Syntactic Structures in Research Article Titles from Three Different Disciplines: Applied Linguistics, Civil Engineering, and Dentistry

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Abstract

Deducing what a paper is about, titles are considered as the most important determinant of how many people will read the article. Therefore, studying the use of different syntactic structures and their rhetorical functions in titles is of great significance. The current study was set to investigate these structures used in research article titles in three disciplines of Applied Linguistics, Dentistry, and Civil Engineering. To this end, 420 research articles were randomly selected from four reputable journals in each field and their titles were analyzed based on Dietz's (1995) taxonomy for syntactic structure of article titles. The findings of the study indicated that, although there are some similarities in title structures, there are some discipline specific differences. Such differences observed not only in title components, but also in title length and style. These differences reflect the academic conventions of title construction in different disciplines; moreover, they show communicative or rhetorical features emphasized in characterizing the nature and content of research in that discipline. These findings suggest several courses of action for different members of the English for Specific Purposes community.

Keywords: article titles, English for specific purposes, syntactic structures, title components, title style

1. Introduction

Titles, though a small part of the text, play a major role in attracting the attention of readers; therefore, they deserve to be investigated thoroughly. A title creates identity for any academic piece of work. Actually, without titles academic endeavors would find no space in the intended discourse community; the main purpose of a title is, thus, to attract readers and persuade them to read the whole document. The better a title is, the more easily readers can decide to read something. Titles are, in fact, first impressions and they ought to be well presented since "first impressions are strong impressions'' (Day, 1994).

Since 1990s, there has been a particular interest in genre-based analysis of different types of texts. This approach, mainly derived from discourse analysis, has been used in the field of English for Specific Purposes (ESP) extensively (Bhatia, 2008; Dudley-Evans, 1994; Hyon, 1996; Martín & León Pérez, 2014; Swales, 1990; Wood, 1982, to name just a few). Doing genre based studies, researchers paid careful attention to research articles (RAs hereafter), because they are considered as the main vehicle for scholarly communication and circulation of academic knowledge (Peacock, 2002). Since scholars and scientists need to communicate their ideas and findings in their academic community, they need to have a full grasp of the discourse community's conventions. In this regard, RAs are considered as the main vehicle for scholarly communication and circulation of academic knowledge (Peacock, 2002). RAs are, in fact, gateways for exchanging knowledge in academic communities. This has turned RA into a high-status genre to be examined in various studies (Biber & Conrad, 2009); hence, a need to supply models of academic and scientific texts for them has increased the interest to conduct genre based studies on RAs (Martin, 2003).

After Swales' (1990) book on genre analysis, there has been considerable interest in studying RAs from different perspectives. Accordingly, both macro and micro structures have been investigated, i.e., the studies focused not only on linguistic features such as voice (Tarone, Dwyer, Gillette, & Icke, 1998), tense (Burrough-Boenisch, 2003; Salager-Meyer, 1992) and pronouns (Kuo, 1999) but also on the major sections of RAs like   abstract (e.g., Cross & Oppenheim, 2006; Marefat &

Mohammadzadeh, 2013; Martin, 2003), introduction (e.g., Habibi, 2008; Jalilifar, 2010a; Keshavarz, Ataei, & Barzegar, 2007; Mahzari & Maftoon, 2007; Samraj, 2002;), method (e.g., Lim, 2006; Peacock, 2011), result (e.g., Brett, 1994; Thompson, 1993; William, 1999) discussion(e.g., Amirian, Kassaian,& Tavakoli, 2008; Amnuai1 & Wannaruk, 2013; Basturkemn, 2012; Fallahi Moghimi & Erzi, 2003; Jalilifar, Hayati, Namdari, 2012; Peacock, 2002) and conclusion (e.g., Yang, & Allison, 2003). Compared to other sections, titles have received little attention in the mainstream of RA studies. However, in the last three decades due to the growing interest in studying titles, they have been studied in different academic genres, such as review papers (Soler, 2007), dissertations (Dudley-Evans, 1984), and research articles (Goodman, 2000; Haggan, 2004; Wang & Bai, 2007).

