



# A Corpus Based Study on Shell Nouns in Natural and Social Science Research Articles

Correspondence:	Zahra Rubab < <a href="mailto:zahrajaffri12@gmail.com">zahrajaffri12@gmail.com</a> >	Lecturer, Department of English, Riphah International University, Faisalabad Campus, Faisalabad, Pakistan
	Prof. Dr. Muhammad Asim Mahmood < <a href="mailto:masimrai@gmail.com">masimrai@gmail.com</a> >	Dean, Faculty of Arts and Social Sciences, Government College University, Faisalabad, Pakistan
	Arslan Arshad < <a href="mailto:arslanarshadali1@gmail.com">arslanarshadali1@gmail.com</a> >	Research Associate, University of Lahore, Lahore, Pakistan

## Abstract

This study examined structural and functional analysis of shell nouns in research articles of social and natural science disciplines. The purpose of this research was to conduct an analysis of shell nouns with reference to the lexico-grammatical patterns in the academic compositions of Pakistani research article writers. In this regard, this research utilized both qualitative and quantitative techniques for analysis through Antconc software 3.2.4. The data was randomly selected from 20 research articles that were divided into two groups. The principles of Schmid's (2000) lexico-grammatical patterns, with their functions, were used as an analytic tool for this research. The results revealed that social science writers used lexico-grammatical patterns more frequently with their function in their writing to develop more cohesiveness by following the taxonomy of Schmid (2000) as compared to natural science research article writers.

**Keywords:** cohesion, cohesive devices, lexico-grammatical patterns, research articles, shell nouns

## 1. Introduction

One of the fundamental purposes of writing in an academic situation, is to make such texts as are coherent and durable so as to build up useful correspondence in an academic network. In this regard, the utilization of different cohesive devices has been of extraordinary enthusiasm for researchers and language teachers engaged in the investigation and instruction of academic writing (Connor, 1984; Francis, 1989; Hinkel, 2001; Scarcella, 1984). In addition, cohesive devices are commonly the focal point of classes committed to the enhancement of academic writing abilities of the students of English. ESL students and teachers frequently explore distinctive approaches to make cohesion in writing with the assistance of different lexico-grammatical features, for example, nouns, conjunctions, and adverbial phrases among others. Investigating how these components work in an academic text, to create cohesion, may reveal an insight into new development for the teachers of English for specific purposes and researchers.

As indicated by Connor (1984), the extensive use of lexical cohesion is the main factor in the writings of ESL native researchers. The results of her examination demonstrated that native researchers could carry their ideas with diverse lexical items as cohesive connection in their written work. So also, Scarcella (1984) found that high capability native speaker writers utilized alternative basic structural and pragmatic source for cohesion and coherence more successfully than nonnative speaker writers. Likewise, the texts composed by native speakers with increasingly lexical connection as cohesive device were not so much equivocal but rather more bound together than those composed by non-native speaker writers. In the light of past research on the significance of lexical devices as a cohesive device, the present research centers around a group of lexico-grammatical patterns, abstract nouns, possibly used to create cohesion in the text and characterized as shell nouns. The findings of a study, led by Hinkel (2001), demonstrate that abstract nouns are not accurately utilized by some nonnative writers since they are utilized in obscure and summed up proclamations without respect to the real text referential properties of these nouns. Therefore, the utilization and capacity of these nouns ought to be tended to in detail in the instructing of second language (L2) writing. In addition, the effect as strong connections that these nouns make in text ought to be incorporated into writing guidance (Hinkel, 2004). Just a couple of studies have managed this issue, including the researches by Francis (1986, 1988, 1989) and Flowerdew (2003) which demonstrate that lexico-grammatical patterns (as cohesive devices) should be investigated further to educate L2 writers for they assume an essential part in guidance about the association of the ideas and themes in a text. However, none of these researches introduces an authentic and complete investigation of these nouns in academic writing despite the fact that they stress more on the significance of the convenience and probability of abstract nouns in academic writing. Therefore, this study presents a complete concept of shell nouns as cohesive devices by investigating the social and natural sciences research article texts to elaborate the phenomena of cohesiveness.

## 2. Literature Review

### 2.1 Nouns and Their Functions

Halliday and Hassan (1976) determined five classes and 19 subclasses of the cohesive ties. The five classes include; reference, substitution, ellipsis, combination, lexical emphasis and collocation. Ellipsis and substitution are considered as one. Different corpus-based studies have been conducted to examine these cohesive devices. A few studies concentrated on significant classes of cohesive ties (Ahmad, Shah & Mushtaq, 2019; Ahmad, Mahmood & Siddique, 2019; Halliday & Hassan, 1976), on shell nouns (Aktas & Cortes, 2008), on conjunctive cohesion (Trebit, 2009), on demonstratives (Gray, 2010) and on lexical bundles (Bal, 2010; Jablonkai, 2010; Jalali & Ghayoomi, 2010). One of the classifications that leads to lexical cohesion, is shell nouns. All through the literature, abstract nouns have been characterized and considered by different linguists under various names.

