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Structural Patterns of Lexical Bundles in Business Studies Research Articles

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Abstract

Lexical bundles are defined as sequences of words that frequently occur together in a register. They are regarded as essential components of written academic discourse as they are prevalent in written registers. The purpose of this study is to examine the structure of three-to-six-word lexical bundles identified in the three sections of the business studies research articles: the Introduction, the Method and the Results sections, and classify them into structural categories. Subsequently, these bundles are compared across the three sections of the business studies research articles in terms of their structural patterns. A corpus-based approach was adopted in order to identify the lexical bundles. AntConc 3.5.8w (Anthony, 2019) computer software was used to generate the lexical bundles from the research articles. The findings revealed that there are structural differences in the use of lexical bundles across the three sections, and that most of the lexical bundles constituted noun phrases and prepositional phrases. The findings also show that business academic writers rely most on noun phrases and phrasal bundles for producing their written discourse. In this study, a list of lexical bundles in business studies research publications from various business subject areas, along with the structure of these bundles, is an outcome of the study that would be of significance to academic writers in the field of business studies. The results of this study have pedagogical implications for EAP course developers and instructors.

Keywords: Lexical bundles, Business studies, Research articles, Structural patterns, English for Academic Purposes (EAP)

1. Introduction

As there is growing importance in understanding how multiword sequences are structured and applied in academic discourse, a substantial number of corpus-based studies have set out to highlight the role of lexical bundles in describing academic registers, genres and disciplines (Adel & Erman, 2012; Ang & Tan, 2018; Biber & Barbieri, 2007; Cortes, 2004; Gungor & Uysal, 2016; Hyland, 2008; Karaback & Qin, 2013; Salazar, 2014, Ucar, 2017). These studies indicate that lexical bundles play a vital role in academic discourse.

Coxhead and Byrd (2007) stated that lexical bundles are instrumental in academic writing as they offer ready-made sets of words which can be employed as a partial foundation in the development of academic prose. In addition, lexical bundles facilitate and represent fluent language use and indicate that a writer is a "member" of a discourse community. Moreover, they also note that lexical bundles represent register-specific ways of expressing particular meaning. Coxhead and Byrd's statements are supported by other researchers as well such as Hyland (2008a) and Biber (2006).

In regard to the significant role of lexical bundles in academic writing, there is need to do more research in the domain of lexical bundles. There are several key reasons for focusing on the structural patterns of lexical bundles in business studies research articles (RAs). First, business studies discipline is considered as an important field of study and popular among students in higher education institutions. However, lexical bundles in the field of business studies have been relatively under-researched in EAP. A majority of previous studies on

lexical bundles in academic register have mainly focused on the disciplines of linguistics and hard sciences (e.g. biology, chemistry, physics).

Second, previous studies have reported that ESL and EFL students face challenges in English-medium business programs in terms of writing skills (Alhassan, 2021; Al-Khasawneh, 2010; Mhedbi, 2014). In regard to this, identification of structural patterns of lexical bundles in business studies RAs can ultimately present postgraduate students or academic writers in the field of business studies a general idea of formulaic sequences of RAs.

Third, previous studies demonstrate that different sections of research articles vary from each other in their rhetorical structures and depend on different lexical and structural patterns (e.g., Swales, 1990, Swales and Feak, 2010). In regard to this, most of the previous studies on lexical bundles in the field of business studies have considered RA as an undivided register with the assumption that language features and discourse functions are equally distributed across every section of the RA (e.g. Ang & Tan, 2018; Hyland, 2008a, Hsu, 2014). In light of this, identification of structural patterns of lexical bundles in different sections of business studies RAs may be beneficial in terms of understanding the type of bundles that perform as the building blocks of academic writing in the business studies field and the connection between the occurrence of bundles and the rhetorical functions across the sections. This is interesting because it provides insights into the disciplinary community preferences which can be useful to EAP learners, instructors and material developers and designers in the field of business studies. The current study sets out to identify the various structural patterns of three-to-six -word lexical bundles that appear in the three main sections of the business studies research articles, Introduction, Method and Results, and identify the differences and similarities in terms of application in these three sections.

