A Corpus-based Collocational Analysis of Noun Premodification Types in Academic Writing

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ABSTRACT

This study employs a corpus-based method in analysing the noun and noun premodification in journal articles relevant to the field of International Business Management. Following the frequency-based tradition, the noun and noun premodification are identified and extracted by using the node-and-collocate approach. The corpus is divided into five sub-corpora for the purpose of analysing the noun collocations and noun premodification types in each section and between different sections in the journal articles, namely, Introduction, Literature Review, Methods, Results and Discussion sections. The findings show that general adjective is the most common noun premodifier, followed by noun premodifier in both the Introduction and Literature Review sections, whereas general adjective and noun premodifier are both commonly used as premodifiers for nouns in Methods and Results sections. Besides, the general adjective is the most dominant premodifier in Discussion section. The findings also indicate that ed-participial and ing-participial premodifiers are not commonly used in the relevant journal articles. With regard to the use of noun premodification types between different sections in journal articles, general adjective+noun collocation is more pervasive in Introduction, Literature Review and Discussion sections. On the other hand, noun+noun collocation is more commonly found in Methods and Results sections. Following Hoey's Lexical Priming, the results show that priming occurs at grammatical level within the discourse. The noun collocations identified are compiled for the possible use in the English for Academic Purposes Course.

Keywords: corpus-based method; noun premodification; frequency-based; collocation; textual colligations

INTRODUCTION

The appropriate use of multi-word units such as collocations is crucial in ensuring the naturalness of language use in real life situations (Pawley & Syder 1983, Sinclair 1991, Howarth 1998). Pawley and Syder (1983, p. 191) insightfully state that "fluent and idiomatic control of a language rests to a considerable extent on knowledge of a body of sentence stems which are institutionalised or lexicalised". This notion is evidently substantiated by the findings of a number of psycholinguistics research such as Ellis and Sinclair (1996). They find that competent access to multi-word units facilitates fluency and improves processing time psycholinguistically. The processing advantages facilitated by the effective use of multi-word units have also been evidenced by other research methods such as self-paced reading tasks (Tremblay et al. 2012) and eye-movement studies (Siyanova-Chanturia et al. 2011). The knowledge of multi-word units is also important to warrant pragmatic competence, given the prevalence of multi-word units in both spoken and written discourse (Wray 2008). The

prevalence of multi-word units indicates that meanings and functions in language are realised by multi-word units. In view of the phraseological and collocational nature of language (Pawley and Syder 1983, Sinclair 1991), recent studies have tried to examine phraseological language such as collocations in academic and learner writing (Ang et al. 2011, Ackermann and Chen 2013, Hadi Kashiha and Chan 2014). These studies have shown that phraseological units are crucially frequent, pervasive and useful in the current academic discourse. It is therefore rightly claimed that language users and learners need to familiarise themselves with the multi-word academic conventions used in academic settings as well as master the specialised phraseological language common in their respective academic fields (Hyland and Tse 2007).

LITERATURE REVIEW

The literature review section includes the review of the approaches and studies on collocation, before looking at the pertinent issue of specificity in English for Academic Purposes (EAP) settings, noun and noun premodification realised in noun collocations, as well as the theoretical framework of the study.

APPROACHES AND STUDIES ON COLLOCATION

Collocations have been studied under many rubrics and there seems to be little agreement as to what constitutes a collocation. Different approaches have been used to determine lists of collocations in various genres. It is commonly agreed that collocations have been seen from a frequency-based perspective and from a phraseological perspective. From the frequency-based perspective, collocation is seen as word combinations in which two or more words are more likely to co-occur than would be expected based on the frequency of each word in a text (Sinclair 1991, Stubbs 1995). In contrast with the frequency-based definition of collocation, a phraseological definition identifies collocation along a continuum, from fixed or frozen idioms, restricted set of word combinations to free word combinations (Howarth 1998). In order to provide a working definition of collocation for the present study, a definition inclining more toward the frequency-based approach is adopted in which two types of collocations, namely noun-noun collocations and adjective-noun collocations were identified and examined following the statistical criteria proposed by researchers in the field.

Previous studies on collocations have found that the productive use of collocations pose difficulties to language learners as collocations contain combination restrictions that ensure the collocability of the component words (Ang et al. 2011).   This feature has made collocations challenging for language learners, particularly EFL and ESL learners. Empirical studies on the knowledge of collocations among different groups of ESL or EFL learners reveal that learners face particular difficulty in producing appropriate word combinations because of their lack of collocational knowledge (Howarth 1998). It has also been reported that non-native learners do not seem to use collocations to the same extent as native speakers do (Laufer and Waldman 2011) and they are found underusing "the most academic-like recurrent word combinations" (Paquot and Granger 2012, p. 139).

In view of the dearth of collocational knowledge among learners of ESL and EFL, there is an increasing awareness among scholars about the importance of multi-word units such as collocations in EAP settings. Corpus techniques have begun to be used in creating lists of multi-word units for EAP pedagogy (Durrant 2009, Simpson-Vlach and Ellis 2010, Ackermann and Chen 2013). It is worth noting that collocation and other multi-word lists compiled by Durrant (2009), Simpson-Vlach and Ellis (2010) and Ackermann and Chen

(2013) are essentially derived from academic writing in a number of academic disciplines, Their selections of corpora indicate their intention to create lists of interdisciplinary and common-core lists of multi-word expressions which can be used in various EAP courses. A major drawback of creating common-core lists of multi-word units is that the compilations of collocations or other multi-word units do not take into account frequent, important and specific expressions commonly found in a particular discipline, and only phrases which are frequently used in a number of disciplines are included. This issue is closely linked to the notion of specificity. It is also pertinent to the question on which collocations should be made available to learners in EAP courses. Essentially, there are two fundamental perspectives on EAP teaching and learning. One approach posits that there is a set of common-core academic language forms that cuts across various academic disciplines (Simpson-Vlach and Ellis 2010). From this common-core perspective, EAP instructors should focus on collocations common to all disciplines.

