

美國專利書「獨立項數」之搭配詞初探：
以 LexisNexis 法律資料庫為例

Collocation Features of Independent Claim in U.S. Patent Documents: Information Retrieval from LexisNexis

林信宏 Darren Hsin-Hung Lin
謝菁玉 Shelley Ching-yu Hsieh
國立成功大學外國語文學系(所)

Department of Foreign Languages and Literature
National Cheng Kung University
g364375@ms49.hinet.net

Abstract

The present study examines English patent documents extracted from LexisNexis. We compiled a reference corpus of independent claim texts and lay the focus specifically on their collocation features. The findings suggest the functional development of independent claim involves verb-noun collocation and semantic prosody. Verb-noun collocations happen to function as semantic trigger affected by semantic prosody. In particular, clausal nominalization ([13]) is observed in that of verbal clauses. Based on discourse thematic referentiality ([2]), independent claim entails how clausal-specific units constructed the patent setting. The result is significant because discourse thematic referentiality which addresses how lexical units build up modern patent language providing empirical evidence for the overall characterization of independent claim. Besides, rhetorical structure and lexical meaning of independent claim can be derived from components of clausal types as they occur collocationally, referentially and dependently. Mutual information is attainable with the help of selectional collocation features that specific clausal types represented in natural language processing of modern patent language. It is suggested that the development of independent claim as a primer for Patent English.

Keywords: intellectual property rights, patent, corpus, collocation, functional grammar

1. Introduction

In the knowledge economy age, the intellectual property rights (IPR) become the important assets to human beings. Especially to the knowledge industry, the IPR is the key measure of a company competing with others.

As globalization has resulted in greater economic growth rapidly, inevitably the challenges of interdisciplinary communication that concerned with intellectual property and other significant sector encounters has increased. This recognition of the importance has brought intellectual property to the limelight. Resulting from such recognition, the recent emphasis that has been placed on using English as the lingua franca to apply patents on an international level and how to write professional patent documents for successful patent application becomes a significant research topic in applied linguistic research.

1.1 English for Specific Purposes (ESP)

ESP is now well established as an important and distinct part of English Teaching ([3]). As English has acquired the status of lingua franca in almost any field of research, the teaching of ESP has generally been seen as a separate activity within English language teaching, and ESP research as an identifiable component of applied linguistic research ([7]).

Basically, the origins of ESP can be traced back to the 1960s when there is a growing need for the technological and business industries ([24]). ESP, the prime realization of applied discourse analysis, was later evolved for every specialized area needs appropriate teaching materials. Recently, ESP is utilized as an umbrella term with multitudinous acronyms standing for the various sub-fields ([7]).

Under ESP framework, there are two major sub-fields, English for Academic Purposes (EAP) and English for Occupational Purposes (EOP) which are distinguished by their research nature and pedagogical tradition ([7], [20]). EAP concerning students' needs to learn academic language constitutes the majority of ESP, whereas EOP comprises of professional purposes in administration, medicine, law and business, and vocational purposes for non-professionals in work or pre-work situations ([7]). In EOP, there has been little investigation into interdisciplinary needs of patent over workplace settings which motivate the present research.

1.2 Technical vocabulary

Writing for specific purposes requires familiarity with not only knowledge of the content but knowledge of the language. Unfamiliarity with vocabulary in writing is perceived to be a challenging task for language learners. As the importance of teaching vocabulary has been gained recognition, Coxhead and Nation (2001) [6] categorize vocabulary into four groups: high frequency words, academic vocabulary, technical vocabulary, and low frequency vocabulary.

Nation (2001) [19] defines those words in the use of writing. High-frequency words refer to the most frequently used 2000 words of English that were used in all types of writing. Low-frequency words are the rarely used terms and covered only 5% of all words. Academic words, namely semi-technical or sub-technical vocabulary, were for academic purposes. This vocabulary is common to a wide range of academic fields but is not what is known as high frequency vocabulary and is not technical in that it is not typically associated with just one field ([5]). In contrast, technical words are the ones used in a specialized field, which are considerably different from subject to subject. As Chung and Nation (2003) [5] point to, technical vocabulary is largely of interest and used to people working in a specialized field. In the genre of law, Mellinkoff (1963) [18] suggests legal vocabulary are those of common words with uncommon meanings. For example, *merger* and *acquisition* bear the same literal meaning as 'combination' in general English. However, of economic and financial law, *merger* depicts the acquisition of one company by another. The combination into a single legal entity will increase the benefits to each other is semantically positive. As to *acquisition*, the combination often bears unequal treatments is often negative.