Today, specifically, with the advent of online publication, scholars often search for the relevant RAs they look for, only by surveying the table of contents of academic journals in specific disciplines. Illuminating the study by highlighting its most crucial points, good titles often catch the eye of readers before the content of the articles is completely read. To specify the crucial role RA titles play, Soler (2007, p.91) mentioned that "titles in science mirror a set of requisites that are crucial to the construction, communication, and progress of new knowledge". Swales (2003) also believes that an RA title is both ''front matter and summary matter'' (p.179); i.e., a title should not only summarize the main content of the paper, but also convince others to read the RA. In fact, reading the title of an RA, the readers decide whether to continue reading or put it aside.

Syntactic structures of tittles can play a crucial role to effectively present the distinctive content of the articles; therefore, they need to be investigated thoroughly. Different studies have been conducted in analyzing RA titles syntactically considering such variables as structural constructions (e.g., Haggan, 2004; Soler, 2007; Wang &Bai, 2007), the length of titles (e.g., Anthony, 2001; Haggan, 2004), and titles in different genres (e.g., Soler, 2007). Researchers adopted both mono disciplinary and cross-disciplinary approaches to investigate academic titles from different perspectives. Cross disciplinary studies, however, lead to crossing of the boundaries of disciplinary research in ESP studies, hence they open new

horizons in interpreting the existing phenomena by paying attention to similarities and differences. Such studies help us integrate new knowledge and make innovations and bring novelty in language research (Herieg, 2011).

Various cross-disciplinary studies on RA titles have been conducted to investigate various issues including syntactic structures. Buxton and Meadows (1977) was one of the earliest studies in this trend. They studied RAs from *natural* and *social sciences*, and reported some differences in the structure of RA titles from different disciplines. During the same year, Fortanet, Coll, Palmer, and Posteguillo (1997) analyzed not only the structure but also the content of 200 RA titles in Computer Science, Applied Linguistics, Business, Economics, and Chemistry. They reported significant differences in use of different syntactic structures in these disciplines. Such differences were reported in verbal constructions, use of articles, and even in content of RA titles from different discipline (As cited in Salager-Meyer & Ariza, 2013). Since then, researchers continued their investigations on syntactic structures of RA titles. Haggan (2004), Soler (2007), and Wang &Bai (2007) are among the most influential empirical investigations on syntactic structures of titles in different disciplines or different genres.

Haggan (2004) investigated syntactic differences between RAs in science and linguistics. Based on a detailed analysis of 751 RA titles in linguistics, literature, and science he reported some syntactic differences. Later, trying to have a more comprehensive view on the issue, Lewinson and Hartley (2005) studied thousands of titles of academic publications in different disciplines in series of studies. They reported differences not only in structure and length but also in content of titles in different genres namely books and RAs. They also found out that scholars' preferences in using different punctuations in titles vary by different discipline.

Then, Soler (2007) not only studied syntactic structures of titles in two contrasting fields of biological sciences and social sciences, but also emphasized two genres of research papers and review papers. He identified four main syntactic structures used in titles: nominal, question, full-sentence, and compound constructions, and concluded that there are some differences not only between disciplines but also between the two selected genres.

The aforesaid clearly emphasizes that the field called "titleology" (Biacchi 2003, as cited in Soler 2011, p. 124) has considerably grown since its creation. As Soler (2011) pointed out, the field has been diversified through an extensive range of topics addressed by applied linguists, information scientists and psychologists. Titles of various genres, including research articles, have been described from different perspectives; based on pedagogical, linguistic, diachronic, and scientometric approaches, different features were selected for investigation.

Most of these studies, however, have examined only a limited number of features. Lewison and Hartley (2005), and Ball (2009) for example, studied a massive number of titles from various journals in different disciplines, but their study was restricted to a few features such as the number of words and use of colons or the use of question marks. Even if the scope is wider, the disciplines are limited; Gesuato (2008), for instance, conducted a comprehensive study and analyzed titles of books, dissertations, journal articles, and conference proceedings articles, but only within Applied Linguistics. The problem with most cross-disciplinary studies is that many of them reach conclusions based on a very small sample, or merge several disciplines together as, for example, "science" (like in Haggan 2004).