The main objective of the present study is to identify three-to-six-word lexical bundles in the introduction, method and results sections of published business studies RAs and to categorise them into various structural types. Different academic discourses rely on different forms of lexical bundles. In order to become proficient in the recognition, comprehension and usage of lexical bundles, learners need to be aware of these bundles. In order to acquire or learn this knowledge, students need a list of these relevant bundles, they need exposure in reading texts that contain these bundles, and they need to practise and employ them in writing. In view of the importance and relevance of lexical bundles in academic writing and for academic writers, the present study investigates the structural patterns of the lexical bundles in the introduction, method and results sections of the business studies RAs as an academic genre and register. In order to attain an in-depth investigation of lexical bundles applied in the introduction, method and results sections of published business studies RAs, this study investigates the following research questions:

1). What are the structural patterns of lexical bundles identified in the introduction, method and results sections of the business studies research articles?

2). To what extent do the lexical bundles in each section of the RAs are similar or differs in terms of structure?

2. Literature Review

2.1 Definition and Description of Lexical Bundles

The term "lexical bundles" was originally presented in the Longman Grammar of Written and Spoken English (Biber et al., 1999) to describe the recurring multiword sequences identified in the Longman Spoken and Written English Corpus of conversation and academic prose. Lexical bundles are described as "combinations of words that in fact recur most commonly in a given register ‘’ (Biber et al., 1999, p.992). Lexical bundles differ from other multiword sequences such as idioms and collocations as they have several distinctive features. It is important to note that there are three main criteria that are taken into account in the identification of lexical bundles. They are frequency, length and the range of distribution.

Frequency is the number of times a sequence needs to occur to be identified as a lexical bundle. Various studies set different frequencies, ranging from 10 to 40 times per million words. Length is referred to the number of words in each lexical bundle. Normally, three-to-six- word lexical bundles are investigated in studies. Whereas, range of distribution is the number of times a bundle needs to occur in texts. Different studies set different range of distribution.

2.2 Structural Classification of Lexical Bundles

In terms of the structure, lexical bundles are generally incomplete structural units. Biber et al. (1999) in their comprehensive corpus-based study of English grammar discovered that only 15% of lexical bundles in conversation represent complete structural units whereas in academic prose, less than 5% of the lexical bundles can be regarded as complete structural units.

According to their research, the register determines how certain grammatical features seem to occur. In other words, it implies that a strong relationship exists between the register and the structural patterns of lexical bundles. Bundles in conversation appear to be clausal (e.g. I want you to, it's going to be) whereas in academic prose most of the bundles are usually phrasal (e.g. as a result of, on the other hand). It is also important to note that, shorter lexical bundles are usually incorporated into longer word sequences. For example, the 4-word bundle it can be viewed forms part of the 5-word bundle it can be viewed as and this bundle forms part of the six-word bundle it can be viewed as the. Based on these grammatical features, Biber et al. (1999) propose a structural classification for lexical bundles.

Lexical bundles are categorized into two major categories in terms of structure and function. It is vital to examine structural and functional characteristics of lexical bundles in order to help learners gain control over the use of lexical bundles. Structural characteristics refers to the grammatical forms of lexical bundles. Biber et al. (1999) proposed a framework for the analysis of structural characteristics of lexical bundles which has been extensively used in many studies on lexical bundles (Biber et al., 2004; Byrd & Coxhead, 2010; Chen & Baker, 2010; Cortes 2002, 2004; Hyland, 2008a, 2008b; Jalali & Ghayoomi, 2010; Salazar, 2010, 2014). Lexical bundles were categorized into three types: (1) lexical bundles that incorporate verb phrase fragments, (2) lexical bundles that incorporate dependent–clause fragments and

(3) lexical bundles that incorporate noun phrase and prepositional phrase fragments.

2.3 Key Studies on Structural Patterns of Lexical Bundles

A great number of researchers in the field of formulaic language (e.g. Jalali & Moini, 2014; Damchevska, 2019; Shirazizadah & Amirfazlian, 2021; Zare & Valipouri, 2021; Cui & Kim, 2023) have adopted Biber's structural taxonomy to categorise the bundles in various registers, especially in the academic writing. The findings of these studies reveal that the structure of bundles differ across various field of studies. On a similar note, the findings of a study conducted by Biber, Conrad and Cortes (2004) show that the bundles in the academic prose are phrasal rather than clausal. Furthermore, the findings also show that 70% of the bundles consist of noun phrase expressions such *as the nature of* the or a sequence that bridges across two preposition phrases, for instance, *as a result of*. However, it was discovered that bundles in the spoken discourse constitutes declarative clauses or questions.

