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STRUCTURAL AND FUNCTIONAL TAXONOMIES OF LEXICAL BUNDLES: AN OVERVIEW

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Abstract
The current research work is a descriptive study which focuses on reviewing different taxonomies which have been used to analyse discourse functions and structural patterns of lexical bundles extracted from different corpora. Structural taxonomies proposed by Biber et al. (1999) and Salazar (2014)and functional taxonomies put forward by Biber et al. (2004), Hyland (2008a) and Salazar (2014) have been discussed in detail by the researchers. The current research also makes the abovementioned taxonomies more understandable and applicable especially for studying the structural patterns and functions of lexical bundles.

Key Words: Lexical bundles, structural taxonomy, functional taxonomy

Introduction:
Writing is still a challenging task for novice non-native language learners. It is because these learners face difficulty in choice of suitable words. The selection of words in the right context and in the right combinations is the requirement of these writers. So, it is advantageous forthem to learn word combinations (i.e. lexical bundles) frequently used in specific registers,disciplines and genres (Salazar, 2008). Corpus based language studies have revealed that even the natives often depend on stock of fabricated semi-automatic words' chunks or lexical bundles in their writings instead of constantly making new combinations (Sinclair, 1991). Altenberg (1998) observed that around 80% of the words in London-Lund Corpusformed part of recurrent word combinations,thusit is important for the novice non-native writersto learn lexical bundles in order to improve their writing skills. Just memorizing frequent lexical bundles in a particular genre is not enough, in order to get good command of using lexical bundles in writing novice writers also require to know both the forms and discourse functions of the acquired bundles (Salazar, 2014). In this way the novice language learners can become proficient writers.Zhang et al. (2021) endorse the above mentioned view. Theystate thata good command of using lexical bundles can be indicative of a professional and proficient academic writer and is thus regarded as important skill for student writers, especially EFL student writers, to achieve sustainable growth of writing competence.Such results have led the contemporary researchers of linguistics togive importance to lexical bundles instead of individual words in language learning process (Wray, 2000; Wray & Perkins, 2000). Researchers have proposed different taxonomies that help in classifying and acquiring the dominant forms and discourse functions of lexical bundles. The current study work explains some importantfunctional and structural taxonomies of lexical bundles.

Significance of the Study
The current research work may be of vital importance for the researchers, teachers and language learners. The research will be helpful in identifying and classifying multiple words combinations which are frequently used in different genres. Although traditional word-based approaches to language ignore thesemultiple words combinations, these lexical sequences (lexical bundles) are considered important to achieve native-like and competence, and they are regarded very

essential in language learning and teaching (Coxhead, 2008; O'keeffe et al., 2007; Wray, 2000). Schmidt (1990) recommended that lexical bundles should be conscious. According to him, unconscious learning of lexical bundles cannot help language learnersmaster them so language learners need to learn these bundles consciously in academic disciplines in different contexts. In this context, the current study on the functional and structural taxonomies of lexical bundles can provebeneficial for learning andteaching of lexical bundles.

Literature Review

Over the past few years, researchers and linguists have started utilizing advanced technological means to compile large volumes of text which paved the way for research on naturally occurring language, thus setting up the base of corpus studies for linguistic analysis. Some of the major techniques of analysis that can be carried out in corpus linguistics are concordancing, wordlists or words' frequency counts, cluster analysis, keyword analysis and lexico-grammatical profiles. Frequency count is generally considered to be the key factor in such type of researches but corpus-based researches go beyond the exploration of simple counts of linguistic features. These studies have also uncovered the patterns of multi-word lexical bundles in different genres(Craig, 2008; Damchevska, 2019; Jalali & Moini, 2014; Kashiha & Heng, 2014; Yousaf, 2019). Corpus-based analytical methods are not limited to investigating only the structural aspects of language rather these methods also help the researchers to investigate language use in context i.e. discourse functions of lexical bundles (Beng & Keong, 2015; Hussain et al., 2021; Liu & Chen, 2020; Panthong & Poonpon, 2020). The present study explains some of the important taxonomies that have proved to be useful in exploring the dominant discourse functions andstructural patterns of lexical bundles in the last two decades.Before moving towards structural and functional taxonomies of lexical bundles, it is better to explain the term lexical bundles.