Reviewing the available literature, the researchers found out that empirical research on syntactic structure of RA titles needs to be expanded. There is still a lack of detailed analysis of syntactic structures and their rhetorical functions in RA titles in specific disciplines. Most of the studies have reported the presence of different syntactic structures in RA titles from different disciplines, but they did not carry out in-depth investigation on the existing differences; in fact, they just talked about similarities and differences without paying attention to the rhetorical functions of the syntactic structures and the reasons for which similarities and differences were caused. Moreover, according to Swales (2003), different sections of RAs such as introduction, method, results, and discussion have been studied as a whole and in details considering features such as tense, voice, personal pronouns, etc.; however, RA titles have not received due attention in the mainstream of RA studies. Although Swales (2003) clearly warned about the

special need of scientific studies on RA titles, the problem has still remained unsolved.

Based on what mentioned above, the present study was conducted to investigate the structural construction of titles in three different disciplines of Applied Linguistics, Dentistry, and Civil Engineering to find out whether the structural construction of titles and their function are a key distinctive feature between RA titles in different disciplines. Moreover, the researchers hope to reach conclusions to find the syntactic structures that scholars frequently use to meet the essential requirements of RA titles, to help novice researchers, practitioners, and students who wish to publish their RAs in prestigious journals, and to help ESP teachers by presenting useful advice for title writing. Accordingly, the research questions addressed in this study were as follows:

1. Do structural constructions of titles and their functions create distinctive features among RA titles in different disciplines?
2. What are different rhetorical functions of the syntactic structures used in RA titles in different disciplines?

2. Method

Design

This text-analysis study was set to analyze syntactic structures of 420 RA titles in three disciplines of Applied Linguistics, Dentistry and Civil Engineering published in reputable and authoritative journals indexed in high credit websites such as Elsevier and Sage since 2010. First, the selected articles were analyzed based on a framework developed by Dietz (1995, as cited in Bush-Lauer, 2000). Then quantitative and qualitative analyses were carried out to shed light on the findings. This taxonomy not only focuses on different title components, but also on different title styles; consequently, it enabled the researchers to have a more detailed look at functional and rhetorical aspects of using different syntactic structures in titles. The study was primarily quantitative, however, qualitative analysis of the data led to more comprehensive views towards different rhetorical functions of each structure in RA titles.

Material

In this study three fields of Applied Linguistics, Civil Engineering, and Dentistry (regardless of their sub branches) were focused. The reason behind this selection was Hyland's (2000) discussion on disciplines in terms of hard versus soft, distinguished by their structures of knowledge and intellectual inquiry to be revealed in rhetorical conventions of the discipline. He, however, suggests that this is not the matter of dichotomy of being hard or soft, but that the disciplines are situated on a continuum between the two extremes of 'soft' and 'hard'. Hyland emphasizes that disciplines are placed on the scale in relation to each other according to discourse features; thus, disciplines develop specific conventions to reinforce their approaches to knowledge. By selecting these three distinct disciplines the researchers tried to get a more comprehensive view of this continuum.

Consulting several scholars in each field, and considering such issues as impact factors and ranking lists, the researchers selected these twelve journals in Applied Linguistics, Civil Engineering, and Dentistry (four journals in each discipline).On the one hand, they are internationally prestigious, authoritative and reputable journals in each discipline; on the other hand, they publish RAs on a wide variety of major issues in all the three selected disciplines. To collect data for each discipline, 35 articles were randomly selected from each journal; i.e., for each discipline 140 articles were analyzed. In order to eliminate the effect of changes which might be caused due to the change of language use during the time, all selected articles were published in a five year period (2010-2015). Table 1 shows the information about the title corpus, including journal title, and number of items selected for each discipline.

