

Research article titles in applied linguistics

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With increasing diversification of research, a research article depends much upon the title to encapsulate its distinctive content. The present study aims to examine the syntactic structures and functions of research article titles in applied linguistics. Using a corpus of 796 titles from four journals that are included in the Social Sciences Citation Index (SSCI), we identified five syntactic structures, namely, compound, nominal, full-sentence, V-ing phrase, and prepositional phrase. Of the five structures, compound titles, which enable research article writers to present dual foci of studies, constitute more than half of the occurrences, followed by nominal titles, which can concisely summarize the essence of studies. Each of the other three structures accounts for a very small percentage. A second-phase analysis was performed on the two constituent elements of the compound titles and on the heads and modifiers of the nominal titles. For the former, a total of eleven categories were found, revealing a wide variety of crucial aspects of research in applied linguistics, including mainly Topic-Scope, Topic-Method, Topic-Description, Topic-Source, Metaphor-Topic, and Topic-Question. For the nominal titles, both discipline-specific and non-discipline-specific heads were recognized. A majority of the discipline-specific heads are compound nouns, and prepositional phrases are widely used as post-modifiers. The analysis results provide useful information for the academic writing pedagogy.

Key Words: research article titles, syntactic structures of titles, compound titles, nominal titles.

1. Introduction

Ever since Swales published his canonical book on genre analysis in 1990, there has been growing interest in the genre of research articles (RAs) in English for Academic Purposes (EAP). Studies on RAs are mainly conducted along two lines. One line of research has analysed the macro-structures of the major sections in research articles (Lim, 2006; Swales, 1990; Yang & Allison, 2003). The other line has examined the linguistic features of this particular genre, such as voice, tense, reporting verbs, or modals (Hawes & Thomas, 1997; Malcolm, 1987; Swales, 1990). Titles, however, have received very little attention in the mainstream of RA studies.

The titles of research articles, though a small part of the text, play a major role in attracting the attention of readers. Specifically, with the prevalence of online publication, researchers often search for studies pertinent to their research by surveying the table of contents of prestigious journals in the discipline. Good titles of research articles often catch the eye of researchers before the content of the articles is actually read. A title illuminates the study by highlighting its most crucial points. Elaborating the role titles play in scientific papers, Soler (2007) summarized that, “titles in science mirror a set of requisites that are crucial to the construction, communication, and progress of new knowledge” (p. 91). To impress readers most favourably,

RA writers must choose syntactic structures for titles that can effectively present the distinctive content of their articles. It is, therefore, essential for novice writers to know the structures and features of good titles.

Previous works on titles are highly diversified, focusing on the length of titles (e.g., Anthony, 2001; Haggan, 2004; Yitzhaki, 1994), titles in different genres (e.g., Hamp-Lyons, 1987; Soler, 2007), memory recall using titles (e.g., Hartley, 2005), applications (e.g., Goodman, Thacker, & Siegel, 2001), and structural constructions (e.g., Haggan, 2004; Soler, 2007; Wang & Bai, 2007). However, few studies have provided an in-depth analysis of the syntactic structures of research article titles in a specific discipline. In addition, little has been known about how different types of structures may distinctively present the essence of research reported in research articles. The purpose of this study, therefore, is to investigate the syntactic structures and their functions in research article titles in applied linguistics.

2. Studies on research article titles

Many studies on titles have been done by information scientists (Hartley, 2005, 2007a, b; Kilgour, 2004; Lewison & Hartley, 2005; Yitzhaki, 1994). These scholars have focused on the length and classification of titles. The results of these studies are helpful in organizing and retrieving papers in catalogues, indexes, and databases. Nevertheless, studies on titles from the perspectives of applied linguistics or genre have been relatively under-represented.

A number of academic writing textbooks and style manuals have proposed the elements of good RA titles. For example, Swales and Peak (2004) indicated three requirements for good research paper titles: “(1) The title should indicate the topic of the study. (2) The title should indicate the scope of the study. (3) The title should be self-explanatory to readers in the chosen area” (p. 278). Day (1998) defined a good title as “the fewest possible words that adequately describe the contents of the paper” (p. 15). Although these proposals indicated the general characteristics of good titles, they were not based on empirical data. Only a few recent studies have empirically investigated the syntactic structures of titles in different disciplines or different genres (Haggan, 2004; Soler, 2007; Wang & Bai, 2007). In the following, the findings of studies which focus on the syntactic structures of RA titles across different disciplines are briefly reviewed, followed by a discussion on the features of each major type of titles.