2. Methodology

2.1 Independent claim

As patent law 35U.S.C.§112 paragraph 1 reads, “patent claim” is viewed as the specification containing a written description of the invention, and of manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. That is to say, patent claims of a published patent inform the public the scope of rights that distinguished the invention. As it is technically dealt with specific terms used, it allows the users to familiarize with the invention an applicant owns.

Based on technical vocabulary suggested from the USPTO (United States Patent and Trademark Office) Glossary, the frequency of each has been listed according to the occurrence in the USPTO Patent Full-Text and Image Database (PatFT), and the distribution is presented in Table 1([16]).

Table 1. Frequency of the patent technical word list ([16])

Topic	Technical Words	Total Frequency	Percentage	Rank
Patent Activity	99	6,622,873	28	2
Patent Claim	17	12,695,484	54	1
Patent Community	23	1,455,693	6	3
People of the Patent	18	1,468,215	6	3
Patent Description	30	1,060,782	4.5	5
Patent Aid	25	342,988	1.5	6
Total	212	23,646,035	100	

As Table 1 shows, “patent claim” which has high priority (54%) is valuable for a corpus-based research. According to the definition, “patent claim” is the precise legal definition of the invention, identifying the specific elements of the invention for which the inventor is claiming rights and seeking protection. Besides, of patent claims, “independent claim” which describes the invention in adding the essential features will provide a comprehensive view of patent claim ([16]). Technically, an “independent claim” is a proper noun in terms of patent which formally describes the invention in adding the essential features. In the patent application for a pencil, for example, the independent claim might begin with “a device comprising a cylindrical piece of wood with a piece of lead inserted into the center of the wood.” In such case, a pencil was distinguished with regard to the shape (cylindrical) and the materials they were made of (wood and lead). For the same pencil with the opposite shape, it will not be taken into consideration for such invention.

2.2 Compilation of the reference corpus of independent claim texts

Since more efforts have to be made to explore the possibilities of modern patent language in applied linguistic research, we compiled a reference corpus made up of

independent claim texts, over a period of time 2000 to 2009, retrieved from LexisNexis, a database of multitudinous information for professionals in legal fields.

Corpus of the present research contained 98 English patent documents with independent claim texts retrieved, and is made up of 4,887,084 word tokens. Although LexisNexis does not have a build-in patent claim subcorpus, the self-compiled reference corpus of independent claim texts adds significant strength to the development of claim language. Although an available specialized corpus contains an infinite amount data, constructing a small scale one would be needed for a profound linguistic study ([10]).

2.3 WordSmith tools 5.0

Owing to the size of text collection, the quantitatively analysis was computer-assisted, using WordSmith Tools 5.0 ([21]) to search for the word item as a string of letters to ascertain the absolute and relative frequency. Concordancer-tagged function of WordSmith 5.0 allowed us to calculate collocations and clusters around the search or node word. With the help of such tools, we can find more discriminative linguistics patterns and structures in the patents.

The researchers search for instances of independent claim in the corpus resulted in a concordance containing 249 citations. This is a list of the 249 examples of independent claim with the words that preceded and followed. Figure 1 shows part of the concordance.