One of the principal definitions, for abstract nouns, was given by Francis (1986) who named them as anaphoric nouns. According to her definition, the function of anaphoric nouns, in content, is to give sign posts to the readers by the assistance of which the writer keeps the plan and creation of content in text together inside a literary textual cohesion. Despite the fact that she essentially centers on the anaphoric function of these nouns in this definition. Later on, she stresses every single co-referential function of these nouns that conveys the idea of naming with



cataphoric and anaphoric functions i.e., where the mark goes before its lexicalization, it will be named as advance label and where it flows its lexicalization, and it will be known as a review and retrospective label or mark (Francis, 2002).

Another definition was given by Ivanič (1991) and these nouns and their functions were characterized as carrier nouns. According to Ivanič (1991), there is a discourse function which is explicit to these nouns. They are carrier nouns on the grounds that they secure short lived meanings which change in different contexts. A couple of instances of carrier nouns given by Ivanič (1991) are idea, jact, jactor, reason, impact, clarification, result, and so forth. Ivanič additionally recommends that these nouns are possibly helpful for dialect students in a scholarly domain since they are not subject-explicit. With respect to the essential functions these nouns perform in a content, Ivanič (1991) clarifies that when they perform anaphoric function these nouns 'embody' going before meaning and turn it into the given data in resulting discourse and when they perform cataphorically their meaning can be found in a clause and they go about as a guidance to find information of a particular type. The writer concludes her paper with a proposition about these nouns. She proposes that these lie some place on a continuum among open and close framework nominals, since they keep their meaning as in their lexicon and dictionary meaning, and yet they have different meanings as pronouns do. In this way, they convey a function of alteration and enumeration, which is normal for open framework nominals, and furthermore another function of cohesiveness, which is commonly normal for close system nominals. Enumerative nouns' title, assigned to these nouns by Tadros (1994), are a collection of general nouns and as Hinkel (2001) demonstrates, they might be a standout amongst other approaches to make cohesion in writings since they have explicit referents in content, to which these nouns are associated. In particular, they are exceptionally regular in academic and research writing since they can be effectively used to build up cohesive links in research and academic composition (Hinkel, 2004). Hinkel (2001) recommends that it is exceptionally valuable to underscore this sort of employments and functions of enumerative nouns or catch all nouns in educating ESL writings. The key principle of cohesive functions of enumerative nouns is to tabulate and arrange themes and ideas, as well as to start an elaboration. In addition, as Tadros (1994) recommends that the enumerative nouns may function as content referential and cohesive devices that can exhibit new substance and build new information or repeat and restate information and material. A comparative definition was proposed by Flowerdew (2003) marking these nouns as singling nouns, that belong to any abstract nouns' class the meaning of which must be made explicit by reference to its context. Flowerdew (2003) presents a few instances of singling nouns i.e., attitudes, assistance, difficulty process, reason, result etc. As author states that these nouns have discourse functions that create cohesive connections across and inside clauses and they are generally utilized in academic and research compositions.

## 2.2 Cohesion as Text and Texture

Each language comprises of etymological units i.e., morphemes, words, clauses, sentences, writings. 'Content' is characterized as a semantic unit of language being used (Stubbs, 2002). This implies that a gathering of the language units cannot frame a content if the connection between them is inadequate with regards to an importance. An accumulation of words, clauses, sentences just turn into a content, when they are attached to one another by importance. To stress this point, Lyons (1995) states that the units of a text is formed, regardless of whether they are sentences or not, will be not just hung together in succession, but rather should be associated in some relevantly suitable way. Therefore, text must not be seen just as a protracted section of different semantically associated sentences, rather it must be one sentence or even a word. A text must contain a specific semantic structure, and this structure is known as cohesion of a text's sentences. In this way, a significant and coherent connection of words and sentences are key parts of a text.

## 2.3 Schmid's Framework for Shell Nouns

Aside from the definitions given for abstract nouns, Schmid (2000) additionally makes a commitment to the literature by thoroughly breaking down these nouns under the name of shell nouns. According to Schmid's (2000) comprehensive depiction, shell nouns are a subcategory of Halliday and Hasan's (1976) general noun, since general nouns cover distinctive classes, for example, human, non-human animate, animate concrete, inanimate concrete, inanimate abstract, place, action and fact.