Lexical Bundles

Biber et al. (1999)introduced and popularized this term for the first time. Different researchers used different names for the same term. The other labels for the term lexical bundles areclusters(Hyland, 2008b; Schmitt et al., 2004),recurrent word combinations(Altenberg, 1998; De Cock, 1998), n-grams(Stubbs, 2007a, 2007b) andphrasicon(De Cock et al., 2014). Lexical bundles can be defined as sequences of three or more words statistically co-occur in a register (Biber et al., 2006; Cortes, 2004a) and serve as building blocks in discourse production (Biber et al., 1999). Many subsequent researches (Biber et al., 2004; Bychkovska & Lee, 2017; Cortes, 2004a, 2006; Grabowski, 2015; Hyland, 2008a, 2008b; Jalali & Zarei, 2016; Mbodj-Diop, 2016; Neely & Cortes, 2011; Yousaf, 2019; Zhang et al., 2021) adopted this definitional framework. It must be kept in mind that co-occurrence of lexical bundles in a multiple texts is very necessary in order to avoid idiosyncrasies of an individual writer or speaker. In order to qualify as a lexical bundle, it must occur across five or more texts and in a million words it must be present at least ten times (Biber et al., 1999). They are generally identified empirically by a software program in a large language corpus (Cortes, 2013).The impact of lexical bundles in improving writing skills of the novice learners has already been discussed in the introductory section of current research work but it would be injustice to ignore the impact of lexical bundles on learners' fluency. Thus, the next section deals withimpact of lexical bundles on learners' fluency.

Impact of Lexical Bundles on Learners' Fluency

Many prominent scholars have admitted the fact that lexical bundles or multiword sequences of language improve learners' fluency. Ellis (1996) argues thatthe acquisition of memorized sequences of language helps in improving fluency. The findings of psycholinguistic researches

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(Kuiper, 1995; McGuire, 2009) support this view and reveal that automatic access to formulaic sequences contributes to greater fluency by freeing up memory and processing resources. Some other researches also link greater use of formulaic language to higher scores and better proficiency ratings (Boers et al., 2006; Ohlrogge, 2009)

Structural Taxonomies of Lexical Bundles

Structural Taxonomy of Lexical Bundles by Biber et al. (1999)

As far as the structures of lexical bundles are concerned, most lexical bundles are not complete structural units. Despite their structural incompleteness, lexical bundles have strong grammatical correlates on which Biber et al. (1999) proposed a taxonomy that can prove helpful in classifying the lexical bundles into several structural types. They distinguished 12 structural categories corresponding to academic prose as shown in Table 1.

Table 1: Structural Taxonomy of Lexical Bundles (Biber et al., 1999)

Sr. No.	Structural Category	Examples
1	Noun phrase with of-phrase fragment	the beginning of the, the presence of a, one of the most
2	Noun phrase with other post-modifier fragment	the fact that the, the way in which, an increase in the
3	Prepositional phrase with embedded of-phrase fragment	on the basis of, in the process of, on the direction of
4	Other prepositional phrase (fragment)	on the other hand, in addition to the, in the same way
5	Anticipatory *it* + verb phrase/adjective phrase	it should be noted, it is necessary to, it is important that
6	Passive verb + prepositional phrase fragment	was approved by the, be taken into account, is based on the
7	Copula *be* + noun phrase/adjective phrase	is a matter of , is one of the, is due to the
8	(Verb phrase +) *that clause* fragment	should be noted that, has been observed that, be noted that the
9	(Verb/adjective +) to-clause fragment	is not possible to, was found to be, is interesting to note that
10	Adverbial clause fragment	as we have seen, if there is a
11	Pronoun/noun phrase + *be* (+ . . .)	there is no doubt that, this is not the
12	Other expressions	Than that of the, as well as the

Note: Adapted from Longman grammar of spoken and written English (pp. 1014-1024) by D. Biber et al., 1999, Longman. Copyright by Pearson Education Limited, 1999.