Figure 1. Concordance of independent claim

N	Concordance	Set	Tag	Word #	t	#	os	#	os	#	os	t
36	rch. The processing computer can also generate claim chart information for the independent claim illustrating whether and how an identified product and/or ser	62,322	093	3%	0	1%						
37	and generate a claim chart report containing claim chart information for the independent claim. The claim chart information can provide the text of the claim	62,211	089	6%	0	1%						
38	similar to, and/or analogous to, the product(s) and/or service(s) to which an independent claim is directed. The processing computer can also search and/or	61,828	077	4%	0	1%						
39	corresponds to the preamble and/or elements and/or limitations of a respective independent claim. The information contained in the claim chart report can be u	59,754	017	8%	0	9%						
40	rch or a search query containing information corresponding to the at least one independent claim, wherein the processing device searches information regarding	58,832	991	0%	0	9%						
41	n regarding the patent, wherein the processing device identifies at least one independent claim of the patent, wherein the processing device formulates a sea	58,808	991	2%	0	9%						
42	uct, products, a service, and services, which are relevant to the at least one independent claim contains a pre-defined number of key word or terms present in	58,135	973	3%	0	8%						
43	of a product, products, a service, and services, relevant to the at least one independent claim in conjunction with information contained in the at least one	58,878	991	3%	0	9%						
44	sent invention can also be utilized in order to parse the subject matter of an independent claim in order to identify preamble subject matter as well as claim	59,497	010	1%	7%	0	9%					
45	ngement of a patent. The present invention can also be utilized to identify an independent claim of a patent and/or the independent claims of a patent. The pr	59,469	010	2%	0	9%						
46	independent claim in conjunction with information contained in the at least one independent claim, and further wherein the processing device generates claim ch	58,890	991	1%	0	9%						
47	hether and how an identified product and/or service may be infringement of the independent claim. Descriptive words, elements and/or features of the identifie	62,338	093	7%	0	1%						
48	he present invention can also be utilized in order to parse the language of an independent claim in order to identify claim limitations in the preamble as wel	65,664	172	4%	0	3%						
49	ntial infringement. The present invention can also be utilized to identify an independent claim of a patent and/or the independent claims of a patent. The ap	65,632	171	2%	0	3%						
50	product(s) and/or a service(s) which infringes and/or potentially infringes an independent claim. ? 0114] It is still another object of the present inventio	65,340	155	8%	0	3%						
51	corresponds to the preamble and/or elements and/or limitations of a respective independent claim. The information contained in the claim chart, claim chart in	65,943	178	8%	0	3%						
52	ed in order to process and/or to parse patent language in order to identify an independent claim or independent claims of the patent. The apparatus 100 and	68,694	246	3%	0	5%						
53	of a patent, software programs and/or algorithms for parsing a claim and/or an independent claim in order to identify the claim preamble, claim elements, and/	67,366	217	1%	0	4%						
54	programs and/or algorithms for parsing patent language in order to identify an independent claim or independent claims of a patent, software programs and/or a	67,338	217	2%	0	4%						
55	similar to, and/or analogous to, a product(s) and/or a service(s) to which an independent claim is directed. ? 0101] It is another object of the present in	64,707	142	2%	0	3%						
56	al patent infringement which can be utilized to parse the subject matter of an independent claim in order to identify claim element(s) and/or a claim limitati	62,719	105	8%	0	1%						
57	al patent infringement which can be utilized to parse the subject matter of an independent claim in order to identify claim limitations in the preamble. ?	62,672	104	9%	0	1%						
58	r analyzing potential patent infringement which can be utilized to identify an independent claim of a patent and/or the independent claims of a patent. ? 0	62,625	103	6%	0	1%						
59	can be utilized in order to identify a product and/or a service covered by an independent claim of a patent. ? 0066] It is still another object of the pres	62,813	107	1%	0	1%						
60	be utilized in order to process and/or to parse information contained in each independent claim in order to identify text information pertaining to a claim e	63,671	124	2%	0	2%						
61	patent infringement which can be utilized in order to identify and/or to store independent claim preamble text information. ? 0081] It is still another obj	63,580	122	0%	0	2%						
62	atent infringement which can be utilized in order to identify and/or to store independent claim information. ? 0080] It is another object of the present in	63,542	121	5%	0	2%						
63	independent claim in conjunction with information contained in the at least one independent claim, generating claim chart information containing information re	76,625	443	2%	0	0%						
64	of a product, products, a service, and services, relevant to the at least one independent claim in conjunction with information contained in the at least one	76,613	443	4%	0	0%						
65	rch or a search query containing information corresponding to the at least one independent claim; searching information regarding at least one of a product, p	76,575	443	8%	0	0%						
66	arsing claim information of the patent in order to identify the at least one independent claim. ?99. The method of claim 51, further comprising: at least	76,977	450	7%	0	0%						
67	f a product to which the independent claim is directed, a service to which the independent claim is directed, a claim element, and a claim limitation. ?71.	77,094	452	8%	0	1%						

Out of the 249 examples of independent claim, 5 were irrelevant to the researchers' analysis because independent claim was being mentioned, rather than used. Those irrelevant examples were those of the same pattern without subject in present progressive

As shown in (1), store outlines a material process in which ‘processing computer’ (Actor) accumulates ‘independent claim text information’ (Goal). In such case, processing computer which occurs with store might provide selectional features (Chomsky, 1965:111) of the knowledge of independent claim. It is noted that verb-noun collocation ‘store + independent claim’ followed by processing computer is a subtle distinctive feature of independent claim which is expected to be known for such grammatical pattern making up knowledge of the grammar of patents in use. The investigation of such collocationally fixed relationship will, in turn give insights to learners how independent claim is used on a lexical level and further, prepare them for the actual business world they may need to work in, or give them the information about patents that they already work for.

