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

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
tense—identifying at least one independent claim of the patent. Of the remaining 244 examples, all concordances for each were stored. Then, the concordance lines for each were manually analyzed one by one for further investigation.

2.4 Functional grammar

We analyzed the collected data by Halliday’s (2004) [8] functional grammar. In Halliday’s (2004) [8] study, he distinguished six central processes which elicit the transitivity that describes a whole clause, rather than the verb and its object.

The total set of functions used in interpreting the clause as representation, with criteria for recognizing the various types of process is illustrated in Table 2.

| Process type | Category meaning |
|--------------|------------------|
| Material     |                  |
| action       | doing            |
| event        | happening        |
| Mental       |                  |
| perception   | sensing          |
| cognition    | seeing           |
| desideration | wanting          |
| emotion      | feeling          |
| Relational   | being            |
| attribution  | attributing      |
| identification| identifying    |
| Verbal       | saying           |
| Behavioural  | behaving         |
| Existential  | existing         |

As for the present research, functional grammar is applied as the 244 citations of independent claim were examined. The researchers first singled out each citation as a constructed clause. In this regard, the researchers conducted analysis at the clausal level to better reflect the actual process an independent claim was associated with. In this manner, the researchers elicited the verbs that distinguished each process type. For verification, the researchers derived nominals that represent participants in each clause. The researchers give an instance in (1).

(1) The processing computer can store the independent claim text information

   Actor        Process        Goal
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).

| 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 experienced by independent claims 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.

| 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.
Theme is a single constituent happens to come at the beginning of a given clause which will label the function of the clause, while everything else in the clause is known as rheme. Example (5) illustrates the theme-rheme structure of the clause.

(5) What the duke gave to my aunt was this teapot

| Theme         | Rheme        |
|---------------|--------------|
| What the duke gave to my aunt | was this teapot |

As Halliday (2004) [8] elaborates, this kind of clause is known as a “thematic equative” because it sets up the theme-rheme structure in the form of an equation, where theme=rheme. According to Halliday, a form such as what the duke gave my aunt is an instance of a structural feature known as nominalization. In such case, theme is the primary element, while nominalization serves a thematic purpose for communication. However, once the usual relationship was reversed and the nominalization becomes marked. In this fashion, it is called ‘marked thematic equative’ as presented in example (6).

(6) This teapot was what the duck gave my aunt

| Theme         | Rheme        |
|---------------|--------------|
| This teapot   | was what the duck gave my aunt |

Significantly, the theme-rheme structure constructs the topic of a clause and further helps learners identify the elements within, such as Goal and Actor of material clauses, Say and Verbiage of verbal clauses, or Identified and Identifier of relational clauses. Most importantly, the researcher found verbal clauses in the data displayed marked thematic equative followed Halliday’s research. Such kind of nominalization of clausal or clause-like structures into a nominal one conforms to Heyvaert’s (2003) [9] nominalization as functional reclassification. Based on Lehrmann (1988) [13], such nominalization is the process wherein a clause is reduced so that it loses the properties of being a clause but acquires nominal properties that allows it becoming a nominal or adverbial constituent of a matrix clause. In Halliday’s (2004) [8] term, such nominalization is known as structural feature in which theme-rheme structure in the form of an equation occurred. In following section, the researcher further addresses his finding of clausal nominalization of verbal clauses which identify the syntactic environment where nominalized clauses are found.

Of the 48 verbal clauses, the researcher found 48 (100%) were nominalized. Table 5 shows the findings.

| Total Frequency | Percentage |
|-----------------|------------|
| Product         | 18         | 37.50      |
| Product/service | 15         | 31.25      |
| Service         | 15         | 31.25      |
| Total           | 48         | 100        |

Table 5. 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.

| 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]). 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.

| 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.’

| 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.

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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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