Meanwhile, the other approach concerns the degree of specificity in conceptualising the language use in different disciplines (Hyland and Tse 2007). The proponents of this discipline-specific approach hold on to the claim that there are significant amount of formalities in academic texts, which are characterised by the use of subject-specific collocations. Hyland and Tse (2007, p. 238), for instance, doubt that there is "a single inventory [that] can represent the vocabulary of academic discourse and so be valuable to all students irrespective of their field of study". Any form of language may have a number of possible meanings and functions depending on the context of use. Also, Hyland and Tse (2007, p. 240) further note that "all disciplines shape words for their own uses" Gledhill (2000, p. 1) emphasises that "it is impossible for a writer to be fluent without a thorough knowledge of the phraseology of the particular field he or she is writing in." Learners should master the multi-word units or phrases commonly used in their respective academic fields. They therefore reject the common-core approach to EAP and suggest that a discipline-specific approach is more appropriate for EAP learning and teaching.

The present study subscribes to the view that the teaching and learning in EAP should follow a discipline-specific approach. It therefore focuses on noun-noun collocations and adjective-noun collocations found in the research articles in a specific field, i.e. the International Business Management (IBM). The contributors to the selected journal mainly consist of Asian expert writers in the field of IBM. The selection of the relevant journal is due to the limited research on the subject and the emerging trend in focusing on business discourse in Asian contexts (Bargiela-Chiappini & Zhang 2013). With the new trend in contextualising English as a language of Asian Business (Bargiela-Chiappini 2011), there is a pressing need to provide findings from descriptive and interpretative linguistic research (Nickerson 2010) relevant to Asian contexts in order to inform local EAP teaching pertinent to business studies.

NOUN AND NOUN MODIFICATION REALISED IN NOUN COLLOCATIONS

Noun and noun modification play a pivotal role in academic writing as they are more prevalent in academic texts than in other registers (Biber et al. 1999). Besides, it has been found that noun and noun modification are challenging for both native and non-native learners, particularly in the science writing, which is mainly due to their syntactic ambiguity and lexical density (Halliday 1993). Also, noun and noun modification, forming noun phrases in academic writing are found to be more complex compared to other registers, due to their high frequencies of noun modification (Biber et al. 1999). In *Longman Grammar of Spoken and Written English (1999)*, Biber et al. (1999, p.97) state that noun modification describes a "head noun", and noun modification consists of premodification (attributive adjectives, noun

premodifiers) and postmodification (relative clauses, appositive noun phrases, prepositional phrase postmodifiers). Noun modification is commonly found in academic writing, in which about 60% of nouns have modifications. This makes noun modification much more common in academic writing compared to other registers, for instance fiction or conversation. Noun phrases in fiction and conversation contain only 30% and 15% of noun modifications, respectively (Biber et al. 1999). It is therefore justifiable to conclude that noun and noun modification are particularly important to characterise types of academic writing.

The present study focuses on noun and noun premodification. According to Biber et al. (1999), there are four types of noun premodification, namely general adjective (f*oreign markets*, *international business*), *ed*-participial modifier (*developed countries*, *fixed effects*), *ing*-participial modifier (*emerging economies*, *developing countries*) and noun modifier (*business opportunities*, *market power*). In order to examine noun premodification types, the node-and-collocate approach was used in the study to identify the possible noun and noun premodification. Two types of noun collocations, i.e. noun-noun collocations and adjective-noun collocations were examined in the IBM journal articles.

THEORETICAL BACKGROUND OF THE STUDY

This is a corpus-based study on noun and noun premodification realised in the form of two-word collocations, which is underpinned by the Lexical Priming theory (Hoey 2005). According to Hoey (2005), collocations are an indicator which offers language users hints on how language is usually used and structured. Linguistic items are always 'primed' for use through the repeated encounters with those items. This would eventually help language users in familiarising with the linguistic items, including the contexts and co-texts in which the items occur. Hoey (2005) elaborates that one of the main aspects of lexical priming is related to the textual contexts of language. It proposes that when language users encounter a word in a text, they also subconsciously know where the word most probably occurs in. For example, in research article, the words *results* and *findings* are often found in Results and Discussions sections. By applying lexical priming theory in this context, the words *results* and *findings* are "primed" to occur in Results and Discussion sections in research articles. Hoey describes this phenomenon as textual colligations. In the present study, the phenomenon of textual colligations described by Hoey (2005) will be observed to determine if lexical priming occurs in different sections of journal articles in different forms. Specifically, the distribution of noun and noun premodification types will be examined to determine if they are used across different sections in the journal articles.

OBJECTIVES OF THE STUDY

The study therefore seeks to use a corpus-linguistic method to identify noun-noun collocations and adjective-noun collocations in order to analyse the types of noun premodification, general adjective, *ed*-participial modifier, *ing*-participial modifier and noun modifier found in different sections in journal articles relevant to the field of IBM. The present study also intends to compile a collocation list for the use in EAP courses relevant to IBM. In order to achieve these objectives, the study attempts to answer the following research questions:

1) What are the common types of noun premodification found in different sections of journal articles in International Business Management?
2) How do the different types of noun premodification+noun collocations vary between different sections of journal articles in International Business Management?

METHODS

The study focuses on two-word collocations defined in the frequency-based tradition. Collocation is regarded as the occurrence of word combinations greater than by chance in their context and where word pairs are found together more frequently than the occurrence of their component words (Stubbs 1995).The frequency-based approach was adopted to identify frequent and statistically significant two-word collocations, (noun-noun and adjective-noun) in a corpus of journal articles relevant to IBM.

THE CORPUS

The corpus used consists of 79 research articles relevant to the field of IBM, chosen from an international refereed journal, the Journal of International Business Studies. The journal chosen achieves a satisfactory impact factor yearly and is indexed in Thomson Reuters. The selection of journal articles in the field of IBM serves to address the issue of specificity which was discussed in the previous section. As IBM is a specific area in business studies, the results of analysis, particularly the list of noun collocations would be useful for the students majoring in IBM when they need to write academic papers relevant to their respective academic field. The corpus consists of 722,246 word tokens and 17,454 word types. The corpus data went through a cleaning process to help avoid results of analysis being skewed due to the extra and irrelevant information in the journal articles. Information such as abstract, numerical data, tables, figures, footnotes and bibliographical references were cleaned up, leaving the actual content of the journal articles at work.