### 2.3.1 Taxonomy of Nouns

The taxonomy of nouns was developed to categorize nouns in different classes. This taxonomy consists of three major classes i.e., concrete, abstract, and deictic. Furthermore, the abstract class of a noun is further subcategorized into three classes, i.e., shell nouns, adverbial head, and other class of nouns. A concrete noun refers to the nouns that demonstrates physical objects. Nouns are considered to be abstract if they are not touched and seen e.g., student, kit, apparatus. A deictic noun belongs to a particular contextual component. Such kind of nouns suggest direction to the reader regarding the particular part of a text or about extra-linguistic elements of a text i.e., diagram, figures, and charts etc. Deictic nouns develop information within a context. The term shell noun, as set up by Schmid (2000), alludes to abstract nouns that make reasonable conceptual limits by throwing bigger pieces of information into nominal structures (Schmid, 2000). Shell nouns have been known by different other names. In his examination of academic lectures and textbooks, Flowerdew (2003) calls them singling noun, characterized as any abstract noun, the meaning of which must be made explicit by reference to its context. In this way, shell nouns are abstract nouns used incorporate itemized information in an efficient manner. Another type of nouns, in taxonomy, is the adverbial head nouns, which refer to the utilization of discourse markers. Biber, Johansson, Leech, Conrad, Finegan and Quirk (1999) also described this term with reference to place, time, reason, way, and days as an adverbial head noun. The last form of noun taxonomy is the other nouns. The nouns, that are not categorized under the umbrella of shell nouns and adverbial nouns, are classified as other nouns.

Schmid's (2000) shell nouns are a mixture of concrete abstract and factual nouns e.g., idea, question, thought, induction, viewpoint, fact, angle, reality, issue, result, process, cause, and so forth. Schmid (2000) clarifies the function of these nouns by the methods for a metaphor. The metaphor he utilizes refers back to the physical world and thinks about the function of these nouns to be the function of a genuine shell which consists of something to perform a function as shelter for things that would somehow or another effectively be scattered or harmed. The motivation behind why he utilizes this metaphor to clarify the function of these nouns is that it is exceptionally hard to characterize these nouns since they establish a functional linguistics' class which signifies whether a given noun is a shell noun or not, does not depend on unavoidable qualities innate in the noun, however on its utilization. Then again, Schmid's metaphor could also be communicated in a definition like Flowerdew's (2003) who considers shell nouns as abstract nouns the meaning of which is just made explicit in reference to their context. In this sense, shell nouns give the speakers a concept of conceptual shell nouns to utilize them along as they need to express something in discourse. Furthermore, Schmid (2000) introduced three major functions of shell nouns i.e. (1) Semantic Function: this function is relevant to the complex chunks of information. (2) Cognitive Function: this function consists of the temporary function of formation. (3) Textual Function: this function belongs to the concept of linkings. In addition, Schmid (2000) demonstrated three functions of shell nouns in detail which are discussed below:

#### 2.3.1.1 Characterization

Characterization of complex information is one of the elements of shell nouns. Two sections of shell thing phrase, shell head nouns and pre modifiers can understand this process of function (Schmid, 2000) and as indicated by Aktas and Corter (2008), writers use shell nouns to semantically depict and describe a bit of involvement in a general route and for understanding the subtleties of the information reference to the context is basic requirement. The lexico-grammatical designs related with this capacity are 'N+cl' and 'N+be+cl' both with a cataphoric reference. The other example as per Aktas and Corter (2008) is 'a/an/the+N+of' design.



2.3.1.2 Temporary Concept Formation

The concepts and ideas can be expressed by a wide range of open class words. However, explicit ideas are expressed by nouns. There is a consistent connection between full content nouns and the experience they need to express as ideas while ideas cannot be shaped by deictics, therefore shell nouns remain between the two restricting shafts that are full content nouns and deictics. Like full content nouns, they show a conceptual relationship to an explicit intermittent sort of experience, and this idea of formation is made by the repeated utilization of a word to refer to a specific experience (Schmid, 2000) and by enabling pursuers to relate the descriptive information to a solitary nominal expression (Gray, 2010). There is a solid connection among characterization and temporary idea formation. The pattern utilized for this process of function is ‘an/a/the+N+of’.

2.3.1.3 Linkings

So far as the function of linking is concerned, shell nouns resemble with pronouns. For the explanation of shell nouns, one must consider shell content that is communicated in the context or it can be surmised from the context. This work is made by linking the nominal shell with related text that gives the point-by-point information (Gray, 2010). The pattern related with this process of function is ‘th-+N’ which passes on anaphoric reference. The utilization of shell nouns may give the cognitive and linking process of functions to represent this issue, as per Schmid (2000), the shells speak to an impermanent semantic development that is intrinsically connected to what he calls the shell content. Types of shell nouns with examples, as given by Schmid (2000), include: (1) Factual e.g., thing, problem, point, and fact; (2) Linguistic e.g., message, question, report, and news; (3) Mental e.g., belief, notion, idea, and purpose; (4) Model e.g., ability, need, and truth; (5) Eventive e.g., reaction, act, and move; and (6) Circumstantial e.g., area, place, and context.