On a related note, Hyland (2008a) pointed out that most bundles in academic writing consists of noun and prepositional phrases and demonstrates different patterns across disciplines. In the field of social science, which includes business studies and applied linguistics, bundles beginning with a prepositional phrase were mostly used. Whereas, in the field of science and engineering, more passive bundles were used in the text. In addition to this, the findings from Jalali and Moini's (2014) study on medical research articles revealed that most of the lexical bundles were prepositional phrases. This finding is similar to the study conducted by Cortes (2004) on lexical bundles in academic history writing in English and Spanish.

A number of studies have focused on the structure of lexical bundles in the various sections of the text and analysed the rhetorical functions that they perform in these sections (e.g. Shahriari, 2017; Cardinali, 2015; Gil, and Caro, 2019; Zare and Valipouri, 2022). For example, Zare and Valipouri (2022) identified lexical bundles in the abstract, introduction, results and discussion sections of the research articles in the field of chemistry. The researchers discovered that various sections in the chemistry research articles are related to specific sets of lexical bundles and perform different rhetorical functions. This is in line with Biber's (2006) argument that lexical bundles play a vital role in the discourse production of all university registers.

The large number of studies on lexical bundles as a whole indicates that lexical bundle research is a crucial field of study. Therefore, more in-depth research is necessary to obtain a comprehensive understanding of the application of lexical bundles in various fields of study because of the differences in these research findings. In order to achieve this, the present study aims to examine lexical bundles in terms of structural patterns. However, it is important to note that in the prior studies of lexical bundles, RAs have been analyzed as a single unit of discourse. In other words, RAs are accounted as an undivided register with the assumption that lexical bundles are equally distributed across every section of the RA. Not many studies have set out to compare the features of lexical bundles across text-internal sections of the RAs. To date, Cardinali (2015) and Shahriari (2017) have analyzed and compared lexical bundles across sections. Cardinali (2015) identified and compared lexical bundles in NSE (Native Speakers of English) corpus in the field of biology and compared the bundles across

four main sections of research articles: Introduction, Methods, Results and Discussion. On a similar note, Shahriari (2017) examined and compared features of lexical bundles in the field of Applied Linguistics, which focused on 4-word and 5-word lexical bundles.

No study to date has directly attempted to empirically analyze the lexical bundles across RA sections in the field of business studies. An empirical investigation of this subject matter is essential because business studies is considered an important academic discipline in the field of EAP and ESP. In light of the pedagogical value of lexical bundles in EAP practice, this study addresses the issue of specificity in EAP by identifying and examining the structural patterns of three-to-six-word lexical bundles that appear in different sections of business studies RAs.

3. Method

3.1 Corpus Collection and Compilation

The corpus of this study comprises 500 RAs on business studies that were published in ISI-indexed journals in Q1 and Q2 between 2016 and 2020. RAs were selected from the five main sub-disciplines within the field of business studies; accounting, economics, finance, marketing and management. The RAs were downloaded from the online versions of the chosen leading and reputable international journals in the field of business studies, as determined by the impact factor of the journals in the Journal Citation Reports (JCR). There were four journals chosen for every subdiscipline. For this study, a total of twenty journals were selected. Five issues were randomly chosen between years 2016 and 2020. A total of 25 RAs were selected from each journal to serve as representatives of the articles relevant to the present study. Furthermore, only RAs with the IMR format (Introduction, Method and Results) were included.

3.2 Text Analysis Programs

The lexical bundles in the business studies corpus (BSC) were extracted using AntConc 3.5.8 (Anthony, 2019). The bundles were analyzed within their respective settings to identify the structural patterns by using the software's concordance tool.

3.3 Data Analysis Method

In order to generate lexical bundles across the introduction, method and results sections of the business studies RAs, a corpus-based approach was adopted in the present study. The extraction process involves three main criteria; the cut-off frequency, the range of distribution and the length of the sequence which are determined by the researcher based on the size of the corpus. The cut-off frequency refers to the number of times the sequence would have to occur per million words. The cut-off points differ according to the length of the lexical bundle. In this study, cut-off frequency of 30 per million words for 3-word bundles, 20 per million words for 4-word bundles and 10 and 8 per million words for 5-and 6-word bundles were used respectively. Range of distribution refers to the number of different texts the sequence would have to be found in. In the current study, 3 to 6-word lexical bundles have to appear in at least 5 different texts. This step was taken in order to prevent individual writer's

idiosyncrasies (Biber et al., 2004). For instance, for a word sequence to be considered as a lexical bundle related to the introduction section, it had to occur in at least five different introduction texts. Length refers to the length of the sequence. In this study, a list of three-to-six-word bundles were examined in order to conduct a more comprehensive analysis on the bundles.