DIVISION OF CORPUS INTO SECTIONS

Academic journal articles have been studied from the perspective of structural organisation, and their macro-structure has been well documented. The commonly found macro-structure of research (journal) articles is the IMRD format, consisting of Introduction, Methods, Results and Discussion. These sections feature and function differently in the journal articles (Swales 1990). Nevertheless, an important section which is often integrated into the Introduction section is the Literature Review section. This section provides important background and justification for the study which should be given due attention by writers in various fields. The present study therefore intended to describe not only the noun premodification types in IMRD, but also those in Literature Review section separately. The corpus was thus divided into five sub-corpora, comprising Introduction, Literature Review, Methods, Results and Discussion. The five sub-corpora were tagged according to their Part-Of-Speech (POS) using CLAWS POS tagger service available online. The noun-noun collocations and adjective-noun collocations were identified based on the POS tags in five different sub-corpora for comparison purposes.

PROCEDURE

The present study employed node-and-collocate approach to identify the noun-noun collocations and adjective-noun collocations for the purpose of analysing types of noun premodification. The node-and-collocate approach was entirely dependent upon computer algorithms. The head nouns were regarded as the node while the premodifiers, including adjectives and nouns were considered as the immediate left collocates. The node and collocate were identified and extracted using the POS tags. *AntConc* software (V.3.4.1w) was used to explore the five sub-corpora for the purposes of generating the relevant frequency calculation and statistical measures.

As the present study follows frequency-based approach in identifying the relevant noun collocations, three important measures were taken to identify the relevant word combinations, namely minimum frequency or cut-off point, Mutual Information (MI) score and collocation dispersions in the corpus. Little consensus exists with regard to the determination of the appropriate cut-off point. Based on the literature, the minimum cut-off points range from 10 to 40 times per million words (Biber et al. 1999, Simpson-Vlach and Ellis 2010). In the present study, it was decided to have the minimum cut-off point set at 10 times per million words in order to include more relevant noun collocations. In short, the word combinations need to occur at least 10 times per million words in the corpus to qualify as the noun collocations for the present study.

Another important statistic used to identify the noun collocations is the MI score. MI is a measure of the strength of association between words, as it

> compares the probability of observing x and y together (the joint probability) with the probabilities of observing x and y independently (chance). If there is a genuine association between x and y, the joint probability […] will be much larger than chance.
>
> (Church & Hank 1990, p. 23)

A higher MI score means a stronger association and thus a more coherent relationship between the node and collocate. This statistical measure is useful to avoid discounting useful but less frequent phrases that tend to end up at the bottom of frequency-based lists (Simpson-Vlach and Ellis 2010). Hunston (2002) suggests that an MI score of 3.0 and above is capable of detecting strong word combinations. It was therefore decided to set the minimum MI score at 3.00 for the present study.

A final measure used in identifying noun collocations is the word combinations dispersions in the corpus. A multi-word unit has to occur in three to five texts (Biber & Barbieri 2007) or 10% of texts to avoid certain writers' idiosyncrasies (Hyland 2008). In the present study, it was determined that the word combinations which occur in at least 10% of the texts were qualified as noun collocations.

After the identification of the relevant noun collocations, i.e. noun-noun collocations and adjective-noun collocations, the left collocates in collocations were analysed to determine the types of premodification they belong to, i.e. general adjective, *ed*-participial modifier, *ing*-participial modifier or noun modifier. Their occurrences in percentages were compared across different sections in the journal articles relevant to the field of IBM. The lists of noun collocations were compiled according to sections for the possible use in EAP courses.

RESULTS

COMMON TYPES OF NOUN PREMODIFICATION

The common types of noun premodification found in the Introduction, Literature Review, Methods, Results and Discussion sections will be presented individually.

INTRODUCTION SECTION

Table 1 presents the types of noun modification found in the Introduction section in the relevant journal articles, while Table 2 displays examples of the relevant noun collocations. The results show that in the Introduction section, general adjective is the most predominant premodifier for nouns, followed by noun premodifier.

TABLE 1. Types of noun modifiers in introduction section

General adjective		ed-participial modifier		ing-participial modifier		Noun modifier	
word type	word token	word type	word token	word type	word token	word type	word token
16	329	0	0	1	15	5	97
(73 %)	(75%)			(4%)	(3%)	(23%)	(22%)

TABLE 2. Some examples of noun modifiers in introduction section

Type of modifier	Example
General adjective	international business, joint ventures, foreign firms, foreign markets
ing-participial modifier	emerging markets
Noun modifier	home country, entry modes, host country, transaction costs

Some examples in context are shown in the following sentences:

*One contribution of our study therefore lies in bringing together the **international business** and economic geography literatures.* (13)

*The stronger competition in **foreign markets** forces firms to improve both products and processes and thus remain competitive.* (17)

*Relative to developed markets, appropriability hazards are more salient in **emerging markets** which typically lack effective institutional support such as the protection of property rights.* (77)

*These investors have reduced their FDI in corrupt countries after their **home country** had laws against bribery abroad in place.* (67)

LITERATURE REVIEW SECTION

Table 3 presents the types of noun modification found in the Review section in the relevant journal articles, while Table 4 displays some examples of the relevant noun collocations. The results of analysis indicate that general adjective is the most commonly used premodifier for nouns, followed by noun premodifier in the Literature Review section.

TABLE 3. Types of noun modifiers in literature review section

General adjective		ed-participial modifier		ing-participial modifier		Noun modifier	
word type	word token	word type	word token	word type	word token	word type	word token
81	2,104	2	32	4	111	21	545
(75 %)	(75%)	(2%)	(1%)	(4%)	(4%)	(19%)	(20%)

TABLE 4. Some examples of noun modifiers in literature review section

Type of modifier	Example
General adjective	foreign markets, local partners, joint ventures, absorptive capacity
ed-participial modifier	developed countries, based view
ing-participial modifier	developing countries, emerging markets, emerging economies
Noun modifier	host country, power distance, business partners, business opportunities

Some examples in context are shown in the following sentences:

*Nevertheless, entering **foreign markets** adds inherent risk and uncertainty with new and relatively unknown surroundings.* (62)

*In general, **local partners** of IJVs in emerging markets technologically lag their MNC partners.* (77)

*This also permits us to test whether MNEs from a home country that has just reached a high level of development follow a similar behavioural pattern to other MNEs from already **developed countries** or whether, contrary to expectations, they exhibit any noteworthy peculiarities.* (78)

*Typically, in **emerging economies**, such firms are relatively small, but account for significant employment.* (30)

*We view alliances between MNEs as nested within multiple contextual environments of the **host country**.* (8)

*Compared with most industrialised democracies, developing countries have fewer entrepreneurs willing and able to exploit new **business opportunities**.* (34)

METHODS SECTION

Table 5 presents the types of noun modification found in the Methods section in the relevant journal articles, while Table 6 displays some examples of the relevant noun collocations. The results of analysis clearly show that general adjective and noun premodifier are almost equally common in the Methods section.