Schmid (2000) states that the idea of the types of shell nouns (e.g., full content words, pronouns, and shell nouns) has originated from Ivanič (1991). According to Schmid (2000) full content nouns have a potential to portray what speakers need to discuss. The reason is that nouns like teacher, cat, adventure etc. have balanced and rich denotations. In light of their particular meanings, full content nouns and other open class items e.g., modifiers and verbs are the fundamental methods for depicting people, animals, objects, what is more, plants and occasions. Pronoun is another sort with anaphoric function that has an exceptionally constrained potential for the portrayal of what the speakers need to discuss. The individual pronoun e.g. ‘I’, ‘you’, ‘he’ describes their referents just as for a few semantic dimensions i.e., speaker versus recipient versus different roles, human versus non-human etc. Shell nouns, on the other hand, hold a center position between these boundaries. To a specific degree, speakers can in fact use them to portray a bit of understanding and they determine their potential for the portrayal from their denotations. However, nouns that can be utilized as shell nouns ordinarily have abstract and unusual meanings. The ideas made by shell nouns are entirely dynamic. They are of a transitory nature since content changes in situational and linguistic context in which they are used.

Schmid (2000) further states that these types and patterns of nouns (see table 1) are utilized in four lexcio-grammatical patterns where they perform a function of interpretation of the content at the position of anaphoric and cataphoric references. Schmid (2000) defines these references as the interpretation of one expression with its antecedent or background information, which provides the essential information for the expression to fulfil the purpose of interpretation. On the other hand, cataphoric reference is defined as convention of one expression with another expression that follows it. In this way, the resultant expression is an extract of a text that produces the information essential for the interpretation of the following one. Thus, all of these expressions are responsible to create cohesive connection within a sentence. Schmid's (2000) idea of lexico grammatical patterns covers the past research (i.e., Francis, 2002; Halliday & Hasan, 1976).

Table 1: Lexico-grammatical Patterns of Shell Nouns

Function	Pattern	Abbreviation
Cataphoric	Shell nouns + clause / That clause/ to infinitive clause/ wh clause	N + c
	Shell nouns + be= complementing clause	N + be + cl
Anaphoric	Demonstrative adjective (this, that) + shell nouns	Th + N
	Demonstrative pronoun as subject (this, that) + be + shell nouns	Th + be + N

Source: Schmid (2000)

2.4 Realization of Cohesive Devices in Academic Research Article

Some researchers (see e.g., Ahmad, Shah & Mushtaq, 2019; Ahmad, Mahmood & Siddique, 2019; Liu & Braine, 2005; Witte & Faigley, 1981) have discovered a relationship between cohesive devices and writing quality. As per Richards and Renandya (2002), the trouble arises both from producing and sorting out thoughts and making an interpretation of these thoughts into the content. Halliday and Hasan (1976) believed that cohesion and coherence, as the two essential literary components, have for quite some time been perceived as an important element of good composition. It is also believed that exceedingly scored papers incorporate more lexical collocations than do low scored ones (Johns, 1980). They additionally held that lexical cohesion is the most normally utilized classification in research papers, followed by conjunction and reference (Johns, 1980; Meisuo, 2000).

2.5 Lexical Cohesion and Shell Markers as Cohesive Devices in Academic Writing

Halliday and Hasan's (1976), while introducing cohesion theory, state that cohesion occurs when the semantic relations in a text influence it to create a texture in the text. This concept has been investigated by Carrell (1982) who asserts that the idea of cohesion is an intuitive and interactive procedure between the text and the reader as opposed to being situated in the cohesive and coherent text alone. This analysis takes its beginning stage from reading; however, cohesion can also be created in writing. In addition, it manages thoughts regarding textual cohesion, for instance, Hinkel (2004) states that cohesion refers to the relationship of ideas and themes in paragraphs and sentences. Moreover, Hinkel (2004) illustrates the contrast between cohesion and coherence, and characterizes the capacity of cohesion as associating sentences and passages. So also, coherence might be the association of all components that fit together in the text. As indicated by Francis (1989), there is a great emphasis on the teaching of grammatical devices for example, reference, substitution, and ellipsis in the enhancement of writing aptitudes and very little interest is found for lexical cohesion that could be created by a lot of lexical or lexico-grammatical patterns. In another study by Francis (1988), it was observed that language students obviously and much of the time improperly utilized the grammatical devices chosen for the study i.e., students failed to utilize the lexical patterns and devices, and they utilized an exceptional range of abstract nouns over and again. In an investigation led by Connor (1984) to analyze the relationship of coherence and cohesion in advance level ESL students writing in contrast to the writing of native speakers. The system of the examination concentrated on the investigation of cohesion through the amount and nature of cohesive ties in T-units in the writings of native speakers and ESL students. The results demonstrated that the quality and amount of cohesion was not a differentiating factor between the local speakers and the ESL students.