3. Results

Since independent claim describes the invention in adding the essential features, in this section, independent claim is annotated by three primary clauses of the total four clausal types found in the data. They were material, relational, and verbal clauses. The concept of clause as representation ([8]) is applied to remind language users where to locate independent claim to produce correct sentences.

3.1 Clausal types of independent claim texts

There are a total of four clause types found in the data (see Table 3).

Table 3. Clauses types of independent claim

Clause Type	Total Frequency	Percentage
Material Clauses	127	52.0
Relational Clause	65	26.6
Verbal Clause	48	19.7
Existential Clause	4	1.7
Total	244	100

As Table 3 shows, material clauses have the largest proportion among the total, which account for 52%, with relational clauses coming next at 26.6%, followed by verbal clauses, making up 19.7%, and finally come existential clauses at 1.7%. However, behavioral clauses were not found as legal discourse of the Republic of China also addresses such phenomena. Tsai (2006) [25] explains law is essential in that it elaborates the obligation of human beings. Behaviors such as *dream*, *cough*, and *cry*, however, were basic instincts that human beings embraced. There is less importance to further develop such behaviors in the discourse of law. Though patent language and legislative language differ in their rationale, declarative sentences were favored in that of the examined clauses of the present research is in accordance with Tsai’s (2006) [25] research on legislative language.

It can be concluded from Table 3 that material clauses are the most commonly experience that independent claim embraced, while existential clauses are the least. These clauses of independent claim entail the directions for the novice. They should learn material clauses first.

3.2 Verb-Noun collocations of independent claim texts

Frequently used verbs in patents can be seen as concepts which carry meanings to specify the clauses for communication. In total 244 examined clauses, the researchers found 23 verb-noun collocations from the data. Meanings of each collocating verb from the verb-noun collocations were carefully analyzed. Table 4 illustrates the results.

Table 4. Collocating verbs of independent claim

Verb	Verb Meaning	Total Frequency	Percentage
identify	to extract, recognize, discover, or find	61	25.00
direct	to request or enjoin with authority	51	20.90
contain	to have within	42	17.20
be	state of having existence	20	8.19
correspond	to be in conformity or agreement	11	4.50
infringe	to encroach upon in a way that violates law or the rights of another	7	2.90
analyze	to determine the nature and relationship of the parts of by analysis	6	2.50
isolate	to set apart from others	6	2.50
perform	carry out an action or pattern of behavior	6	2.50
generate	to bring into existence	5	2.00
process	a series of actions or operations conducing to an end	4	1.64
store	to place or leave in a location	4	1.64
regard	an aspect to be taken into consideration	4	1.64
exist	to have the functions of vitality	4	1.64
break up	to do away with	2	0.80
formulate	to develop a formula for the preparation	2	0.80
permit	to consent to expressly or formally	2	0.80
fall	to come within the limits	2	0.80
illustrate	to make clear	1	0.41
provide	to take precautionary measures	1	0.41
utilize	turn to practical use or account	1	0.41
associate	to bring together or into relationship	1	0.41
exhibit	to show or display outwardly especially by visible signs or actions	1	0.41
Total		244	100

As Table 4 indicates, auxiliary ‘be’ made up nearly 8.2%, while the rest constitutes 91.8%. ‘Identify’ and ‘direct’ were frequently used with independent claim account for appropriately 46%. ‘Contain’, in contrast, was the third remarkable (17.2%). These three verbs represent over 63% of verb-noun collocation. By average, there were five verb-noun collocations (identify, direct, contain, be, and correspond) appear over 10 times, making up 76.2%.

In most cases, ‘identify (to extract, recognize, discover, or find)’ collocates with independent claim, making up 25% of the verb-noun collocations. Examples (2) to (4) demonstrate such kind.

- (2) The database can also contain any one or more of software programs and/or algorithms for parsing patent language in order to identify a claim or claims of a patent, software programs and/or algorithms for parsing patent language in order to identify an independent claim or independent claims of a patent.
- (3) Parsing claim information of the patent in order to identify the at least one independent claim.
- (4) The processing computer can identify and store the preamble text information for the independent claim.