This taxonomy either in original or modified form became the base of many studies and found to have been reliable for structural analysis of lexical bundles (See, for example, Candarli & Jones, 2019; Damchevska, 2019; GEZEGİN, 2019; Güngör & Uysal, 2016; Jalali et al., 2014; Jalali & Moini, 2014; Lee, 2020; Salazar, 2011; Yousaf, 2019)

Structural Taxonomy of Lexical Bundles (Salazar, 2014)

A notable modification of Biber et al.'s (1999) structural taxonomy of lexical bundles was put forward by Salazar (2014), in an investigation offunctions and structures of lexical bundles in a corpus of1.3 million-wordof published native and non-native scientific writing in English. She amended and modified Biber et al.'s (1999) classificationin order to classify the structures of the target bundles more accurately.Salazar (2014) introduced five new categories: *verb phraseswith*

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personal pronoun 'we', other verbal fragments, other adjectival phrases, other noun phrases, and other passive fragments (**Table 2**).

Table 2: Structural Taxonomy of Lexical Bundles (Salazar, 2014)

Noun phrase with *of*-phrase fragment	*a variety of, the association of, the total number of*
Noun phrase with other post-modifier fragment	*no effect on, a role in, the difference in*
Other noun phrase	*lines of evidence, the present study*
Prepositional phrase + *of*	*in the presence of, as a consequence of*
Other prepositional phrase (fragment)	*in addition to, as a result, with respect to*
Passive + prepositional phrase fragment	*are shown in, was associated with*
Other passive fragment	*has been reported, similar results were obtained*
Anticipatory *it* + verb or adjectival phrase	*it is likely that, it has been proposed that*
Copula *be* + adjective phrase	*is consistent with, are representative of*
(Verb phrase or noun phrase) + *that*-clause fragment	*this suggests that, the possibility that*
(Verb or adjective) + *to*-clause fragment	*shown to be, is likely to, to account for*
Adverbial-clause fragment	*as described previously, as seen in*
Verb phrase with personal pronoun *we*	*we found that, we were unable to*
Other verbal fragment	*for review see, does not require*
Other adjectival phrase	*similar to that, not due to*
Other expression	*in order to, as well as*

Note: Adapted from *Lexical Bundles in Native and Non-native Writing*(p. 51) by D. Salazar, 2014, John Benjamins Publishing Company. Copyright by John Benjamins B.V., 2014.

Functional Taxonomies of Lexical Bundles

Functional Taxonomy of Lexical Bundles by Biber et al.(2004)

Research on lexical bundles started with the exploration and investigation of their formal characteristics and their fundamental nature. It was followed by efforts to categorize them in terms of their respective functions they perform in discourse. Cortes(2002)proposed a preliminary functional classification which was later improved by Biber et al. (2004). Their functional taxonomy describes the followingmain functions of lexical bundles: (1) stance expressions, (2) discourse organizers and (3) referential expressions (**Table** 3).

Table 3: Functional Taxonomy of Lexical Bundles (Biber et al., 2004)