In Scarcella (1984), the principal objective was to see how native speakers utilized cohesive devices to accomplish cohesion and coherence in their writings. The essays, composed by native and nonnative speakers, were divided into proficiency levels and first language foundation, and they were investigated by the scientific classification by Halliday and Hasan (1976) to discover the utilization of cohesive devices including conjunctive ties, lexical ties, and reference ties. The results demonstrated that the quantity of cohesive devices was not a deciding variable for cohesion in text, or maybe, the utilization of alternative structural and pragmatic methods for cohesion and coherence was what

made a text coherent. In addition, high proficiency native writers were more effective than their partners in utilizing diverse cohesive devices since they utilized progressively lexical ties as cohesive devices in their writing. In another research (see Hinkel, 2001) on a native and nonnative speaker’s corpus of academic essays was conducted to decide the explicit contrasts and similarities in the utilization of cohesive devices. The focal point of the investigation was on the middle recurrence rates of utilization of cohesive devices, for example, sentence transition, demonstrative pronouns, and enumerative and resultative nouns. The results demonstrated that even nonnative speaker writers did not utilize a wide range of cohesive connections to compose a text.

Hinkel (2001) recommended that in second language writing guidance, the utilizations and elements of enumerative and resultative nouns, for example, advantage, factor, issue, reason, and stage should be accentuated. Halliday and Hasan (1976) have shown that lexical cohesion is a cohesive effect that is made by vocabulary decision, and general nouns just as shell nouns have a cohesive capacity on the ground that these nouns demonstrate a discrimination among given and new data to make associations in the substance of a text. They additionally clarified the lexico-grammatical cohesive elements of these nouns on a similar line to what Ivanič (1991) has proposed for her carrier nouns, under which shell nouns are also set (Schmid, 2000), may have a cohesive capacity since a general noun is itself a marginal case between lexical items and grammatical cohesive devices.

3. Research Methodology

3.1 Type of Research

This study involves both quantitative and qualitative analysis. Both types of analyses were done under the principles of Schimd (2000) lexico-grammatical patterns with its function as analytic tools adopted for the research. Hinkel’s (2004) list of highly prevalent abstract nouns with cohesive functions (see table 3) was used in this research. Framing of the sentence level analysis was done qualitatively, while word level analysis was carried out quantitatively. For the purpose of word level analysis, Antconc 3.2.4w software was used.

The target content comprised of research articles written by Pakistani research writers that were divided into two major categories i.e., social sciences disciplines (i.e., psychology, sociology, literature, linguistics) and natural science (e.g., botany, zoology, environmental science, and bio informatics) research articles. As the content was divided into two categories, the cluster sampling technique was applied because to select a particular number of research articles from both groups (40 in total. 20 from each group).

3.2 Research Tool

Schmid’s (2000) lexico-grammatical patterns and functional analysis were used as an analytical tool. Lexcio-grammatical patterns are presented in table 1. For the functional analysis of these patterns, Schmid’s (2000) functional categories i.e., characterization, temporary concept formation, and linkings have been employed to investigate the shell nouns’ utilization as a cohesive connection within the research articles of two disciplines i.e., natural and social science.

3.3 Procedure

The investigation of this research consists of the analysis of cohesive devices in constituent with a ‘lexical cohesion’. For this part, the description of the quantitative analysis, as shown in table 2, demonstrates an insight for the analysis of data including the related steps of data analysis.

Table 2: Procedure of Analysis

Research Question	Objective	Method of Analysis	Steps of Analysis
What are the frequencies of the selected shell nouns in the articles of natural and social science disciplines?	To check the frequency analysis of 35 cohesive shell nouns in the articles of natural and social science disciplines?	Quantitative	Analysis of the 35 shell nouns with Antconc software limiting the raw data only to shell nouns type.
Which lexico- grammatical patterns can be frequently recognized in the articles of natural and social science disciplines?	To recognize the most frequent lexico-grammatical patterns in the articles of natural and social science disciplines?	Quantitative	Investigation of the six most frequent shell nouns in the articles of natural and social science disciplines?
How do the shell nouns function in different lexico-grammatical patterns as cohesive devices in the articles of natural and social science disciplines?	To conduct the functional analysis of the articles of natural and social science disciplines?	Qualitative	Investigation of the functions of the six shell nouns in different lexico-grammatical patterns.
Are there any functional differences between the use of shell nouns as cohesive devices in the articles of natural and social science disciplines?	To find functional differences between the natural and social science discipline articles.	Qualitative	Comparison of each noun for its functions in different lexico-grammatical patterns between two corpora. Recognition of the functional differences in two corpora.