TABLE 5. Types of noun modifiers in methods section

General adjective		*ed*-participial modifier		*ing*-participial modifier		Noun modifier	
word type	word token	word type	word token	word type	word token	word type	word token
47	1,000	1	21	1	10	40	804
(53 %)	(54%)	(1%)	(1%)	(1%)	(1%)	(45%)	(44%)

TABLE 6. Some examples of noun modifiers in methods section

Type of modifier	Example
General adjective	independent variables, empirical analysis, significant differences, positive relationship
ed-participial modifier	fixed effects
ing-participial modifier	missing data
Noun modifier	dummy variables, data collection, regression model, sample size

Some examples in context are shown in the following sentences:

*I convert all of the time-varying **independent variables** into averages, and transform the entire calculation into a cross-sectional analysis.* (21)

*The growth rates in each group of firms are compared between the two countries, and an analysis of variance (ANOVA) is employed to test for **significant differences** between the four groups of firms in each country.* (69)

*However, in our data, some countries have only one bank in the US market. It is therefore not possible to estimate **fixed effects**, as they correlate perfectly with the time-invariant distance measure.* (29)

*Owing to **missing data** for sales concentration and network variables, the sample was further reduced to 90 observations.* (53)

*To ensure internal consistency, we measured perceived career prospects again as part of a separate survey that was sent to the same inpatriate sample 2 years after the initial **data collection**.* (42)

RESULTS SECTION

Table 7 presents the types of noun modification found in the Results section in the relevant journal articles, while Table 8 displays some examples of the relevant noun collocations. Again, the results of analysis show that general adjective and noun premodifier are both commonly used as premodifiers for nouns in the Results section.

TABLE 7. Types of noun modifiers in results section

General adjective		*ed*-participial modifier		*ing*-participial modifier		Noun modifier	
word type	word token	word type	word token	word type	word token	word type	word token
16	252	1	15	0	0	15	294
(50 %)	(45%)	(3%)	(3%)			(47%)	(52%)

TABLE 8. Some examples of noun modifiers in results section

Type of modifier	Example
General adjective	statistical significance, explanatory variables, , significant coefficient, negative effect
ed-participial modifier	estimated coefficients
Noun modifier	regression analysis, interaction term, host country, correlation matrix

Some examples in context are shown in the following sentences:

I find that seven Controls exhibit the expected signs and six do so at 5% or 1% levels of **statistical significance.** (34)

Sister subsidiary experience in different cohorts has a **negative effect** *on a subsidiary's exit rate.* (18)

The **estimated coefficients** *suggest that an interquartile increase in Left ideology decreases the CSP index by 0.08.* (16)

The period after the IPO has a positive effect on exporting, and exporting activities of newly listed firms increase when they mature, as reflected in sign of the **regression coefficients** *for our time dynamics variable.* (55)

The coefficient of the interaction term between global competitive intensity and mutual importance of the **host country** *is positive and strongly significant.* (8)

DISCUSSION SECTION

Table 9 presents the types of noun modification found in the Discussion section in the relevant journal articles, while Table 10 displays some examples of the relevant noun collocations. The results of analysis show that general adjective is the largest group of premodifier for nouns as it makes up almost 90% of the total word types and word tokens in the Discussion section.

TABLE 9. Types of noun modifiers in discussion section

General adjective		*ed*-participial modifier		*ing*-participial modifier		Noun modifier	
word type	word token	word type	word token	word type	word token	word type	word token
46	1,078	1	15	1	44	5	97
(87 %)	(87%)	(2%)	(1%)	(2%)	(4%)	(9%)	(8%)

TABLE 10. Some examples of noun modifiers in discussion section

Type of modifier	Example
General adjective	international business, future research, firm performance, social capital
ed-participial modifier	developed countries
ing-participial modifier	emerging markets
Noun modifier	host country, home country, property rights, business literature

Some examples in context are shown in the following sentences:

Our study contributes to research on opportunism in **international business** *and emerging markets.* (23)

Thus our overall finding is that in **developed countries** *patent reforms have positive effects on innovation and positive effects on diffusion up to some point, beyond which market power effects have net negative effects.* (75)

Our analysis therefore not only builds on growing qualitative evidence in the international automotive industry about the role of relational factors in promoting knowledge transfer, but also contributes to the growing research in **emerging markets** *about how the social and institutional embeddedness of firms shapes upgrading.*(53)

Companies need to consider spouse familiarity with the culture of the **host country**, *given the crossover effects of spouse-perceived culture novelty on expatriate adjustment.* (76)

As the findings of the necessary causes show, corruption and lack of **property rights** *are the foremost but not sufficient institutional conditions that prevent FDI inflows.* (68)

DISCUSSION

The corpus analysis show that the general adjective is the most common noun premodifier, followed by noun premodifier in both the Introduction and Literature Review sections, whereas general adjective and noun premodifier are both commonly used as premodifiers for nouns in the Methods and Results sections. Also, the general adjective is the most predominant premodifier in the Discussion section. The findings also indicate that *ed*-participial and *ing*-participial premodifiers are not commonly used in IBM journal articles. The absence of such premodification types could possibly be due to the preference of expert writers in IBM toward the use of general adjective and noun premodifier in their writing. Besides, the results of analysis could be useful to EAP teachers as they may focus on the types of noun premodification which are more frequently used in the IBM writing, which would in turn benefit the learners.