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I. Stance expressions	II. Discourse organizers	III. Referential bundles
Express attitudes or assessments of certainty that frame some other proposition	Reflect relationships between prior and coming discourse	Make direct reference to physical or abstract entities, or to the textual context itself
A. Epistemic stance *I don't know if, I think it was, are more likely to, the fact that the* B. Attitudinal/modality stance B1) Desire *if you want to, I don't want to* B2) Obligation/directive *you might want to, it is important to* B3) Intention/prediction *I'm not going to, it's going to be* B4) Ability *to be able to, can be used to*	A. Topic introduction/focus *what do you think, if you look at* B. Topic elaboration/ clarification *I mean you know, on the other hand*	A. Identification/focus *that's one of the, of the things that* B. Imprecision *or something like that, and stuff like that* C. Specification of attributes C1) Quantity specification *there's a lot of, how many of you* C2) Tangible framing attributes *the size of the, in the form of* C3) Intangible framing attributes *the nature of the, in the case of* D. Time/place/text reference D1) Place reference *in the United States* D2) Time reference *at the same time, at the time of* D3) Text deixis *shown in figure N, as shown in figure* D4) Multifunctional reference *the end of the, the beginning of the*

Note: Adapted from "If you look at…: Lexical bundles in university teaching and textbooks," by D. Biber, S. Conrad,& V. Cortes, 2004, *Applied Linguistics*, *25*(3), 371–405.

This functional classification was adopted by subsequent researches (Cortes, 2004a, 2006, 2013), and was modified and expanded by other researchers(Ädel & Erman, 2012; Chen & Baker, 2010; Simpson-Vlach & Ellis, 2010).

Functional Taxonomy of Lexical Bundles by Hyland (2008a)

A notable modification ofBiber et al.'s (2004) functional categorization of lexical bundles was put forward by Hyland (2008a), in an investigation of the frequency, structures and functions of lexical bundles in a 3.5 million word corpus of doctoral and master's dissertations of four discipline and research articles. He expanded and modified Biber et al.'s (2004) framework and introduced some new categories that better represented the functions performed by lexical bundles in a corpus, and came up with a classification that assigns each bundle to one of three broad categories of research, text and participants, which are further divided into several subcategories (**Table 4**).

Table 4: Functional Taxonomy of Lexical Bundles (Hyland, 2008a)

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Research-oriented bundles	Text-oriented bundles	Participant-oriented bundles
Help writers to structure their activities and experiences of the real world	Concerned with the organization of the text and its meaning as a message or argument	Focused on the writer or reader of the text
Location Indicating time/place *at the beginning of, at the same time, in the present study* **Procedure bundles** *the use of the, the role of the, the purpose of the, the operation of the* **Quantification** *the magnitude of the, a wide range of, one of the most* **Description** *the structure of the, the size of the, the surface of the* **Topic** related to the field of research *in the Hong Kong, the currency board system*	**Transition signals** Establishing additive or contrastive links between elements *on the other hand, in addition to the, in contrast to the* **Resultative signals** Mark inferential or causative relations between elements *as a result of, it was found that, these results suggest that* **Structuring signals** Text-reflexive markers which organize stretches of discourse or direct the reader elsewhere in text *in the present study, in the next section, as shown in figure* **Framing signals** Situate arguments by specifying limiting conditions *in the case of, with respect to the, on the basis of, in the presence of, with the exception of*	**Stance features** Convey the writer's attitudes and evaluations *are likely to be, may be due to, it is possible that* **Engagement features** Address readers directly *it should be noted that, as can be seen*

Note: Adapted from "As can be seen: Lexical bundles and disciplinary variation," by K. Hyland, 2008a, *English for Specific Purposes*, *27*(1), 4–21.

Following subsequent researches used this framework and found it reliable (Beng & Keong, 2015; Güngör & Uysal, 2016; Jalali et al., 2014; Jalali & Moini, 2018; Johnston, 2017; Panthong & Poonpon, 2020; Zhang et al., 2021).

Functional Taxonomy of Lexical Bundles by Salazar (2014)

A notable modification of Hyland's (2008a) functional classification was put forward by Salazar (2014), in an investigation of functions and structures of lexical bundles in a corpus of1.3 million words of published native and non-native scientific writing in English. The modification was carried out to classify the functions of the target bundles more accurately.Three broad categories ofHyland's (2008a) classification were maintained, but the subcategories were modified and some new categories were added.In the text-oriented subcategories,*resultative*and *contrastive* functions were substituted by the narrower subcategories *inferential* and *causative, and additive* and *comparative* respectively, and three new subcategories were added: *citation*, *generalization*, and *objectives.*In the research-oriented subcategories, the *topic* subcategory was changed with a new category called *grouping*. In the participant-oriented category, the *acknowledgment* subcategory was added(**Table 5**).