Source: Author’s Own Work

4. Results and Discussion

4.1 Quantitative Analysis

By utilizing Hinkle’s (2004) list of highly prevalent abstract nouns with cohesive function (see table 3) were checked in the corpora. The first stage of quantitative analysis was based on the frequency analysis of 35 abstract nouns. The frequency analysis of both corpora was explored through corpus software named as Antconc to determine whether the use of these selected shell nouns was significant or not. The frequencies of selected shell nouns of both corpora were counted by utilizing corpus software Antconc. The results are presented in a table 3.

Table 3: Frequencies of Shell Nouns

Natural Sciences		Social Sciences	
Shell Nouns	Frequency	Shell Nouns	Frequency
Effect	35	Method	45
Result	33	System	40
Fact	25	Process	32
Form	29	Result	20
Type	18	Effect	28

Change	12	Reason	28
System	11	Fact	20
Process	10	Form	16
Problem	9	Problem	16
Approach	9	Change	10
Reason	9	Class	10
Purpose	9	Type	9
Characteristic Form	8	Approach	9
Form	8	Issue	8
Issue	7	Purpose	8
Method	7	Trend	8
Factor	7	Category	8
Feature	6	Event	7
Manner	6	Stage	7
Event	6	Task	7
Stage	5	Challenge	7
Trend	5	Trend	6
Task	5	Phase	6
Category	5	Tendency	6
Challenge	4	Difficulty	6
Subject	4	Subject	5
Tendency	3	Manner	5
Aspect	3	Item	5
Class	3	Feature	4
Difficulty	3	Facet	4
Phase	2	Factor	3
Topic	2	Circumstance	2
Experience	0	Topic	2
Item	1	Characteristics	1
Facet	0	Aspect	0

Table 3 presents the frequency of each shell noun in both corpora. The frequencies of both corpora clearly show that the authors of social science articles used six shell nouns (e.g., effect, result, fact, type, form, and change) more frequently than natural science article writers. The occurrences of most frequent six shell nouns in both corpora are demonstrated in Figure 1.

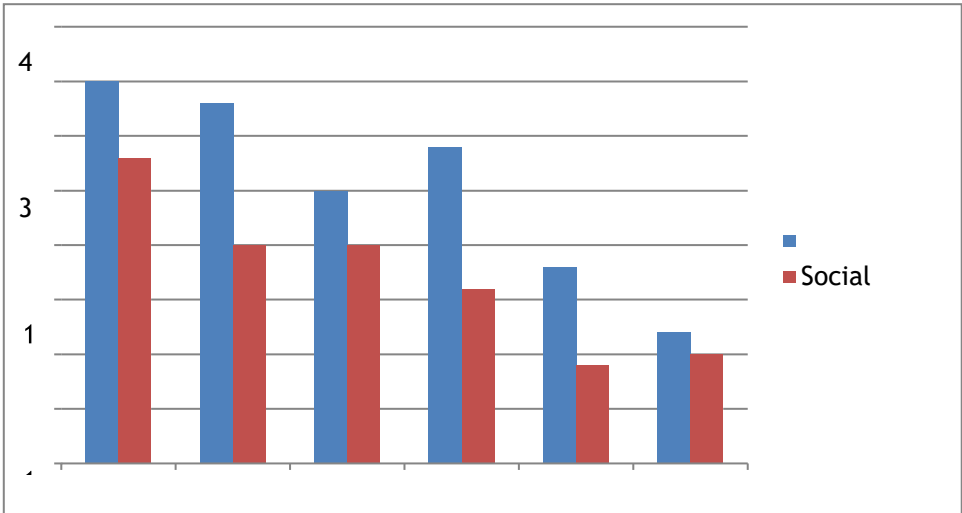


Figure 1: Comparison of Six Shell Nouns

4.2 Structural Analysis

4.2.1 Frequency of Shell Noun ‘Effect’

The most frequently used lexico-grammatical pattern for the shell noun ‘effect’ was the collocation pattern i.e., ‘the+N+of’. The frequency of shell nouns in both corpora is presented in tables 4 and 5.