Table 1. Information about the title corpus

	Journal	**Number of titles**
Applied Linguistics	Journal of Applied Linguistics	35
	Second Language Research	35
	TESOL Quarterly	35
	The Modern Language Journal	35
Dentistry	Dental Clinics of North America	35
	Dental Materials	35
	Journal of Dental Research	35
	Journal of Dentistry	35
Civil Engineering	Building and Environment	35
	Construction and Building Materials	35
	Engineering Structures	35
	Soils and Foundations	35

Procedure

First, the titles were analyzed based on a taxonomy adapted from Dietz (1995, as cited in Bush-Lauer, 2000), then quantitative and qualitative analyses were carried out. The framework is presented in Figure 1.
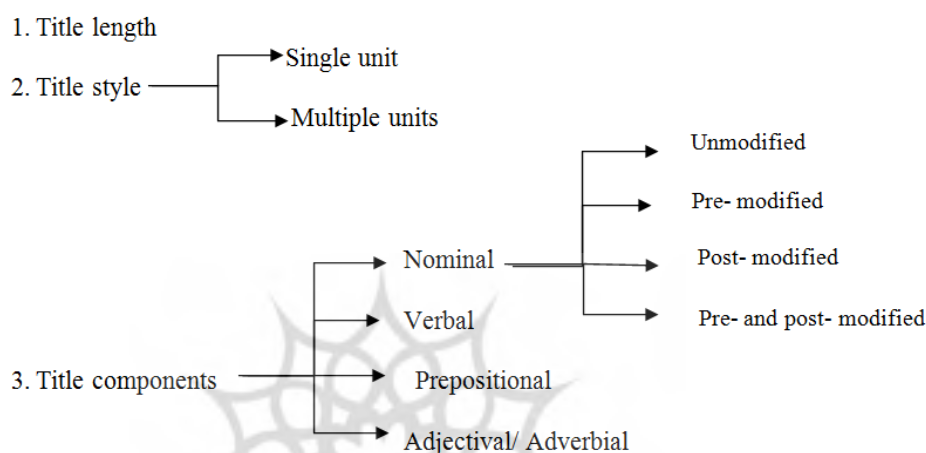

Figure 1. A framework adapted from Dietz (1995) to analyze titles' syntactic structures

To know the title length, the number of words in the titles was counted, and in order to recognize the title style, the constituent parts of titles were considered. To analyze the components of titles, however, syntactic structure of the titles were taken into account; in fact, the instances of each structure were identified and counted. During the data analysis procedure, the researchers realized that syntactic structures in each constituent part of a multiple unit title can be different. They found out that double counting of structures in multiple unit titles and complete titles could make the calculation of the frequency of each structural category confusing. Therefore, they decided to analyze single unit and multiple unit titles separately; therefore, in the results section, the numerical analysis of the data is carried out in two separate sections of single unit and multiple unit titles (except for the title length where this fact does not play a role). In order to analyze the constituent elements of the multiple unit tittles, the researchers used Anthony's (2001) classification of compound constructions. His categorization encompasses five types of Name-Description, Description-

Name, Topic-Description, Topic-Scope, and Topic-Method which enabled the researchers to closely investigate the relationship between units of titles.

For considerations of reliability and to minimize the risk of subjectivity, data analysis procedure was carried out by the researchers twice, with a three weeks interval. In order to complete data analysis procedure, experts in linguistics and specifically in syntactic argumentations were consulted when it was necessary.

3. Results and Discussion

3.1 Title length

As mentioned earlier, the length of titles was measured in number of words. For this reason, a typographic definition of word was used. Based on this definition, words were considered as strings of letters preceded and followed by spaces or punctuation marks; therefore, capitalized abbreviations and non-hyphenated compounds were considered as a single word. For example, the title *Sodium Fluoride Inhibits MMP2 and MMP9* was regarded as a six word title and *The False- friend Effect in Three Profoundly Deaf Learners of French* as an eleven word title. To measure the length of titles count of words in each title was carried out using Microsoft Word. Table 2 shows the total number of title words, and the average number of words per title across the three selected disciplines.

