										10
18. inter-	هم	4			7	میان	27	بین	24	در هم	4	چند	3	
	بینا	3				بر	2	واسط	2	پایه	2	درون	2	
						متقابل	1	رابط	1	پیما	1	مرز	1	
						پس‌پیشین	1	مخلوط	1	به هم	1	میانجی	1	
						برهم	1	دو	1					76
19. meta-	دگر	7	فرا	5	16	متقابل	1	پر	1					
	پس	2	در	1										2
	شبه	1												
20. micro-	فرا	1			1	ریز	45	خرد	12	کم	3	میکرو	1	61
21. mis-	نا	1	دگر	1	2	کژ	2	نامناسب	1	خطا	1			4
22. multi-	هم	2	چندا	2	5	چند	42	بس	2	چندم	2	مکرر	1	
	بیش	1				دو	1							48

23. non-	نا	44	غیر	33	88	عدم	2	بدون	1	فاقد	1	سلب	1	6
	بی	9	ن	2		برون	1							
24. off-	پس	2	فرا	1	5	برون	5	گشته	4	خارج از	2	بیرونی	1	16
	غیر	1	بی	1		دور	1	خارج	1	کج	1	پایان	1	
25. on-	با	1			2	آغاز	1	سو	1	در	1	به	1	6
	بر	1				روی	1	بر	1					
26. out-	بر	1			1	برون	7	دور	2	پی	1	دریا	1	13
						بیرون	1	ردی	1					
27. over-	بیش	19	فرا	3	23	اضافه	3	مفرط	2	اضافه	1	بیش بود	1	15
	بیش	1				رو	1	تند	1	بیش از حد	1	اضافی	1	
						سر	1	زیاد	1	پر	1	بر	1	
28. post-	پس	15	پسا	13	28	ناگذر	1	پس از	1	پشت	1			3
29. pre-	بیش	60	پیشا	6	67	پیش از	6	زود	3	مقدماتی	1	سر	1	16
	فرا	1				کمک	1	نوک	1	پیش بینی	1	کوچک	1	
						تقدیمی	1							
30. pro-	بیش	30	فرا	4	40	برون	2	آینده	1	دومرحله ای	1	پی	1	7
	بر	3	فرو	2		آغازین	1	بیرون	1					
	پیشا	1												
31. pseudo-	شبه	12			12	نما	6	کاذب	3	دروغین	1	بس	1	11
32. retro-	پس	8	وا	2	11	برگشتی	1	عقب	1	پشت	1	گذشته	1	4
	بر	1												
33. semi-	شبه	1			1	نیم	27	نیمه	19					46
34. sub-	فرو	8	وا	3	15	زیر	48	نیمه	7	جنب	5	جا	4	74
	دگر	1	شبه	1		خرده	2	فرعی	2	تحت	1	نیم	1	
	بر	1	پس	1		زیرین	1	پایین	1	دوم	1	پی	1	
35. super-	ابر	28	فرا	6	36	برهم	2	زیر	2	افراطی	1	ثانویه	1	12
	بر	1	باز	1		برتر	1	بسیار	1	تند	1	سر	1	
						ترکیبی	1	رو	1					
36. supra-	فرا	1	فوق	1	3	بالا	5	زیر	2	بر	1	بالایی	1	10
	ابر	1				تک	1							
37.	ترا	37	ورا	2	42	ترانس	3	گردانی	2	نیم	1	هما	1	8

trans-	فرا	2	دگر	1		رو	1							
38. un-	نا	25	ن	11	51	عدم	1						1	
	بی	10	غیر	5										
39. under-	نا	1			2	زیر	14	کم	7	کمبود	2	کسر	2	33
	فرو	1				کف	1	فرود	1	زیرین	1	در	1	
							کم	1	بن	1	ناکافی	1	کند	
40. up-	فرا	11	پاد	2	15	بالا	8	به کار	1	چپ	1	بعد	1	14
	پیش	1	پس	1		فرد	1	کارایی	1	افزایی	1			
Total					705									732

Table 3 - Morpheme as UT

In table 3, 40 English prefixes are listed as SL Prefixes. Their extracted TL equivalents are portrayed in two separate columns in front of them. The first column includes those equivalents that are similarly considered prefixes in Persian. The second column comprises the equivalents considered lexemes in Persian. Moreover, two columns are used to showing the sum of TL prefixes and lexemes for each SL prefix.