4.2.2 Frequency of Shell Noun ‘Result’

The second most frequent shell noun was ‘result’. The frequency of this shell noun is presented with comparison in tables 4 and 5 which clearly demonstrate that the most frequent lexico-grammatical pattern in both corpora is ‘the+N+of’ which is similar in the case to another shell noun ‘effect’. The pattern ‘a(n)+n’ is used only by social science article writers but the lexico-grammatical pattern ‘a(n)+N+of’ is used by both writers i.e., natural and social science articles.

4.2.3 Frequency of Shell noun ‘Fact’

There were only two patterns that favoured the shell noun ‘fact’. In this regard, the lexico-grammatical pattern ‘N+clause’ was frequently used by social science article writers than the natural science article writers as illustrated in tables 4 and 5. One of the occurrences of another pattern for this shell noun was observed in the form of ‘the+n’ (i.e., defined as demonstrative adjective + noun). The frequency of this pattern is totally opposite to the other pattern’s frequency. This pattern is most frequently used by natural science article writers.

4.2.4 Frequency of Shell Noun ‘Type’

In both of the corpora (i.e., social and natural science articles), highest occurrence of lexico-grammatical pattern was ‘the+n’. Social science writers used this pattern more frequently than natural science writers. The second pattern of this shell noun was ‘the+n+of’. It was frequently utilized by social science writers only and the pattern of ‘a(n)+n’ was used by natural science writers only. While the writers of social sciences only used the collocation pattern of ‘the+n+of’ and ‘a(n)+n+of’ with regard to this shell noun in their articles and the collocation pattern ‘a(n)+n’ was utilized by natural science writers in their articles.



4.2.5 Frequency of Shell Noun ‘Form’

This shell noun form was utilized most frequently by the writers of social science discipline as compared to natural science article writers. The distribution of lexico-grammatical pattern, with regard to this shell noun i.e., ‘form’, is presented in tables 4 and 5. One of the most frequent lexico-grammatical pattern ‘n-cluase’, ‘the+n’ and ‘a(n)+n’ was used more frequently by the writers of social science articles. On the other hand, the patterns ‘a(n)+n’, ‘the+n+of’ and ‘the+n’ were observed being less frequent pattern with this shell noun in the natural science corpora.

4.2.6 Frequency of Shell Noun ‘Change’

The most frequent collocation patterns, for the shell noun ‘change’, i.e., ‘the+n+of’ and ‘the+n’ were used by the writers of social sciences than natural science writers. While the other two lexico-grammatical patterns i.e., ‘a(n)+n’ and ‘a(n)+n+of’ were used only by the writers of natural science and social science discipline writers avoided this pattern with regard to this particular shell noun i.e., ‘change’.

4.3 Overall Frequency of Social Science Lexico-Grammatical Patterns

In social science articles’ corpora, as identified by the frequency table of shell nouns, the most frequent shell noun result has a very high frequency in the pattern of ‘the+n+of’.

Table 4: Lexico-Grammatical Patterns' Frequency of Social Science Articles

Pattern	Effect	Result	Fact	Type	Form	Change
N + cl	0	0	15%	8%	2%	8%
N + be + cl	10%	0	0	0	0	0
The + be + n	0	0	0	0	0	0
The + n	18%	15%	25%	9%	35%	21%
The + n + of	20%	56%	0	7%	18%	40%
A(n) + n	5%	10%	15%	0	14%	9%
A(n) + n + of	12%	8%	40%	10%	0	12%

Table 4 shows that lexico-grammatical patterns ‘the+n+of’ and ‘the+n’ have been most frequently used with anaphoric function. Furthermore, the most frequent shell noun, for these patterns, as utilized by social science article writers, is ‘result’.

Table 5: Lexico-Grammatical Patterns' Frequency in Natural Science Articles

Pattern	Effect	Result	Fact	Type	Form	Change
N + cl	0	0	0	0	0	0
N + be + cl	0	0	0	0	0	0
The + be + n	0	0	0	0	0	0
The + n	0	15%	12%	3%	15%	15%
The + n + of	8%	7%	10%	0	6%	26%
A(n) + n	2%	0	0	10%	8%	12%
A(n) + n + of	0	6%	0	0	0	4%

According to the table 5, the most frequently used shell noun by the natural science article writers is ‘change’, and ‘a(n)+n’ pattern has been frequently used to express the shell noun ‘change’. While, the writers of natural science did not utilize the patterns i.e., ‘n+cl’, and ‘n+be+cl’ as ‘shell noun phrase+be+cl+that clause’, to infinitive clause, wh clause with cataphoric reference. The other pattern was ‘the+be+n’ as demonstrative pronoun i.e., subject this, that +be+shell noun with anaphoric reference in their articles.