As can be seen, in these examples, “independent claim” is viewed as Goal. For instance, example (2) points out that database will parse the patent language to be identical in independent claim. Example (3) elaborates the behavior to parse information regarding patent claim to recognize independent claim. In example (4), processing computer causes the preamble text information to be extracted with independent claim as the Goal. In these examples, ‘identify’ is with the precise meaning “to cause something to become identical” implying that patent is a specific genre with fixed verb meaning embodied.

While vocabulary knowledge may involve a number of qualified rules of the kind Chomsky (1965) [4] calls “selectional feature”, collocating verb has the selectional feature of its own. Better to say, collocating verb is a collocation-based feature of verb-noun collocation that maps the detailed contour of knowledge on clausal types. For each clausal type, verb-noun collocations involved explains the grammar of words, the interaction between two associated participants, and the experience a particular clausal type embraced. In this regard, verb-noun collocations elicited from the present research can equip learners with a better sense of the firmly collocational relationship.

3.3 Clausal nominalization of independent claim texts

As verb-noun collocation ‘independent claim + direct’ shows a strong tendency in characterizing passive structure of verbal clauses, the researcher found the nominalized *to which the independent claim is directed* functions as adverbial constituent of the clauses and is unusually positioned clause-finally. Based on this, ‘independent claim + direct’ is a selectional feature of clausal nominalization in verbal clauses as functional grammar applied. Clausal nominalization, in turn, is a functional feature which elucidates mutual information shared in verbal clause of the modern patent language. In following, the researcher gives a brief introduction in 4.3.1 clausal nominalization as strategies and 4.3.2 clausal nominalization of verbal clauses.

In the verbal clausal nominalization the researcher investigates this section, “to which an independent claim is directed” appears to be the adverbial constituent of the main clause nominalization. In this regard, product/service and service make up similar proportion at 31.25%, whilst product represents 37.5 %. Examples (7) to (9) illustrate such findings.

- (7) A product to which the independent claim is directed.
- (8) The product(s) and/or service(s) to which the independent claim is directed.
- (9) A service to which the independent claim is directed.

As can be seen, these examples demonstrate not only ‘marked thematic equatives’ but also wh-cleft¹. Based on the observation, the researcher found rheme in verbal clauses of modern patent language states an authority to its target of product and/or service. In (7), for example, independent claim of rheme requests an underlying purpose for a particular product; a particular product is addressed by an independent claim.

In short, the emergence of nominalization underlines the psychological phenomenon that human being’s verbal behavior (independent claim) embodied in modern patent language. Moreover, since verb-noun collocation ‘independent claim + direct’ has no other similar collocation in verbal clauses, “to which an independent claim is directed” was of mutual information value with the same rheme but alternative themes.

3.4 Semantic prosodies of independent claim texts

As mentioned earlier, a verb-noun collocation has selectional features that associate itself with a particular set of semantic contexts. Verbal clause, for example, shows a tendency to occur when product collocates with ‘independent claim + direct.’ Based on this, it shows how verbal clause found to be regularly collocated with ‘independent claim + direct’ that share semantic similarity—product. In this regard, the semantic context that attracts such verb-noun collocation is considered ‘semantic prosody.’ Since the function of semantic prosody is to transfer communicative purposes ([23]), in this section, the researcher lays his attention on semantic prosody of the verb-noun collocations to elucidate semantic associations in patent environment of independent claim.

The notion of semantic prosody arising from corpus linguistics reflects how lexical items are habitually associated with particular connotations that attract considerable attention since its advent in the early 1990s ([26]). Based on this, it is known as the function of the whole extended unit ([23]), in turn, will provide potentially powerful generalizations for language learners ([15]). Stubbs (2001) [22] once analyzed “undergo” which collocates with prosodic categories ‘medicine’ (treatment, hysterectomy), ‘test’ (examination, training), and ‘change’ (dramatic change). All these prosodic categories of ‘undergo’ shared a strong semantic prosody—people are hesitated to experience something they do not prefer. For example, people show a tendency to refuse experiencing ‘treatment’, ‘examination’, and ‘dramatic change’ which, in turn, considered negative prosodic categories that undergo associated with.

Based on the verb-noun collocations the researcher examined in 4.2, he looks at semantic prosody in particular as presented in Table 6 below.