In terms of the noun-noun collocations and different types of adjective-noun collocations derived from the IBM corpus, many appear to be discipline-specific combinations that are used in the international business settings, such as *international business, foreign firms, foreign markets, business partners, host country, joint ventures* and etc. (refer to Appendix for more examples) This rightly shows that "all disciplines shape words for their own uses" (Hyland and Tse 2007, p. 240). It can therefore by safely said that it is essentially needed and useful to adopt discipline-specific approach to study phraseological language such as collocations in academic writing to fulfil linguistic inquiries as well as for EAP teaching and learning purposes.

Based on the results of analysis, the revised macro-structure of the current corpus data (Introduction, Literature Review, Methods, Results and Discussion) seems to be not useful in presenting collocations which occur heavily in particular sections. There are a number of the same collocations which occur almost equally heavily in more than one section, for instance *foreign markets*, *emerging markets* and *host country*. These three different noun collocations occur commonly in Introduction, Literature Review and Discussion sections. It is therefore unnecessary to divide the research articles into different sections for the purpose of identifying useful word combinations as useful and frequent word combinations are seen occurring across the texts. This finding does not correspond to the lexical priming theory in which words are bound to 'prime' in certain positions in textual environment. The priming does not occur at word level in the current context. Nevertheless the following research finding provides evidence of priming in the current study.

DIFFERENCE BETWEEN TYPES OF NOUN PREMODIFICATION+NOUN COLLOCATION

Figures 1 to 4 show the distributions of general adjective, *ed*-participial modifier, *ing*-participial modifier and noun modifier in percentages across five different sections in journal articles, respectively.
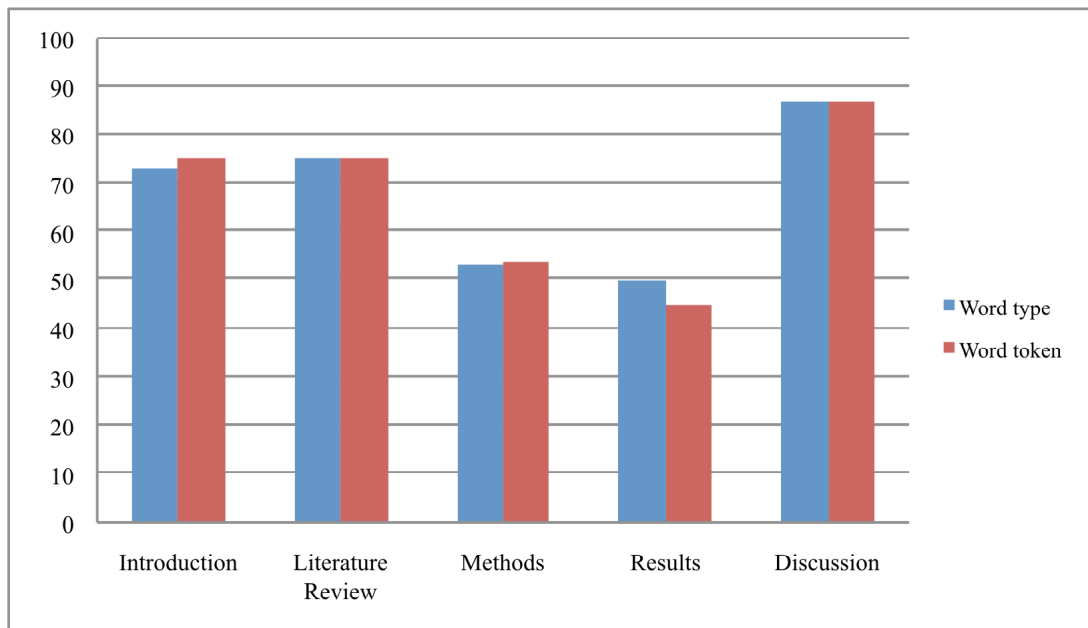
FIGURE 1. General adjective as modifier in five sections

As illustrated in Figure 1 above, general adjective is found in every section of IBM research articles as a premodifier of noun. Nevertheless, among all the premodifiers, general adjective is used most extensively in the Discussion section (87% types, 87% tokens), the use of general adjective premodifier is also prevalent in both the Introduction and Literature Review sections, with the type and token percentages ranging from 73% to 75%, as compared with other premodifiers used in both sections.
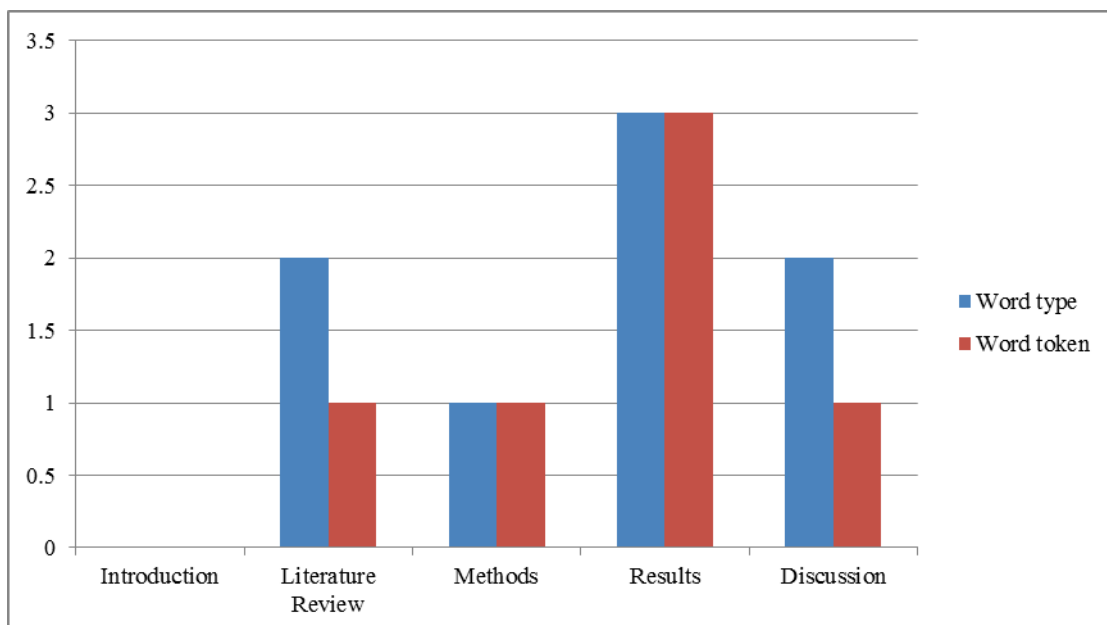
FIGURE 2. *ed*-participial as modifier in five sections