4.4 Functional Analysis

Schmid (2000) introduced three functions of shell nouns such as, characterization, temporary concept formation and linking. These functions were observed in both corpora i.e., natural and social science articles. Details are given below.

4.4.1 Characterization

The first function of lexico-grammatical pattern is characterization. The writers of social science articles utilized this function effectively with whole lexico-grammatical pattern. The patterns of this function are ‘n+cl’, ‘n+be+cl’, ‘the+n+of’, ‘/an+n+of’ which are most frequently utilized by social science article writers. The examples, taken from social and natural science corpora, are presented in tables 6 and 7.

Table 6: Examples of Lexico-Grammatical Patterns from Social Science Articles

Pattern	Example
N + cl	In fact there can be no divine revelation.....
The + n + of	The result of both prior experience and learning.....
A + n + of	A form of social practice.....
An + n + of	An effects of the findings.....

Table 7: Example of Lexico-Grammatical Patterns from Natural Science Articles

Pattern	Example
A + n + of	A type of disability which has many type.....

As table 7 shows, the writers of social science articles utilized ‘characterization’ completely whereas the writers of natural science utilized only one lexico-grammatical pattern for this function i.e., ‘a+n+of’ with the purpose of characterizing the piece of information efficiently.

4.4.2 Temporary Concept Formation

The second function of lexico-grammatical pattern is ‘temporary concept formation’. This function refers to the repetition of different patterns to convey a specific experience. Therefore, it has unique and strong relationship with the concept of characterization. This function is also associated with the involvement of cognitive skills to develop a word in mind relevant to the concept. In this regard, social science article writers used two basic patterns of this function while natural science article writers used only one pattern of this function as demonstrated in tables 8 and 9.

Table 8: Examples of Lexico-Grammatical Patterns from Social Science Articles

Pattern	Example
The + n + of	The result of both prior experience and learning.....
A + n + of	A form of social practice.....
An + n + of	An effect of findings.....

Table 9: Examples of Lexico-Grammatical Patterns from Natural Science Articles

Pattern	Example
The + n + of	The change of the two properties of acrylic-based polyurethane.....

It is possible to say (in the light of results presented in tables 8 and 9) that in the corpora of social science articles, there are most distinct frequencies of temporary concept formation than in natural science articles’ corpora. This function has very strong relationship with characterization, because both are responsible to refer to experience. Furthermore, the writers of natural science may have found it difficult to use this function effectively in their writings because of its cognitive aspect. On the other hand, the social science article writers have highly linked with cognitive aspect behind the structure they have utilized in their articles.

4.4.3 Linking

This function is relevant to the contextual aspect of writing in which words create linking function that depends on the material they carry in the context. The lexico-grammatical patterns, linked with this function, are ‘the+n’ and ‘the+be+n’. The writers of social sciences used both of these patterns in their writing while natural science writers only utilized one pattern of this fnction as depicted in tables 10 and 11.

Table 10: Examples of Lexico-Grammatical Patterns from Social Science Articles

Pattern	Example
The + n	The fact is that before producing a text.....
The + be + n	The form may be merge into this.....

Table 11: Examples of Lexico-Grammatical Patterns from Natural Science Articles

Pattern	Example
The + n	The fact is that concentrations of toxic metals increase.....

In this way, it can be said that the most frequent lexico-grammatical pattern with three functions introduced by Schmid (2000) is highly utilized by the writers of social science articles to create cohesiveness while the writers from natural science discipline have used less patterns and function in their articles.

5. Conclusion

This study examined the structural and functional categories of shell nouns in research articles of social and natural science disciplines. The result indicated that out of 35, social science writers utilized six shell nouns (i.e., effect, result, type, change, fact, form) most frequently. In this way, social science article writers frequently used three lexico-grammatical patterns such as ‘n+cl’, ‘the+be+n’, ‘the+n’ with their function of characterization, temporary concept formation and linking to create more cohesive writings. On the other hand, the writers of natural science articles most frequently utilized only one pattern of Schmid’s (2000) shell nouns’ category that was; the+n’ with the function of linking and another one was ‘a+n+of/an+n+of’ with the function of characterization. As Schmid (2000) states that shell nouns carry two naïve linguistic phenomena i.e., the first one is that it performs three basic functions of cohesiveness such as characterization, temporary concept formation, and linking which equally belongs to different linguistic elements to produce more cohesive writings, and the second reason is that shell nouns perform this function by creating an effective balance between conceptual stability and informational flexibility. Therefore, it can be concluded that social science writers use lexico-grammatical patterns more frequently with their function to develop more cohesiveness in their articles by following the taxonomy of Schmid (2000) rather than natural science article writers.

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