Table 2. Title length across disciplines

	Applied Linguistics	Dentistry	Civil Engineering
Number of words	1804	1454	1896
Average words	12.88 words	10.38 words	13.54 words

It can be seen from Table 2 that Dentistry RA titles are the shortest in length compared to the titles in other two disciplines. Since the tiles were not very long and the range of average number of words in three disciplines was 3.16, it can be concluded that this difference among the discipline should be seriously considered. In fact, the researchers concluded that title length could be considered as a disciplinary feature. This verifies Swales &Feak's (1994) claim that title length directly depends on the discipline. At

the same time, this is in contrast with Soler's (2007) and Nagano's (2015) findings where they asserted that RA titles are longer in medical sciences than in social sciences. One reason behind this fact is that in Dentistry RA titles more compound words are used than in other two disciplines; moreover, the number of multiple unit titles in Dentistry RA titles was less than the others which caused production of longer titles. Another reason may lie in the fact that for RA titles in medical sciences providing detailed information on the study is less required than in social and hard sciences.

3.2 Title style

Another feature of titles considered in this study was the number of units each title was made up of. Consider the following two examples:

Identity and Activism in Heritage Language Education

Uptake, Modified Output, and Learner Perceptions of Recasts: Learner Responses as Language Awareness

The first is a single unit title; i.e., the whole title is presented in one part only; the second example, on the other hand, is a multiple unit title. Such a title is presented in more than one unit which are linked by an appropriate punctuation mark, usually a colon. Two unit titles are the most frequent form of multiple unit titles.

Haggan (2004) believes that multiple unit titles are the common type of titles; however, the detailed analysis of the syntactic structures of the RA titles in this study showed that single unit titles were used much more frequently than multiple unit titles. Table 3 shows the distribution of titles in two different styles.

Table 3. The frequency and percentage of single and multiple unit titles in three disciplines

	Applied Linguistics		Dentistry		Civil Engineering		Total	
Style	n	%	N	%	n	%	n	%
Single unit	58	41.42 %	119	85.05 %	130	92.85%	307	73.09%
Multiple unit	82	58.57 %	21	14.95 %	10	7.15%	113	26.9%

There were quite a spread among disciplines with multiple-unit titles being more common in Applied Linguistics; in fact, multiple unit titles were more frequent and diverse in Applied Linguistics RA titles than in the two other disciplines. This is in consistence with Hartley's (2007) finding that multiple unit titles abound in the disciplines of arts and humanities. This may also relate to the issue of providing more detailed information in RA titles for social and hard sciences than in medical sciences. In fact, in most of the multiple unit titles the first unit of the title provides general information about the study, while the rest share more details about the scope of the study, the subjects, methodology, etc.

As previously mentioned, in order to prevent double counting of structures in multiple unit titles the remaining results are presented in two sections of single unit and multiple unit titles

A. Multiple unit titles

In Applied Linguistics research the complicated relationships among a number of key elements such as participants, data sources, social context, scope, method, etc. have been systematically investigated; thus, in addition to a general topic, the indication of a specific research focus in titles is often needed. The reason why multiple unit titles were frequently used in Applied Linguistics is probably that this structure gives the opportunity to writers to construct titles with two main parts, often the research topic and a specific aspect of research. In other words, constructing titles, Applied Linguistics researchers tend to indicate the topic of their study in one part of the multiple unit title, and present the distinctive feature of the study in the other part.

Another issue considered in analyzing multiple unit titles was the rhetorical relationship between the constituent elements of the titles. Based on Anthony's (2001) classification, the analysis of the two parts of all multiple unit titles identified three main types of combinations (no instances of Name-Description and Description-Name were found). Therefore, in all titles under investigation in the present study topics were pivot parts narrowed by providing methods, scopes, and descriptions of the research studies. Each of the cases is illustrated as follows:

A Culture of Collaboration: Meeting the Instructional Needs of Adolescent English Language Learners (topic-scope)
Dental Implants in the Eye of the Public: A Qualitative Study (topic-method)
Bilingual Word Recognition in Deaf and Hearing Signers: Effects of Proficiency and Language Dominance on Cross-language Activation (topic-description).

The table below illustrates these rhetorical combinations in multiple unit tiles from different disciplines.