¹ ‘Wh-cleft’ involves the division and repacking of the information in a clause in two parts (Locks, 1996:238).

Table 6. Semantic prosody of independent claim

Prosodic Type	Semantic Prosody	Total Frequency	Percentage
Innovation	product, present invention	63	25.8
Technology	processing computer, processing device	59	24.2
Service	service	39	16.0
Knowledge	information	34	13.9
Tool	apparatus, database, vehicle	29	11.9
Function	search query, claim	16	6.6
Violation	infringement	4	1.6
Total		244	100

From the corpus-based analysis, verb-noun collocations of independent claim were found collocates mostly with prosodic type ‘innovation’ (25.8%), followed by ‘technology’ (24.2%), ‘service’ (16%) coming, and ‘knowledge’ (13.9%), making up nearly 80% in total. All these prosodic types imply a positive semantic prosody—patents were important assets of human beings. Based on this, the researcher argues that semantic prosody is the exponent of a special correlation between the semantic structure and syntactic form they were put into. The distribution of the prosodic items, in turn, show the extent of the syntactic forms expressed by semantic links of the grammar of words. The present research rated those over 20 % on high frequency; less than 20% but more 10% on mid frequency; less than 10% on low frequency. It is noted that there was 1.6 % concerned with infringement. It is of less percentage but of importance in that the public should draw attention to the rise of potential perils as ‘violation (infringement)’ which brought about torts and plagiarism they overlooked.

The researcher lays his focus on low frequency level for an instance. In his regard, aside from prosodic type “violation” which is on the low frequency level discussed earlier, there is a 6.6% of verb-noun collocations co-occur with prosodic type “function” that might elicit the underlying mechanisms of independent claim. The researcher gives examples in (10) to (11).

- (10) A search query containing information corresponding to the at least one independent claim.
- (11) An example of a search or search query, associated with the independent claim directed to the exemplary vehicle locating apparatus, can include the following search words terms and/or connectors.

From the above examples, search query is viewed as the semantic prosody co-occurs with ‘correspond + independent claim’ and ‘associate + independent claim’, respectively. In these examples, search query is the shared prosody embraced by different collocating verbs. Since semantic prosody is a powerful linguistic device in that it stands for language universality ([14]), the result obtained from the low frequency level further explores how it is shared by a particular syntactic category of collocating verbs that motivates the investigation into different frequency levels.

3.5 Discourse thematic referentiality of independent claim texts

Chen (2009) [2] proposed a discourse-functional approach “discourse thematic referentiality” to the referential use of noun phrase (NP). He points out such context-dependent referentiality is viewed as thematicity of referents or referentiality in terms of thematic importance of objects in discourse. Based on this, he holds the views that grammatical categories such as nouns and verbs were potential functional features to perform the referring function. He lays his attentions on noun group as the researcher lays the focus on how semantic prosody associated with verb-noun collocations. He states that noun group is of genuine importance in that it represents thematic referentiality highly in the context of language use.

In section 3.4, semantic prosody is considered referential of thematic importance in the discourse of independent claim. As for the present research, semantic prosody, however, only collocates with certain verbs unusually. Some share the same verbs; some share a unique verb on their own; some have both tendencies. In this section, semantically, the researcher lays his focus on the intimacy between semantic prosody and independent claim. Pragmatically, the researcher further addresses that semantic prosodies are referential when structured with collocating verbs which will highlight their referring functions.

Table 7. Discourse thematic referentiality of material clauses

Theme (Semantic Prosody)	Referentiality (Verb)	Discourse (Genre)
processing computer	[+identify], [+be], [+break up], [+contain], [+formulate], [+generate], [+infringe], [+isolate], [+perform], [+process], [+regard], [+store]	independent claim
processing device	[+identify]	independent claim
present invention	[+identify]	independent claim
product/service	[+fall]	independent claim
search query	[+infringe]	independent claim
information	[+identify], [+correspond], [+provide]	independent claim
apparatus	[+identify], [+be], [+utilize], [+store]	independent claim
database	[+identify]	independent claim
claim	[+analyze], [+permit]	independent claim