In the present study, the structure of lexical bundles was examined and classified based on Biber's et al. (1999) structural taxonomy, which include 4 main categories, specifically noun structure, verb structure, prepositional phrase fragments. In Biber's et al. (1999) taxonomy, lexical bundles were divided into 12 major structural categories. However, in the process of classification, it was discovered that a few sub-categories should be added to the original framework to categorize some lexical bundles in the BSC. This is because lexical bundles in the new subcategories were not present in Biber et al.'s (1999) structural taxonomy. Five new categories were incorporated into Biber et al.'s (1999) structural classification. The categories are as follows: other noun phrases, other adjectival phrases, verb phrases with first person pronoun, other passive fragments and other verbal fragments.

First, are the other noun phrase structures. It consists of noun phrase structures that do not belong in the noun phrase + of-phrase fragment and noun phrase with other post-modifier fragments. Examples of post-modifier fragments are an important role, line of research, the important determinant. It should be noted that the difference between the noun phrase + of-phrase fragment and noun phrase with other post-modifier fragment is that in the former structure, the preposition *of* is used. For example, *the effect of, increase in the cost of, a large number of*. Whereas in the latter, the preposition *of* is not used but the *of* preposition is replaced by other prepositions such as *on*, *in*, *from*, *between*. For instance, *the coefficient on, the relationship between, the need for*. In the other noun phrases neither the preposition of or other prepositions are used. Second, are other adjectival phrases. These are lexical bundles made up of various adjectival fragments that do not fit into the other groups and denotes comparative relationships. Examples of other adjectival phrases are *not significant in, consistent with those, closely related to*. Third is the verb phrases with first-person or third-person pronouns are phrases that begin with subject pronouns such as I, we, they are used in academic writing when referring to the writers' own actions and opinions. This type of phrase is used for specific purposes in academic writing. They are used to organize the text and guide the reader through the argument. For example, *we argue that, we focus on, we aim to*. Apart from that, they are used to report methods, procedures and steps undertaken. For example, *I find that, we find that, we examine the effect of*. Fourth, is the other passive fragments category, which includes passive fragments that do not fit in the passive fragments + prepositional phrases. For instance, *can be used*, *used to measure*. Passive fragments are used to emphasize on the methods and procedures used in the research rather than emphasizing on the researcher. Fifth, is the other verbal fragments category, which include structures that do not fit in the other verb structures categories, Examples of other verbal fragments are *play an important role, have a significant impact on, may be more.*

4. Results and Discussion

4.1 Structural Patterns of Lexical Bundles

Table 1 shows the structural classification of lexical bundles in the Introduction section of BSC. The findings revealed that in the Introduction section the noun phrase + of-phrase fragment is the most frequent subcategory. It consists about 31% of the total bundles in this section. (Modal/Pronoun) verb + adjective + to-clause fragment and other prepositional phrase fragments constitute about 13% and 9% of the section respectively. The least used bundle is passive fragment category. In the verb structure category, passive + prepositional-phrase fragments subcategory is the most frequent subcategory.

Table 1. Structural Classification of Target Bundles in the Introduction Section

Structure	Types	%	Tokens	%
Noun Structure				
Noun phrase + of-phrase fragment	176	31.2	7045	37.9
Noun phrase with other post-modifier fragments	46	8.2	1558	8.4
Other noun phrases	15	2.7	355	1.9
Verb Structure				
Passive + prepositional phrase fragments	27	4.8	939	5.0
Other passive fragment	1	0.2	28	0.2
Verb phrase with first/third person pronoun	31	5.5	1215	6.5
Pronoun/noun phrase + be/ verb phrase	7	1.2	69	0.4
Other verbal fragments	19	3.4	295	1.6
Prepositional Phrase Fragments				
Prepositional phrase + of	23	4.1	676	3.6
Other prepositional phrases (fragments)	49	8.7	1922	10.4
Other Structures				
(Modal/Pronoun) Verb/adjective + to clause fragment	73	12.9	1852	10
Verb phrase/noun phrase (fragments)	31	5.5	764	4.1
Adverbial clause fragment	3	0.5	70	0.4
Copula be + adjectival phrase	14	2.5	371	2.0
Other adjectival phrase	8	1.4	215	1.2
Anticipatory it + verb or adjectival phrase	8	1.4	104	0.6
Other expressions	33	5.8	1075	5.8
Total	564	100	18553	100