Table 4. Rhetorical combinations in multiple unit titles in the three disciplines

	Applied Linguistics		Dentistry		Civil Engineering		Total	
	n	*%*	n	*%*	n	*%*	n	*%*
Topic-scope	24	29.26%	3	14.28%	1	10%	28	24.77%
Topic – method	10	12.19%	8	38.09%	4	40%	22	19.46%
Topic - description	48	58.53%	9	42.85%	5	50%	62	54.86%

As shown in the above table, Topic-Description combinations had the highest frequency, which showed that authors need to indicate a general research topic accompanied by an explanation about how the topic was addressed in their study. Parts of a compound title provide this opportunity for the authors to include both the general topic of a study and its specific content which distinguishes the study from other studies in that specific area. Examining the two constituent parts of multiple unit titles in a specific discipline, therefore, may reveal the aspects of research that are perceived crucial or distinctive in that specific discipline.

A comparison of the constituent elements of multiple unit titles in different disciplines revealed that some of these combinations may be discipline-specific. For instance, topic-scope was most frequently used in applied linguistics RA titles. One reason behind this might be the fact that Applied Linguistics links the study of language (Linguistics) with the

teaching and learning of languages; therefore, researching the structure of language involves several areas. In fact, it is an interdisciplinary field of research primarily seeks for the solutions of linguistic problems. It provides not only descriptive but also theoretical foundations for empirical investigations to address language- related issues. Thus, in order to choose an appropriate and informative title for their research articles, writers need to inform readers of their research site, social context, or participants of the study in titles.

On the other hand, topic-method was not used frequently in Applied Linguistics RA titles but in Dentistry and Civil Engineering. It can be inferred that in hard sciences and medical sciences the way through which a phenomenon is investigated plays a more crucial role than in social sciences. This leads one to conclude that different structural configurations of titles may be caused by discipline influences and specific genres. According to Bazerman (1997), genres as frames of *social action* and *environments of learning* provides specific forms for the community members to interact, by shaping the way they think; therefore, the titles of these three different disciplines may possess distinct communicative purposes which are realized through a specific structure for a specific community.

B. Single unit titles

In single unit titles, the most recurrent construction corresponded to the nominal group construction, followed by verbal and prepositional structures, a phenomenon observed in all the disciplines analyzed. No incidence of adjectival/adverbial structures was found. Table 5 shows different syntactic structures used in RAs titles in different disciplines.

Table 5. The frequency and percentage of syntactic structures in single unit titles in the three disciplines

	Applied Linguistics		Dentistry		Civil Engineering		Total	
	n	%	n	%	n	%	n	%
Nominal	40	68.96%	94	78.99%	122	93.84%	250	86.20%
Verbal	17	29.31%	14	11.76%	7	5.70%	38	13.10%
Prepositional	1	1.72%	1	0.84%	1	0.76%	2	0.68%

This result clearly corroborates those of previous research on RA titles that found a marked preponderance of nominal constructions over other

structures (Busch-Lauer, 2000; Haggan, 2004; Jalilifar, 2010b; Soler, 2007; Wang & Bai, 2007, to name only a few). Looking at the matter from a functional grammar perspective (Halliday, 1998), the researchers found the reason for dominance of nominal constructions in the need to concisely name complex issues and processes in titles. The following section is devoted to discussion on the RA titles components.

3.3 Title components

A. Nominal structures

Nominal titles constituted more than three-forth of the titles in the corpus, not including those that form part of the compound titles. The remarkable ability of nominal structures to compact information in an economical way through various pre- and post-modifiers (Wang &Bai, 2007) makes them more informative and explanatory than other structures (Yakhontova, 2002). RA writers, thus, prefer to make use of this advantage.

The functional-systemic perspective on nominalization (Halliday, 1994; 1998) also explains the reason that nominal titles are important and prevalent in academic writing. He believes that nominalization allows writers to provide a lot of information in a nominal group structure and create cohesion as well. In fact, the authors can pack more lexical content in a nominal title, which mainly depends on using pre- and post-modifiers. As Soler (2007) indicated, "the straightforward materialization of informativity is evidenced through a piling up of pre- and post-modifiers, which enables scientists to account for findings synoptically" (p. 98). The heads in nominal titles usually function to inform readers of the general focus of study and they often need further specification (Wang & Bai, 2007); in fact, they often need to be specified. For this reason, the researchers analyzed the kinds of modifiers in nominal constructions. The four following titles are good examples of different kinds of nominal constructions in this study:

Oral Cancer Detection (unmodified)

Assessment and Management of Dental Erosion (post-modified)

Transactional Identities (pre-modified)

Numerical and analytical investigation on the dynamic buckling behavior of glass columns under blast (pre-and-post modified)

The following table indicates the kinds of modifications presented in RA titles in different disciplines.