As Table 7 shows, discourse thematic referentiality shows a strong tendency of language specific. It can be said of true condition in which conditions that must be satisfied by the world if an utterance of a declarative sentence is true. For example, the utterance “There is a cat on the table” is only true if in the real world at that time of the utterance there actually is a table with a cat on it ([11]). Based on this, discourse thematic referentiality can be realized when processing computer, processing device, present invention, product/service, search query, information, apparatus, database, or claim associated with independent claim and particular verb-noun collocations in three major clausal types of a patent environment. However, once inappropriate elements, such as toy boy or gossip girl, appear in such case, it violates the truth condition because it goes with the wrong semantic prosody so as to hinder

semantic presupposition ([12]).² Further, once inappropriate verb works with semantic prosody, it unsatisfies the truth condition and infringes semantic presupposition. For example, processing device only works with ‘identify’ and once either ‘analyze’ or ‘fall’ was adopted, the principle was not cooperated with; discourse thematic referentiality was then cancelled.

Of the relational clauses, ‘contain’ addresses the function mostly as product/service, information and service, in turn, becoming thematically referential.

Table 8. Discourse thematic referentiality of relational clauses

Theme (Semantic Prosody)	Referentiality (Verb)	Discourse (Genre)
product/service	[+be], [+exhibit], [+contain]	independent claim
search query	[+correspond]	independent claim
information	[+contain], [+regard], [+correspond]	independent claim
service	[+be], [+contain], [+regard]	independent claim

Of verbal clauses, discourse thematic referentiality is maintained when semantic prosodies work with ‘direct.’

Table 9. Discourse thematic referentiality of verbal clauses

Theme (Semantic Prosody)	Referentiality (Verb)	Discourse (Genre)
product/service	[+direct]	independent claim
product	[+direct]	independent claim
service	[+direct]	independent claim

As shown in Table 9, product/service, product, and service were referential once they were functioned with ‘direct.’ Further, ‘direct’ is specifically used in that it appears in only verbal clauses. The degree of discourse thematic referentiality is comparatively strong of other clauses. It appears that product and service are basic prosodies that a semantic trigger ‘direct’ they interact with brings about discourse thematic referentiality. Based on clausal nominalization mentioned earlier in Section 4.3, in example (23) (“A product to which the independent claim is directed”), product and ‘direct’ were essential linguistic components that represent the relatively compositionality fixed relationship of verbal clauses. In sum, discourse thematic referentiality accounts for how verb, semantic prosody and independent claim were constructed linguistically. Before closing this section, it is important to accentuate that discourse thematic referentiality which addresses how lexical units build up modern patent language providing empirical evidence for the overall characterization of independent claim.

² Semantic presupposition is presupposition based on either truth conditional theory or semantic relations which were defined in terms of semantic feature or atomic concepts.

4. Discussion and conclusions

Based on clausal analysis, verb-noun collocations were identified among three major clausal types—material, relational, and verbal clauses. Since learners are especially deficient in verb-noun collocations ([1], [17]), the present research identify collocation features of independent claim in US patent documents to equip learners with a better sense of verb-noun collocational relationship. Further, we discern verb-noun collocations happen to function as semantic trigger affected by semantic prosody. For example, processing computer interacts mostly with ‘identify + independent claim’ in material clauses in section 4.4.2. The researchers argue independent claim is best characterized as discourse thematic referentiality falls between semantic prosody and verb-noun collocations which highlight how lexical items construct the patent environment that may encourage more applications of functional features.

Since patent technical terms represent authentic situation that may motivate vocabulary learning, it is implied that ESP teachers can incorporate functional features involved, such as verb-noun collocations or semantic prosody with its rhetorical functions into the teaching of Patent English for interdisciplinary development. Based on functional accounts of independent claim, ESP teachers can show examples by means of clausal types as the hidden context. In turn, students as patent analyzers can learn how different clauses are utilized in US patent documents under different situations. For example, *a product to which independent claim is directed* in example (7) is a verbal clause constructed by virtue of collocating verb ‘direct’ and semantic prosody ‘product’ in which clausal nominalization occurred. Based on this, teachers can integrate verb-noun collocation ‘independent claim + direct’ to guide learners to notice the overlooked prosodic relations. In turn, clausal nominalization embedded will account for rhetorical functions. For advanced learners, teachers can encourage them to apply and learn other technical vocabulary for the writing of professional patents for practice. Based on various linguistic perspectives, this paper pioneers the research in applied linguistics, in particular, the EOP field. It is expected that the proposed corpus-based functional approach to collocation features of independent claim leads to a novel reconsideration on US patent documents as a significant methodological issue.

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