Table 2 presents the structural classification of target bundles in the method section of the BSC. It is evident that noun phrase + of-phrase fragment is the most frequent subcategory under the noun phrase category with 155 bundles which equal to 36.5% of the total bundles in the method section. The second most frequent group of bundles is other prepositional phrase fragments with 61 bundles, which constitutes about 14.4% of the total bundles in the method section. The third most frequent group of bundles is (modal/pronoun) verb/adjective + to clause fragment with 55 bundles, which equal to 13% of the total bundles in the method section. The least frequent categories include the other verbal fragment and other passive fragment with each category having only one bundle. It is also important to note that there are no bundles in the pronoun/noun phrase + be/verb phrase category.

Table 2. Structural Classification of Target Bundles in the Method Section

Structure	Types	%	Tokens	%
Noun Structure				
Noun phrase + of-phrase fragment	155	36.5	8198	40.0
Noun phrase with other post-modifier fragments	19	4.5	1118	5.5
Other noun phrases	23	5.4	1198	5.9
Verb Structure				
Passive + prepositional phrase fragments	40	9.4	1214	5.9
Other passive fragments	1	0.2	43	0.2
Verb phrase with first/third person pronoun	14	3.3	647	3.2
Pronoun/noun phrase + be/ verb phrase	0	0	0	0
Other verbal fragments	1	0.2	21	0.1
Prepositional Phrase Fragments				
Prepositional phrase + of	27	6.4	946	4.6
Other prepositional phrases (fragments)	61	14.4	3234	15.8
Other Structures				
(Modal/Pronoun) Verb/adjective + to clause fragment	55	13.0	2444	11.9
Verb phrase/noun phrase (fragments)	4	1.0	184	0.9
Adverbial clause fragment	4	1.0	141	0.7
Copula be + adjectival phrase	3	0.7	121	0.6
Other adjectival phrase	3	0.7	101	0.7
Anticipatory it + verb or adjectival phrase	5	1.2	74	0.4
Other expressions	9	2.1	767	3.8
Total	424	100	20451	100

Table 3 presents the structural classification of target bundles in the results section of the BSC. It is evident that noun phrase + of-phrase fragment is the most frequent subcategory under the noun structure category with 171 bundles which equal to 26.8% of the total bundles in the results section. The second most frequent group of bundles is noun phrase with other post-modifier fragments. This category consists of 59 bundles which constitute about 9.3% of the total bundles in the results section. The third most frequent group of bundles is other expressions with 56 bundles, which equal to 8.8% of the total bundles in the results section. The least frequent category in the results section is other passive fragment which consists of only 2 bundles and form about 0.3% of the total bundles.

Table 3. Structural Classification of Target Bundles in the Results Section

Structure	Types	%	Tokens	%
Noun Structure				
Noun phrase + of-phrase fragment	171	26.8	11 808	29.6
Noun phrase with other post-modifier fragments	59	9.3	4213	10.6
Other noun phrases	20	3.1	1336	3.4
Verb Structure				
Passive + prepositional phrase fragments	34	5.3	2112	5.3
Other passive fragments	2	0.3	134	0.3
Verb phrase with first/third person pronoun	22	3.5	1488	3.7
Pronoun/noun phrase + be/ verb phrase	5	0.8	136	0.3
Other verbal fragments	14	2.2	519	1.3
Prepositional Phrase Fragments				
Prepositional phrase + of	29	4.6	1582	4.0
Other prepositional phrases (fragments)	46	7.5	3963	10.0
Other Structures				
(Modal/Pronoun) Verb/adjective + to clause fragment	46	7.2	2556	6.4
Verb phrase/noun phrase (fragments)	31	4.9	2135	5.4
Adverbial clause fragment	13	2.0	738	1.9
Copula be + adjectival phrase	43	6.8	2289	5.7
Other adjectival phrases	41	6.4	2410	6.1
Anticipatory it + verb or adjectival phrase	5	0.8	174	0.4
Other expressions	56	8.8	2234	5.6
Total	637	100	39827	100