Each of the prefix or lexeme equivalents is followed by its frequency. For instances, for the first SL prefix (*after-*), the TL prefix equivalent *پس-* is offered in 13 cases while the TL prefix *باز-* (meaning *re-*) is offered in one case. Moreover, some equivalents are considered lexemes including *تکمیلی، دوم، پیشاپسین، بعد* (meaning *complementary, second, succeeding, and then* respectively). Each of these equivalents is employed once. Finally, the sum columns indicate that the prefix *after-* is translated into Persian prefixes in 14 cases while being translated into Persian lexemes in 4 cases. The final row also shows the total cases of translating SL prefixes into TL prefixes or lexemes. In sum, calquing method was used in 1437 words.

Second, in conceptual equivalent-finding, equivalents are offered regardless of the structure of the SL words. Instead, the meaning of the whole word is used as UT in equivalent-finding. Thus, unlike calquing method,

separate equivalents are not identifiable for SL prefixes. Table 4 shows the frequency of this method used for each of the 40 prefixes studied.

SL Prefix	F	SL Prefix	F	SL Prefix	F	SL Prefix	F
1. after-	1	11. dis-	38	21. mis-	3	31. pseudo-	1
2. ante-	4	12. down-	4	22. multi-	21	32. retro-	4
3. anti-	11	13. en-	42	23. non-	24	33. semi-	7
4. arch-	2	14. ex-	144	24. off-	10	34. sub-	35
5. auto-	14	15. extra-	5	25. on-	7	35. super-	17
6. back-	13	16. fore-	8	26. out-	18	36. supra-	0
7. bi-	14	17. hyper-	5	27. over-	4	37. trans-	98
8. by-	0	18. inter-	77	28. post-	9	38. un-	14
9. circum-	4	19. meta-	6	29. pre-	74	39. under-	11
10. counter-	4	20. micro-	13	30. pro-	138	40. up-	13
Sum	917						

Table 4 - Word as UT

In table 4, each prefix is followed by a number in frequency columns. This number shows the frequency of conceptual equivalent-finding used for each of the prefixes. Since in this method the equivalents are offered for the whole word rather than its constituting morphemes, no equivalent is given here. In sum, 917 words were translated using the conceptual method.

With respect to the two methods and the tables offered above, the following results were obtained (see figure 1).

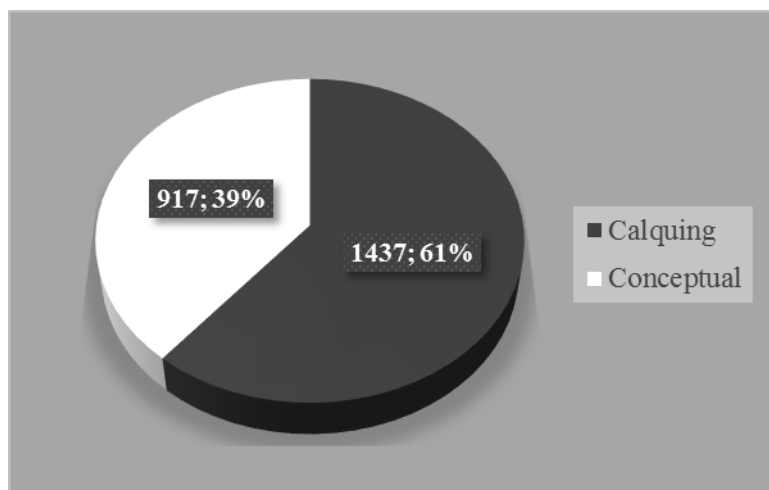


Figure 1 - Calquing vs. Conceptual

It can be noticed that calquing is used more frequently in equivalent-finding methods adopted by the APLL. Calquing is used in finding equivalents for 1437 words. These words constitute 61% of the whole studied words. Moreover, conceptual equivalent-finding was used to find equivalents for 917 words, constituting 39% of them.