Haggan (2004) analysed 751 RA titles in linguistics, literature, and science, classifying the titles into three categories: full-sentence titles, compound titles, and the remaining title structures. The category of the remaining title structures encompasses three subcategories: noun phrases, prepositional phrases, and participial phrases. The results demonstrated that in literature RAs, compound titles predominate (60%), while in science and linguistics, approximately two-thirds of the titles use nominal construction. Soler (2007) examined titles in two genres – research papers (RP) and review papers (RVP) in two contrasting fields – biological sciences (including biology, medicine, and biochemistry) and social sciences (including linguistics, anthropology, and psychology) and identified four structures: nominal, question, compound, and full-sentence constructions. It was found that full-sentence construction is a peculiarity of RP titles in biology, medicine, and biochemistry, but this construction does not occur in RVP titles. In addition, compound construction occurs more frequently in RP titles than in RVP titles.

The results of the above studies suggest that researchers in different disciplines have preferences in the structures of titles. Moreover, some structures may be more suitable than other structures for a specific genre. The frequently used syntactic structures of RA titles not only show the academic conventions of titles in a specific discipline or genre but also reflect their communicative or rhetorical effectiveness in characterizing the nature and content of research in the discipline or genre. It is, therefore, beneficial to know the syntactic features and functions of each type of structures of titles.

2.1. Compound titles

Titles consisting of two parts separated by a colon are usually called colonic titles (e.g., Hartley, 2005). They are also given other names, such as hanging titles, series titles, or compound titles

(Day, 1998). In the present study, we use the term “compound titles” instead of “colonic titles” since punctuations other than colons can be used to form a two-part title.

The two parts of a compound title provide a clever format for RA writers to include not only the general topic of a study but also its specific content that distinguishes the study from other studies on this topic. Examining the two constituent parts of compound titles in a specific discipline, therefore, may reveal the aspects of research that are perceived crucial or distinctive in this discipline. For example, the Problem-Solution type of compound titles may be more commonly used in computer science than in literature as a result of the different nature or focus of research in the two disciplines. Moreover, since either part of a compound title can be a nominal, V-ing phrase, or other structures, a writer has to concisely pack the maximum amount of information into each part to avoid forming long compound titles. Effective compound titles are, therefore, information-dense.

Previous studies comparing RA titles in different disciplines did not show very consistent results. For example, Hartley (2007a) investigated colonic titles (that is, compound titles in the present study) in 17 disciplines and found that they occur more often in social sciences than in natural sciences. However, Haggan (2004) showed that although in literature compound titles had a much higher percentage (60.8%) than nominal titles (32.8%), nominal titles (64.2%) won over compound titles (30.4%) in linguistics. Such inconsistency suggests a need for further investigation of RA titles in these fields.

In addition, the above studies on compound titles have focused on the frequency of this structure in comparison to that of other structures. An in-depth analysis of the constituent parts of compound titles in a specific discipline should reveal more information about the use and functions of compound titles linked to the research foci of the discipline. In their well-known textbook on academic writing, Swales and Feak (1994) indicated four possible combinations for compound titles: Problem-Solution, General-Specific, Topic-Method, and Major-Minor. Anthony (2001) analysed research article titles in computer science empirically and identified more specific combinations, including Name-Description, Topic-Scope, Topic-Method, Description-Name, and Topic-Description. It can be noticed that a combination such as Name-Description (the use of a special name for an approach, algorithm, etc., on one side of the colon and an explanation of the name on the other side) characterizes the nature of research in the discipline. It is of interest to examine if the two constituent elements of compound titles and the relationship between them are discipline-specific.

2.2. Nominal titles

A nominal title consists of one or more nouns, often called head(s), with or without pre-modifiers and/or post-modifiers (Wang & Bai, 2007). The head is the central part of the nominal phrase and other elements in the phrase are in grammatical or semantic relationship to the head (Richards, Platt, & Platt, 1998). Nominal titles are commonly used in research articles. For example, Wang and Bai (2007) analysed the syntactic structures of 417 titles in medical research papers and found a very high percentage of nominal titles (99%). Soler (2007) also found that the nominal group construction is the most recurrent construction in all the disciplines she investigated, although her study focused on two different genres – research papers and review papers.