4.2 Comparison of Lexical Bundles in Terms of Structure

Table 4 shows the comparison of the Introduction, Method and the Results sections in terms of structure. As mentioned earlier, the structure of lexical bundles in this study was analyzed based on the taxonomy by Biber et al. (1999). In this classification, each bundle is categorized into one of the four main structural categories which include noun structure, verb structure, prepositional phrase fragments and other structures. It is evident that noun structure is the most common structural type for all three sections. The results section had the highest number of noun structure bundles. This section contained 250 bundles, which equal to 39.2% of the bundles found in the section. This is followed by the introduction section and the method section. The introduction section contained 237 bundles, about 42% of the total number of bundles in this section. Whereas the results section constituted 197 bundles, which is about 46% of the total number of bundles in this section. However, in regard to the verb structure, the introduction section had the highest number of bundles in this category. The introduction section had 85 verb structure bundles, which accounted for about 15% of the total number of bundles in this section. Whereas, the results section had 77 verb structure bundles, which accounted for about 12% of the total bundles in this section. The method section had minimal number of verb structure bundles compared to the other two sections. It contained 56 bundles, which accounted for about 13% of the total number of bundles in this section.

Table 4. Comparison in Terms of the Structure of Lexical Bundles across the Three Sections

Structure	Introduction	Method	Results
Noun Structure	237 (42%)	197 (46.4%)	250 (39.2%)
Verb Structure	85 (15%)	56 (13%)	77 (12%)
Prepositional Phrase	72(12.8%)	88 (21%)	75(12%)
Other Structures			
Clausal Fragments	107(19%)	63 (15%)	90 (14%)
Adjectival Phrase	22(4%)	6 (1.4%)	84 (13%)
Anticipatory *it*	8 (1.4%)	5 (1.2%)	5 (0.8 %)
Other Expressions	33 (5.8%)	9 (2%)	56 (8.8%)

Subsequently, it is interesting to observe that the greatest number of prepositional phrase bundles were identified in the method section. There were 88 bundles, which accounted for about 21% of the total number of bundles in this section. A total of 75 prepositional phrase bundles, which accounted for about 12% of the total number of bundles in the method section were found in that particular section. In addition to this, 72 prepositional phrase bundles were found in the introduction section, which represented about 12% of the total number of bundles. Overall analysis on the structural form of lexical bundles showed that the bundles that are classified as other structure dominated the results section with 235 bundles, which equal to 37% of the total bundles in this section. The other structure bundles accounted for about 30% and 20% of the total number of bundles in the introduction and the method

sections respectively. However, it is important to note that there are seven structural types under this category which can be subdivided into four main groupings; the clausal fragments, adjectival phrases, anticipatory it structures and other expressions.

Based on the structural analysis of bundles in the other structure category, clausal fragments were found to be the most common structural type in all three sections. A total of 107 bundles, 63 bundles and 90 bundles were found in the introduction, method and results section respectively. Whereas, adjectival phrases were largely distributed in the results section, which accounted for about 13% of the total number of bundles in this particular section. However, the distribution of adjectival phrases is minimal in the method section, with only 6 bundles, which equal to about 1.4% of the total number of bundles in this section.

Subsequently, anticipatory *it* structure is the least common structural type in all three sections. The number of bundles that were identified in each section is less than 2% of the total number of bundles that were found in each respective section. The final structural type in the other structure category is the other expressions. Other expression bundles were predominantly identified in the results section. There were 56 bundles, which accounted for about 9% of the total number of bundles in this section. Apart from this, 33 bundles were also identified in the introduction section, which accounted for about 6% of the total number of bundles in this section. However, the other expression bundles are minimal in the method section. There were only 9 bundles identified in this section, which equal to 2% of the total number of bundles in this section.

4.2.1 Noun Phrase Structure

The following concordance lines are examples of noun phrase structural patterns that are generated from the introduction section of the BSC.