The above-mentioned graph was used to compare the equivalent-finding methods in general. However, a more detailed comparison can be drawn for each SL prefix (see figure 2):

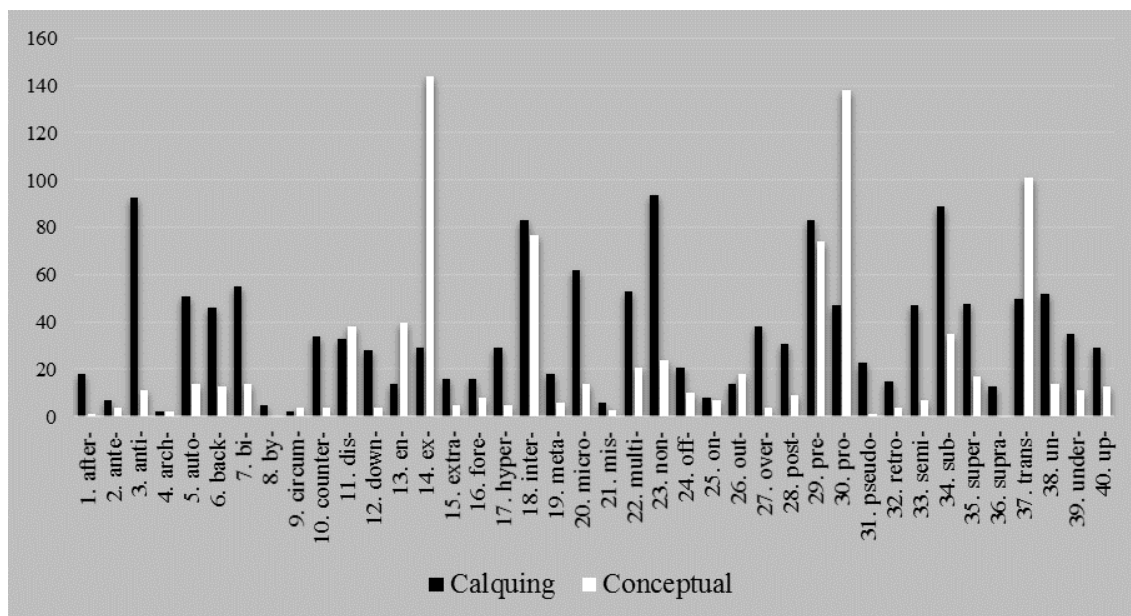


Figure 2 - Calquing vs. Conceptual

In 32 cases, constituting 80% of words, calquing method was more favored. However, in seven instances, equal to 18% of words, conceptual method was more frequent. In one case, the number of calquing was equal to conceptual method.

9. Findings and discussion of the results

The present study investigated the frequency of two term-formation methods, namely structural (or calquing) and conceptual. Calquing was used in 1437 cases (61%) while conceptual equivalent-finding was applied in 917 cases (39%). This indeed supports what was suggested by Tajvidi (2005), that analytic-compositional method has been the most frequent equivalent-finding strategy in recent decades. The results for each of the English prefixes are even more markedly contrastive. The most frequent equivalents (the modes) were formed structurally in 80% of cases while they were produced through conceptual method merely in 18% of cases.

The higher frequency of calquing sheds light on another issue. It shows that morphemes are more frequently considered UTs in Persian term-formation than words. This is indeed a counterexample of what was discussed in the background section that smaller UTs are generally neglected. It can be resolved that smaller UTs are adopted in areas such as term-formation and perhaps continue to be.

10. Conclusions

As a summary, the present study dealt with the UTs adopted in Persian term-formation and their frequencies. It was noted that calquing or structural analysis of words was more frequent than conceptual equivalent-finding. This means that smaller UTs (e.g. morphemes) seem to be more favored by APLL in finding equivalents for SL terms than conceptual equivalent-finding (when UT is the whole word). Moreover, in calquing, the amount of translating prefixes into prefixes or lexemes was very close. Consequently, derivation and compounding were close.

When it comes to the higher frequency of calquing, it can be concluded that the current norm in term-formation is structural analysis of words. This might be interpreted in another way. Calquing involves focusing on smaller UTs such as morphemes. However, in the conceptual method, the whole word is the UT. Therefore, it might be claimed that the terminologist's higher preference for calquing is related to their analytic personality. As noted by Dewey (2004), analytic types of characters pay attention to the parts (morphemes here) while holistic ones see something as a whole (the whole word here), not a collection of parts. Therefore, for instance, holistic people might choose UTs at higher ranks while analytic people may analyze words morpheme by morpheme. As a suggestion for further research, conducting a correlative study on the relation between holistic or analytic personality and the adopted UT is recommended.

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