Table 5: Functional Taxonomy of Lexical Bundles (Salazar, 2014)

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Research-oriented bundles	Text-oriented bundles	Participant-oriented bundles
Help writers to structure their activities and experiences of the real world	Concerned with the organization of the text and its meaning as a message or argument	Focused on the writer or reader of the text
Location Indicate place, extremity and direction *at the site, the tip of, on the left* **Procedure** Indicate events, actions and methods *the onset of, was carried out, used to identify* **Quantification** Indicate measures, quantities, proportions and changes thereof *total volume of, a large number of, the ratio of, a decrease in* **Description** Indicate quality, degree and existence *the appearance of, the extent of, the presence of* **Grouping** Indicate groups, categories, parts and order *a wide range of, this type of, the sequence of, a portion of*	**Additive** Establish additive links between elements *on the other hand, in addition to, in concert with* **Comparative** Compare and contrast different elements *as compared with, in contrast to, significantly different from* **Inferential** Signal inferences and conclusions drawn from data *found to be, these results suggest that, we conclude that* **Causative** Mark cause and effect relations between elements *as a result of, is caused by, by virtue of* **Structuring** Text-reflexive markers that organize stretches of discourse or direct the reader elsewhere in text *as described previously, as shown in figure, in the materials and methods section* **Framing** Situate arguments by specifying limiting conditions *in the case of, with respect to, on the basis of, in the presence of, with the exception of* **Citation** Cite sources and supporting data *it has been proposed that, as reported previously, studies have shown that* **Generalization** Signal generally accepted facts or statements *little is known about, is thought to be* **Objective** Introduce the writer's aims *we asked whether, to show that, in order to*	**Stance** Convey the writer's attitudes and evaluations *is likely to, is necessary for, it is possible that, it is clear* **Engagement** Address readers directly *it should be noted that, see Figure 1, as seen in* **Acknowledgment** Recognize people or institutions that have participated in or contributed to the study *a gift from, kindly provided by*

Note: Adapted from *Lexical Bundles in Native and Non-native Writing* (p. 52) by D. Salazar, 2014, John Benjamins Publishing Company. Copyright by John Benjamins B.V., 2014.

The Strengths and Weaknesses of Reviewed Taxonomies

Structural taxonomies proposed by Biber et al. (1999) and Salazar (2014) provide a comprehensive framework for the classification of lexical bundles in terms of their forms or grammatical patterns in academic discourse but their applicability in other discourses has yet to be validated, thus the need is to apply these taxonomies on discourses other than academic discourse. Same is the case with functional taxonomies proposed by Biber et al. (2004), Hyland (2008a) and Salazar (2014). All these functional taxonomies have proved be useful in classifying lexical bundles in terms of their discourse functions in academic texts but the need is apply these taxonomies on other than academic texts. Modifications in the aforementioned structural and functional taxonomies, as mentioned in the above sections, lead us towards the conclusion that there is still room for new structural and functional taxonomies.

Conclusion

The present study focuses on different taxonomies which have been used to analyse forms and discourse functions of lexical bundles extracted from different corpora. Structural taxonomies proposed by Biber et al. (1999) and Salazar (2014) and functional taxonomies put forward by Biber et al. (2004), Hyland (2008a) and Salazar (2014) have been comprehensively discussed by the researchers. The aforementioned structural and functional taxonomies provide a comprehensive framework for analyzing the forms and discourse functions of lexical bundles in academic texts but their applicability in other forms of texts has yet to be validated. The current research also makes the abovementioned taxonomies more understandable and applicable especially for studying the forms and discourse functions of lexical bundles.

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