(1) "This is critical because **the number of** engagements is necessary for computing the audit firm's rate of internal control audit deficiencies, as reported by PCAOB inspectors, which is a central feature of our research design." (Accounting, Introduction 6)

(2) "First, we show the correlations and dynamic dependencies between attitude survey metrics and online behaviour metrics across **a wide variety of** business-to-consumer industries." (Marketing, Introduction 450)

(3) "Beck et al (2007) conclude that **an increase in** financial depth reduces income inequality." (Finance, Intro 205)

(4) "First, we examine **the relationship between** accruals and cash flow using firm-specific time-series regressions and observe that the results corroborate those from cross-sectional regressions." (Acct Intro 4)

The following are examples of noun structures in the Method section.

(5) "This is **a set of** characteristics that may influence managers' internalization competencies and their ability and willingness to effectively implement them within their firms." (Management. Method 322)

(6) "We analyse the impact of **the level of** and the change in the enforcement separately." (Accounting, Method 94)

The following are examples of noun structures in the Results section.

(7) "This reinforces **the value of** a governance framework to ensure the quality of project documentation, and also the importance of organizational learning in the process." (Management, Results 377)

(8) "The overall mean factor loading was 0.724, with **a standard deviation of** 0.216." (Marketing, Results 424)

(9) "**The results from** both procedures indicate identification rates that are statistically higher than random chance (25% or one out of four words) at the 1% level." (Accounting, Results 22)

The findings suggest that noun phrase structures are used to indicate qualities, to represent groupings, to denote measurements, quantities and proportions.

4.2.2 Verb Structure

The majority of verb structures are composed of a verb in the passive voice followed by a prepositional-phrase fragment. Passive expressions that are composed of a present-tense verb typically indicate locative or logical relations between elements. They largely function to label data presented in tables, graphs and other sources of information or to identify the basis of an argument. The following concordance lines show examples of verb structures in the passive voice used in the Introduction section:

(10) "These outcomes **are associated with** changing fundamentals and risk appetite of the banking system." (Finance, Introduction, 263)

(11) "However, our study **is based on** an argument or relativity." (Accounting, Introduction 55)

(12) "Additional analyses **are presented in** Section 5." (Accounting, Introduction 76)

The following concordance lines show examples of verb structure in the passive voice in the method section:

(13) "Foreign ownership **is calculated as** the percentage of a firm's outstanding shares held by foreign (non-Korean) shareholders at the end of each year." (Management. Method 305)

(14) "The raw data **are obtained from** publicly available sources such as annual reports, 10-k statements and reports on corporate social responsibility." (Finance, Method 297)

The following concordance lines display examples of verb structure in the passive voice in the results section:

(15) "Specifically, 401 of the 408 main foreign customers listed by SMEs in 2005 **were confirmed at** the end of 2013." (Management, Method 304)

(16) "Participants began the experiment by choosing experimental materials from one of two stacks (labelled A or B), which determined whether participants **were randomly assigned to** the role of current investors or prospective investors." (Accounting, Method, 78)

4.2.3 Prepositional-phrase Fragments

The prepositional-phrase fragments with embedded of-phrases generally denotes logical relationships between two or more aspects of a condition or situation. This finding is in line with the findings of Biber et al. (1999) and Hyland (2008a). The following are examples of prepositional-phrase + of across the Introduction, Method and Results sections.

(17) "The second contribution of the paper is an improvement in the accuracy of the estimation of the effects, since another difficulty in capturing the long-term impacts of exposure to natural disasters is that migration may occur **as the consequence of** the disaster." (Economics Intro 159)

(18) **"In the context of** our hypothesis, if an FX option performs well when the underlying portfolio as a whole is doing poorly, that would make the option a valuable addition to the portfolio." (Finance Method 220)

(19) "However, **with the exception of** South-eastern Europe, maximum values in all regions have declined by as much as half." (Economics Results 200)

In addition to this, prepositional-phrase + of fragments describe other aspects that appear in the BSC. These aspects include processes and procedures, quantity, location, time and measurements.

(20) "In addition, the Basel III framework is **in the process of** introducing a simple leverage ratio to act as a supplementary measure to risk-based capital requirements." (Finance, Introduction 228)

(21) "The average reporting lag is about 54 days, **with a standard deviation of** 12.65 days." (Accounting, Method 73)

(22) "While the effects of top incomes and the middle class remain stable compared to the previous estimates, some of the regressions in Table 5 suggest that individuals **at the bottom of** the income distribution has a similar influence on the redistribution process." (Economics, Results 184)

It is important to note that there is a great number of target bundles under the other prepositional-phrase fragments category. These bundles, which are without of-phrase fragments, express various purposes. Several types of bundles in this category are used to refer to particular information or section in the articles. In addition to this, they are also used to highlight different sections of the research articles and stages of the research process. Examples of these types of bundles are *in the section, in the next section, in the first stage, in the subsection, in the data, in the literature* and *in this study*.