Generally, *ed*-participial premodifier is not commonly employed by expert writers in IBM journal articles. Nevertheless, as shown in Figure 2 above, *ed*-participial premodifier could still be found in all sections of IBM journal articles, except Introduction section. The

ed-participial premodifier constitutes relatively small type and token percentages of premodifiers in IBM journal articles, ranging from 1% to 3% in the respective sections.
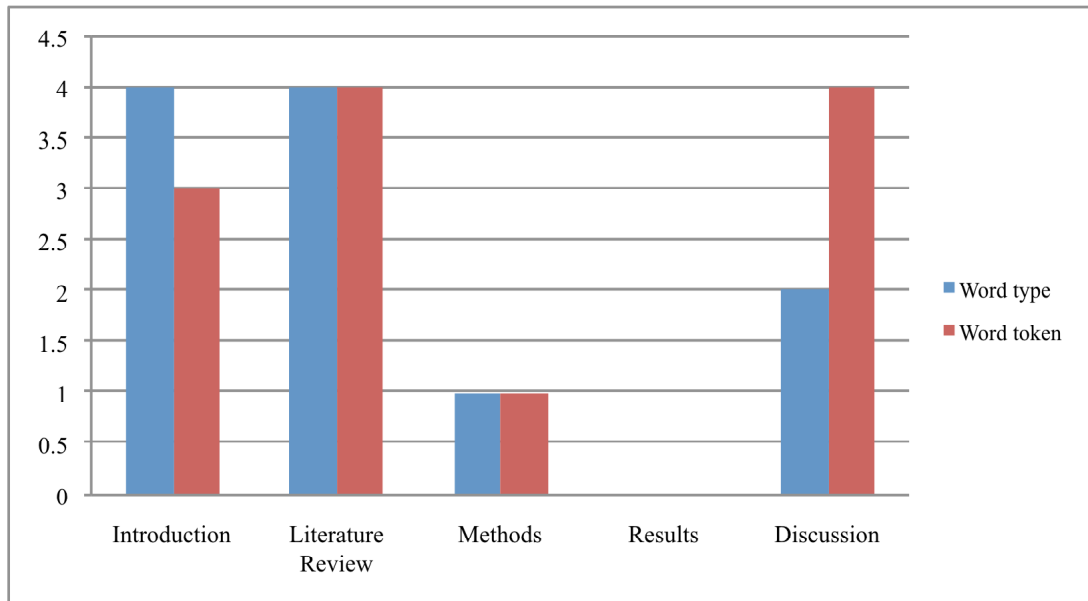
FIGURE 3. *ing*-participial as modifier in five sections

Similar to *ed*-participial premodifier, *ing*-participial premodifier is not favoured by expert writers in IBM journal articles, as this type of premodifier constitutes merely 1% to 4% of the premodifiers in the Introduction, Literature Review, Methods and Discussion sections, as presented in Figure 3. An obvious observation is that *ed*-participial premodifier is totally not found in Results section of IBM journal articles.
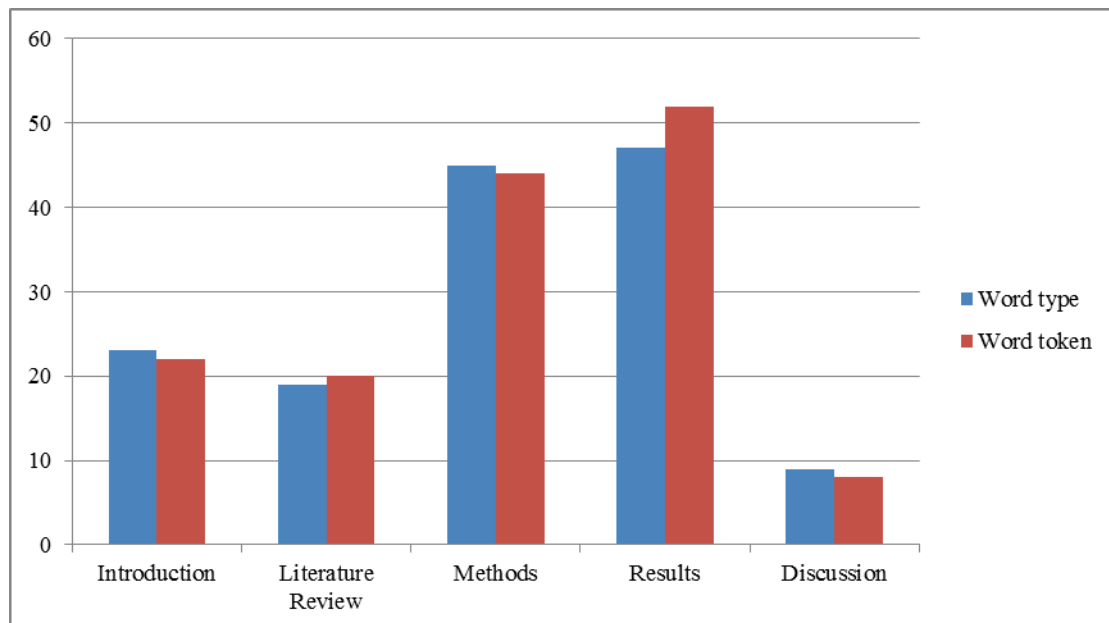
FIGURE 4. Noun as modifier in five sections

As shown in Figure 4, noun premodifier is found in all sections in IBM journal articles. A majority of noun premodifiers are used in the Methods and Results sections, with

the type and token percentages ranging from 44% to 52%. The results of analysis also show that noun premodifier is rarely used by expert writers in the Discussion sections, as it only accounts for 8% to 9% (token and type) of the premodifiers used in the Discussion section.