Table 6. The frequency and percentage of nominal constructions in single unit titles in the three disciplines

	Applied Linguistics		Dentistry		Civil Engineering	
	N	%	n	%	n	%
unmodified	1	2.5 %	6	6.38%	0	0
Pre-modified	2	5 %	6	6.38%	0	0
Post-modified	23	57.5%	54	57.44%	67	54.91%
Pre- and post-modified	14	35%	28	29.78%	55	45.83%

As shown in Table 6, in all the three disciplines, more than half of the nominal groups were post modified. In this study 95.71% of these post modifiers were prepositional constructions. It is believed that the use of prepositional phrases as noun post-modifiers is a good way of presenting information in the shortest possible way (Biber et al., 2000). Moreover, it has been considered as one of the characteristics of academic writing (Biber et al., 2000; Biber & Gray, 2010, Haggan, 2004).

The next commonly used modifiers to nominal constructions were pre and post modifiers, i.e. constructions which were modified both by pre modifiers and post modifiers. According to Biber and Gray (2010), academic writing discourse is structurally compressed and this characteristic is presented by extensive use of embedded phrases rather than dependent clauses for structural elaboration. They indicated that these compressed, phrasal expressions "are more economical, and they allow for faster, more efficient reading" (p. 11). The frequent use of pre- and post-modifiers in nominal titles clearly reflects the compressed discourse style of academic writing.

Dividing all nominal titles into uni-head, bi-head, and multi-head nominal groups (Wang & Bai, 2007), the researchers found that uni-head nominal titles account for the largest proportion of all nominal titles (89.2%). The bi-head and the multi-head groups constituted only 10.8% of all the nominal titles. The titles with bi-head nominal groups mostly consisted of two noun phrases connected by *and*, *or*, and *vs*. Interestingly,

instances of bi-head and the multi-head constructions were only observed in nominal groups.

Comparing the nominal constructions in different disciplines revealed that unmodified nominal constructions were most frequently used in Dentistry RA titles. In complete contrast, in Civil Engineering RA titles, all nominal constructions were post-modified or pre-and-post- modified, i.e., no instances of unmodified nominal constructions were found. The reason might be found behind the fact that in Civil Engineering titles, almost 90% of the titles were nominal; in order to make these titles as informative as possible the writers need to use modifiers.

B. verbal structures

A less preferred structure was verbal constructions. The V-ing phrase titles and full-sentence titles constitute 12.37% of the corpus. The following examples illustrate the use of verbal structures in RA titles:

Biofilm Layers Affect the Treatment Outcomes of NaF and Nano-hydroxyapatite

Exploring Motivational Profiles through Language Learning Narratives

Table 7 indicates the use of verbal constructions across the three disciplines.

Table 7. The frequency and percentage of verbal constructions in single unit titles in the three disciplines

	Applied Linguistics		Dentistry		Civil Engineering	
	N	%	n	%	n	%
Full sentence	4	23.52%	10	71.42%	1	14.29%
V-ing	13	76.48%	4	28.57%	6	85.71%

The verbs in all sentence titles were in the present tense which "emphasizes the note of confident optimism being projected by the writer that what he is reporting stands true for all time or is not simply a one-off occurrence" (Haggan, 2004, p. 297). Few RA titles were in question forms (only 3 instances); others were all in form of statements, often, indicating the general findings of the study.