(23) "**In the next section**, we relate online visibility to network theory and motivate our hypotheses about the effects of visibility on digital gifting." (Marketing, Introduction 426)

(24) "**In the first stage** of data analysis, which was similar to Strauss and Corbin's (1998) techniques of open coding, we remained close to our informants' perspectives and word choices." (Management, Method 310)

(25) "The parameters are calibrated to reproduce typical values used in the existing literature or to achieve key targets **in the data**." (Economics Results 108)

It is also interesting to note that there are several bundles which are known as idiomatic phrases or phrases in both types of prepositional-phrase fragments. They include bundles such as *in light of, in the wake of, at the expense of, at the cost of, on the other hand, on the one hand, in relation to* and *with respect to*. The following are examples extracted from the BSC.

(26) "**In light of** these considerations, the overreaching purpose of this study is to examine whether social status signaling via the purchase of environmental goods occur in the case of green hotels." (Management, Introduction 349)

(27) "**On the other hand**, larger firms often face stronger monitoring from investors, regulators and auditors." (Accounting, Method 96)

(28) "Interestingly, our data also offered more dynamic insights **in relation to** have subsidiaries manage the duality of these two opposing demands." (Management, Results 311)

4.2.4 Other Structure Bundles

In the other structures category, (modal/ pronoun) verb/adjective + to-clause fragment is the most frequently used structural pattern in the Introduction and Method sections. The following concordance lines show some examples of lexical bundles of this structural pattern used across the Introduction, Method and Results sections.

(29) "This evidence **can be used to** assess the policy's two fundamental goals of increasing domestic investment and creating jobs." (Accounting Intro 20)

(30) "The presence of heteroscedasticity **may lead to** bias in the standard errors of the estimated coefficients, which in turn may lead to wrong statistical Inferences." (Marketing, Method 459)

(31) "However, households **may be more likely to** purchase in the category due to a bonus premium." (Marketing, Results 458)

5. Conclusion

To sum up, the present study revealed some interesting findings. First, noun-phrase + of-phrase fragment is the most common structure of all three sections. Second, in the Introduction and Results sections, noun structure is the most frequent bundle category. Third, in the Method section, other structure category has the highest proportion of bundles. Fourth, other passive fragment is the least common type of structure in all three sections. Fifth, new

categories are incorporated into Biber's (1999) structural classifications: other noun phrases, other adjectival phrases, verb phrases with first person/third person pronoun, other passive fragments and other verbal fragments. Sixth, in the current study, noun phrase + of-phrase fragment is the most frequent type of structure in all the three sections of the RAs. This finding shows similarity with the findings of Shahriari (2017) who conducted a study on lexical bundles in applied linguistics research articles. However, Cardinali (2015) discovered that Pronoun/ Noun Phrase + Verb +Complement is the most frequently occurring structure in biology research articles. The differences in findings could be disciplinary due to the different fields of study, especially between the hard or pure science subjects and social science subjects. From the pedagogical point of view, the list of lexical bundles of the present study which were generated from research articles from high impact factor journals could serve as model samples for academic writers and significantly contribute to the field of computational linguistics. The structural studies of lexical bundles in BSC showed that these lexical bundles were overly dense with particular grammatical structures, such as sentence fragments, prepositional phrases, verb phrases, and noun phrases. Consequently, it is necessary to place more emphasis on using these grammatical structures in the teaching-learning process. The list of structural patterns, which includes nouns and prepositional phrases that have been identified from the current study, should be implemented in academic textbooks, particularly in the field of business studies for classroom teaching as textbooks play an important role in disseminating academic knowledge for teachers and students. Furthermore, teaching structural patterns in EAP classroom settings is important as it allows learners to convey their thoughts comprehensively and persuasively through writing. It also provides learners the framework for the clear written expression of ideas and improve academic writing by using simple sentences, compound sentences and complex sentences. The features of lexical bundles in terms of structural forms in any particular field of study could serve as the input for developing research writing tools, thus enabling research writers to structure their research paper accordingly.

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