DISCUSSION

Across sections, the counts for general adjective+noun collocations follow a higher-higher-lower-lower-higher pattern. This is consistent with the functional differences between sections, given the function of general adjective to describe, categorise and specify the relationship between the general adjective and the head noun (Biber et al. 1999, pp. 508-509), for example *foreign markets*, *direct investment*, *international expansion,* etc. It is therefore justifiable that the general adjective for nouns is more prevalent in Introduction, Literature Review and Discussion sections. In contrast with general adjective+noun collocations, it has been found that noun+noun collocation has a lower-lower-higher-higher-lower pattern. The use of noun+noun collocations in Methods and Results sections is obviously higher than that of in Introduction, Literature Review and Discussion sections. The increased use of noun+noun collocations in Method and Results sections may largely be due to the functional use of noun premodifier in identifying the identity, purpose, content or source of the head noun (Biber et al. 1999, pp. 590-591), for instance *regression model*, *interaction terms*, *control variables*, etc.

In contrast to the findings of Research Question 1, the phenomenon of priming could be observed as certain noun premodification+noun are seen 'primed' to occur in certain sections of journal articles. As the findings of Research Question 2 present collocations in colligational/grammatical form (adjective+noun, noun+noun, *ing*-participial+noun, *ed*-participial+noun) which group together collocations of the same premodification types, textual colligation could be seen in the context. As the most popular premodifier, it seems coincidental that general adjective premodifier occurs in every section in the research articles. *Ed*-participial premodifier is prominently found in Results section, while *ing*-participial premodifier is mostly used in the Introduction and Literature Review sections. Noun premodifier is evidently 'primed' to occur in both the Methods and Results sections.

This observation sheds new lights on Hoey's (2005) lexical priming theory in which priming could occur not only at word level, but also at grammatical level within the discourse. Apart from validating Hoey's claims, the lists of noun collocations identified were compiled for the possible use in EAP classrooms (See Appendix).

CONCLUSION

This study employed tools and statistical methods of corpus linguistics to examine the noun collocations and noun premodification types in research articles in the field of International Business Management. The results of analysis indicate that noun collocations are found in different sections in research articles and the evidence of priming is not concrete. General adjective is the most common noun premodification type, followed by noun premodifier. Nevertheless, priming is detected when the noun collocations are realised in the colligational or grammatical form. The findings suggest that Hoey's Lexical Priming could be applied not at word level, but at the grammatical level. The textual priming could be detected by translating the collocations from word form to grammatical form.

The findings also suggest that academic writing needs to be approached from the discipline-specific perspective in order to provide useful collocation lists to EAP learners in

the specific field. It should be noted that the findings are based on the analysis of a corpus consisting of only research articles in the field of International Business Management. Generalisations made are only applicable in the relevant context of International Business Management. The findings are subject to challenge by future research that may explore larger corpora and examine different sets of collocations.

Lastly, learners should be made aware of the importance of noun and noun modification as they are ubiquitous in academic writing. The formation of noun collocations through the use of noun and noun premodification evidently demonstrates the pervasiveness of collocations in authentic language use. Learners who are "collocationally competent … will also be far more communicatively competent" (Hill 2000, p. 62). A simple and direct way to enhance the learners' consciousness about the importance of collocation is to teach them explicitly, as suggested by Hill (2000). It is therefore hoped that the noun collocation list compiled through the analysis of noun and noun premodification types in the present study could serve as a useful teaching material for the relevant EAP courses.

REFERENCES

Ackermann, K. & Chen, Yu-Hua. (2013). Developing the Academic Collocation List (ACL) - A corpus-driven and expert-judged approach. *Journal of English for Academic Purposes*. *Vol. 12*, 235-247.

Ang, L. H., Hajar Abdul Rahim, Tan, K. H., Khazriyati Salehuddin (2011). Collocations in Malaysian English learners' writing: A corpus-based error analysis. *3L: The Southeast Asian Journal of English Language Studies. Vol. 17*, 31-44.

Anthony, L. (2015). *Antconc (3.4.1w)*. Japan: Waseda University.

Bargiela-Chiappini, F. (2011). Asian business discourse(s). In Aritz, J. & Walker, R. C. (Eds.). *Discourse Perspectives on Organizational Communication* (pp. 59-79). Madison NJ: Fairleigh Dickinson University Press.

Bargiela-Chiappini, F. & Zhang, Z. (2013). Business English. In Paltridge, B. & Starfield, S. (Eds.). *The handbook of English for Specific Purposes* (pp. 193-211). Oxford: John Wiley & Sons Inc.

Biber, D., Johansson, S., Leech, G., Conrad, S. & Finegan, E. (1999). *Longman Grammar of Spoken and Written English*. Harlow, Essex: Longman.

Biber, D. & Barbieri, F. (2007). Lexical bundles in university spoken and written registers. *English for Specific Purposes. Vol. 26*, 263-286.

Church, K. W. & Hanks, P. (1990). Word association, norms, mutual information, and lexicography. *Computational Linguistics. Vol. 16(1)*, 22-29.

Durrant, P. (2009). Investigating the viability of a collocation list for students of English for Academic Purposes. *English for Specific Purposes*. *Vol. 28(3)*, 157-169.

Ellis, N. C. & Sinclair, S. G. (1996). Working memory in the acquisition of vocabulary and syntax: Putting language in good order. *The Quarterly Journal of Experimental Psychology. Vol. 49A(1),* 234-50.

Gledhill, C. J. (2000). *Collocations in Science Writing*. Tubingen: Gunter Narr Verlag.

Hadi Kashiha & Chan, S. H. (2014). Discourse functions in formulaic sequences in academic speech across two disciplines. *GEMA Online® Journal of Language Studies. Vol. 14(2)*, 15-27.

Halliday, M. A. K. (1993). *Writing Science Literacy and Discursive Power*. London: Falmer Press.

Hill, J. (2000). Revisiting priorities: From grammatical failure to collocational success. In M. Lewis (Ed.), *Teaching Collocations: Further Development in the Lexical Approach* (pp. 47-69). London: Language Teaching Publications.

Hoey, M. (2005). *Lexical Priming: A New Theory of Words and Language*. London: Routledge.

Howarth, P. (1998). The phraseology of learners' academic writing. In A. P. Cowie (Ed.), *Phraseology: Theory, analysis, and applications* (pp. 161-186). Oxford: Oxford University Press.