With respect to the frequency of full-sentence titles, we found only 15 occurrences of this structure, which is consistent with Soler's (2007) finding that writers do not frequently use this construction. One interesting cross-

disciplinary peculiarity concerns the full-sentence title construction which evidences a high perceptual occurrence in Dentistry RA titles, a finding which is not only in agreement with Berkenkotter and Huckin's (1995) and Haggan's (2004) but also indicative of a marked contrast with respect to the same construction in the titles of Applied Linguistics and Civil Engineering. This also corroborates Hyland's (2004) explanation that in social sciences elaborate exposition and considerable tentativeness is required to express claims, while in biological sciences it seems easier to present ideas by using full sentence constructions (as cited in Soler, 2007). The full-sentence construction is used by authors in RA titles since it allows them to present the general findings of their research both conclusively and synthetically in one single construction; however, as Soler (2007) explained, for social sciences, it may not be as suitable as multiple unit or nominal structures, which enables researchers to focus the specific aspect of the study.

A V-ing phrase is a phrase based on the –ing form of a verb which expresses a process or activity; it often contains modifiers and/or noun phrases functioning as its objects or complements. Using this structure in RA titles indicates that the author tends to highlight the research activity. The modifiers, objects, or complements are also used to provide specific information about the study. V-ing phrase structures, found most frequently in Applied Linguistics RAs, were used to emphasize the research activity; they mostly offer an explicit focus on the research topic. Writers use this structure as a way to increase conciseness and attractiveness on the part of readers (Wang & Bai, 2007). A number of titles contained different forms of VPs which are called *grammatical metaphor* by Halliday (1994). This structure is used more in written language, by turning verbs into nouns.

To sum up, although nominal titles are much more frequently used than other structures, they still have their rhetorical distinctiveness in forming effective titles for specific types of studies. Declarative full-sentence structures can directly tell readers the major results of the study.

C. prepositional structures

A prepositional phrase title structure starts with a preposition which is followed by its grammatical object. *On the Impact of L2 Speech Rhythm on Syntactic Ambiguity Resolution* is an example of this structure. The results

of this study completely corroborates with Haggan (2004) where he found that, of all structures, the prepositional phrase structure had the lowest frequency. In fact, there were only two instances of prepositional structures, one in Applied Linguistics and another in Dentistry RA titles.

4. Conclusion

The main purpose of this descriptive study was to investigate the syntactic structures used in RA titles in three different disciplines of Applied Linguistics, Dentistry, and Civil Engineering. The findings of the study suggest that some syntactic structures are used more frequently than others in academic writing in general. However, close comparison of cross-disciplinary results showed that researchers in different disciplines had preferences in the structures of titles. Moreover, some structures may be more suitable than others for a specific discipline. This preference in using specific syntactic structures in writing RA titles shows the academic conventions of titles in a specific discipline; moreover, it depicts their communicative and rhetorical effectiveness in characterizing the nature of research in that discipline.

Knowledge of genre allows practitioners to have a greater understanding of their discourse communities and become more productive members. By emphasizing the linguistic choices and variables that RA writers use in formulating titles, the results of this study could be served as an eye-opener; it, thus, shows the understanding of writers regarding the way they caption this seemingly peripheral but important rhetorical unit of articles, i.e. the titles. Given the importance of titles, these findings could be of great help to many different members of the English for Specific Purposes (ESP) community; in fact, the study has pedagogical implications in ESP writing in general and in the teaching of title construction of feature articles in particular.

ESP teachers can use these findings to teach reading and writing RA titles to their students or novice researchers because they might experience difficulties in meeting the title requirements of the genre. Since different syntactic structures offer writers different ways to organize and report research information, novice RA writers need to be informed of their

respective features and functions; moreover, disciplinary variation should be considered. Therefore, in ESP courses, the syllabi should contain guidelines on title writing through which students find different structures and learn how to write effective titles in their specific disciplines. Researchers can also utilize the findings of the study by considering different functions of syntactic structures while they try to provide titles for their studies.

Although this study has reached its goals, there were some unavoidable limitations. Clearly, the corpus is limited in the number of disciplines and journals represented; a more comprehensive corpus which contains more articles selected from a wider range of journals in different disciplines of social, medical, and hard sciences would offer a more representative sample for title investigation. Choice of one hundred and forty articles from only four journals in each discipline makes us less confident about the generalizations we made on title formulation in the disciplines. For further research, researchers are suggested to investigate title structures in different genres and in different disciplines. Moreover, the researchers believe that crosslinguistic studies will offer a much more comprehensive view of syntactic structures used in RA titles.

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