Hunston, S. (2002). *Corpora in Applied Linguistics*. Cambridge: Cambridge University Press.

Hyland, K. (2008). Academic clusters: Text patterning in published and postgraduate writing. *International Journal of Applied Linguistics. Vol. 18(1)*, 41–62.

Hyland, K. & Tse, P. (2007). Is there an "academic vocabulary"? *TESOL Quarterly*. *Vol. 41(2)*, 235-253.

Laufer, B. & Waldman, T. (2011). Verb-noun collocations in second language writing: A corpus analysis of learners' English. *Language Learning*. *Vol. 61(2)*, 647-672.

Nickerson, C. (2010). The Englishes of business. In Kirkpatrick, A. (Ed.). *The Routledge Handbook of World Englishes* (pp. 506-519). London: Routledge.

Paquot, M. & Granger, S. (2012). Formulaic language in learner corpora. *Annual Review of Applied Linguistics. Vol. 32,* 130-149.

Pawley, A., & Syder, F. H. (1983). Two puzzles for linguistic theory: Nativelike selection and nativelike fluency. In J. C. Richards & R. W. Schmidt (Eds.), *Language and Communication* (pp. 191-226). London: Longman.

Simpson-Vlach, R., & Ellis, N. C. (2010). An academic formulas list (AFL). *Applied Linguistics. Vol. 31,* 487-512.

Sinclair, J. (1991)*. Corpus, Concordance, Collocation*. Oxford: Oxford University Press.

Stubbs, M. (1995). Collocations and semantic profiles. On the cause of the trouble with quantitative studies. *Functions of Language. Vol. 2*(*1*), 23-55.

Swales, J. (1990). *Genre Analysis: English in Academic and Research Settings*. Cambridge: Cambridge University Press.

Tremblay, A., Derwing, B., Libben, G. & Westbury, C. (2012). Processing advantages of lexical bundles: Evidence from self-paced reading and sentence recall tasks. *Language Learning. Vol. 61*(*2*), 569-613.

Siyanova-Chanturia, A., Conklin, K. & Schmitt, N. (2011). Adding more fuel to the fire: An eye-tracking study of idiom processing by native and nonnative speakers. *Second Language Research. Vol. 27*, 1-22.

Wray, A. (2008). *Formulaic Language: Pushing the Boundaries*. Oxford: Oxford University Press.

APPENDIX

COMMON NOUN COLLOCATION LIST FOR INTERNATIONAL BUSINESS MANAGEMENT

Introduction Section

General Adjective
international business, joint ventures, foreign firms, foreign markets, foreign subsidiaries, cultural differences, different types, foreign market, direct investment, local firms, prior research, international business, international expansion, economic growth, multinational enterprises, other words

Literature Review Section

General Adjective
foreign firms, social capital, cultural distance, domestic firms, human capital, local firms, national culture, joint ventures, cultural differences, international business, other hand, local market, foreign markets, foreign subsidiaries, foreign investors, high levels, informal institutions, foreign market, formal institutions, other firms, institutional environment, cultural values, other words, firm performance, international expansion, international experience, positive relationship, joint venture, local partners, opportunistic behavior, institutional environments, firm size, other countries, empirical studies, competitive advantage, social networks, absorptive capacity, international markets, local knowledge, new knowledge, high level, institutional theory, prior research, different types, institutional context, legal system, organizational learning, positive impact, tacit knowledge, empirical evidence, intellectual property, national culture, foreign subsidiaries, new market, previous research, institutional framework, negative effect, negative effects, negative relationship, new product, positive effect, theoretical framework, conceptual framework, different levels, economic development, european countries, local environment, social interactions, empirical research, strategic management, economic exchange, international business, new products, positive relationship, small firms, important role, institutional environment, new markets, previous studies, recent research, recent studies

Noun Modifier
host country, home country, power distance, entry mode, property rights, transaction costs, market entry, host countries, business partners, home countries, knowledge transfer, market power, host country, exchange partners, export markets, home country, product development, business opportunities, literature review, market opportunities, host market

Methods Section

General Adjective
dependent variable, independent variables, cultural distance, joint ventures, firm size, dependent variables, common method, empirical analysis, foreign markets, explanatory variables, foreign subsidiaries, prior studies, level data, total number, dependent variable, focal firm, foreign firms, joint venture, previous research, firm performance, international experience, standard errors, previous studies, prior research, final sample, foreign ownership, given year, independent variable, level variables, level variables, natural logarithm, descriptive statistics, economic development, large number, standard deviation, total sales, cultural distance, cultural dimensions, different countries, international business, significant differences, average age, cultural differences, new product, positive relationship, confirmatory factor, domestic product, national culture

Noun Modifier
dummy variable, item scale, dummy variables, dummy variable, home country, control variables, host country, data collection, world bank, response rate, stock market, entry mode, power distance, regression model, uncertainty avoidance, , parent firms, market value, sample size, factor analysis, panel data, property rights, data set, survey data, time period, control variables, data sources, error term, gdp growth, home country, home countries, method variance, interaction terms, sample period, control variable, distance measure, growth rate, method bias, regression analysis, research design

Results Section

General Adjective
dependent variable, independent variables, standard deviation, statistical significance, descriptive statistics, logistic regression, , explanatory variables, dependent variables, explanatory power, full model, standard errors, other words, positive relationship, negative effect, significant coefficient, standard deviations

Noun Modifier
dummy variable, control variables, interaction terms, regression analysis, results table, home country, regression results, interaction term, host country, interaction effects, control variables, correlation matrix, regression analyses

Discussion Section

General Adjective
future research, international business, foreign firms, social capital, cultural distance, national culture, cultural differences, future studies, cultural values, local firms, joint ventures, institutional environment, other hand, foreign markets, empirical evidence, foreign market, different types, firm performance, other words, present study, institutional context, institutional factors, international experience, previous studies, firm size, important implications, previous research, positive relationship, prior research, joint ventures, economic development, other types, positive effect, institutional theory, cultural distance, extant research, future work, high levels, dependent variable, empirical findings, negative effect, other countries, other factors, possible explanation, prior studies