The functional-systemic perspective on nominalization (Eggins, 1994; Halliday, 1994; 1998) is enlightening for explaining why nominal titles are important and prevalent in academic writing. Nominalization is perceived as a linguistic resource that allows writers to condense information, particularly information that involves a process/clause, into a nominal group structure and create cohesion as well. In constructing titles, RA writers can pack more lexical content in a nominal title. The packing of lexical content depends mainly on the use of 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). Previous studies have analysed the syntactic classification of the pre-modifiers and post-modifiers of heads in nominal titles (Wang & Bai, 2007). However, the semantic content of the modifiers is more closely related to “the specification of the object of

study” (Soler, 2007, p. 98). For example, in *The Impact of Assessment Method on Foreign Language Proficiency Growth*, the head, *The Impact*, is an abstraction of the essence of research, but the specification of the disciplinary content of the research article relies more on the two prepositional post-modifiers, *of Assessment Method* and *on Foreign Language Proficiency Growth*, which provide specific information about the cause and the receiver of the impact. Rath (2010) also confirmed this function of the pre- and post-modifiers in nominal titles. He suggested that summarization of research article content seems to be more effective when a methodological nominal term is combined with disciplinary content terms. Specifically, nominal groups in Theme/Rheme title structures, based on Halliday’s concepts of functional grammar (1994, 1998), can yield coherence and produce a summarization.

As shown in the literature, nominal titles are prevalent in research articles in many disciplines. With the syntactic structure of head nouns qualified by pre- and post-modifiers, nominal titles can effectively and coherently summarize the essential information of research articles. However, it seems little research has made further efforts in exploring words that are frequently used as heads in nominal titles and the semantic content of pre- and post-modifiers in a specific discipline.

2.3. Other structures

In addition to compound and nominal titles, a number of other structures are also used in titles according to previous studies (Haggan, 2004; Soler, 2007). These structures include full sentences, prepositional phrases, and V-ing phrases. Studies have focused on the frequency of these structures in specific disciplines. For instance, Soler (2007) found full-sentence titles account for 51% and 46% of all research paper titles in biology and biochemistry, respectively; in stark contrast, in linguistics and psychology, no occurrences of this structure were found.

A prepositional phrase title structure starts with a preposition which is followed by its grammatical object. Haggan (2004) found that, of all structures, the prepositional phrase structure had the lowest frequency; in terms of disciplines, there were more occurrences of this structure in RA titles in linguistics and literature than in science.

A V-ing phrase is a phrase based on the –ing form of a verb and thus expresses a process or activity. It often contains modifier(s) and/or (pro)noun(s) or noun phrase(s) functioning as its objects or complements. An RA title using this structure tends to highlight the V-ing, that is, the research activity. The modifiers, objects, or complements then serve to provide specific information about the study. For instance, *Defining the Zone of Proximal Development in US Foreign Language Education* emphasizes the activity of *Defining* the term *Zone of Proximal Development* in the context of *US Foreign Language Education*.

Although Soler (2007) found full-sentence titles are common in biology-related disciplines, other studies (Haggan, 2004; Wang & Bai, 2007) have revealed that full sentences, prepositional phrases, and V-ing phrases occur much less frequently than the compound or the nominal structure in RA titles. In addition to frequency, however, RA writers may still need to know the rhetorical functions of these structures; in other words, what they can effectively communicate if they are used for titles and whether they may be suitable for titles in some specific disciplines.

From the above review of studies on the syntactic structures of titles, we can find that empirical research on RA titles is scarce, that the results of title studies in terms of disciplinary variation seem inconsistent, and that there is a lack of detailed analysis of the rhetorical functions of different syntactic structures in RA titles in specific disciplines. More research is needed to address these issues and yield confirmative results so as to provide novice writers with clear guidance for writing RA titles. The present study aims to find out answers to the following questions:

1. What are the syntactic structures used in the titles of research articles in applied linguistics?
2. How effectively can each type of structures present the essence of the research in research articles?

3. Method

3.1. The corpus of research article titles

In this study, we compiled a corpus consisting of all research article titles from the following four major journals in applied linguistics during the period of 1999-2008: *TESOL Quarterly*, *The Modern Language Journal*, *Language Learning*, and *Applied Linguistics*. These four journals were chosen, on the one hand, because they are internationally prestigious journals in applied linguistics and belong to the Social Sciences Citation Index (SSCI); on the other hand, they publish RAs on a wide variety of major issues in this discipline. Table 1 shows the information about the title corpus, including the publication type, time span, and number of titles collected.

Table 1. Information about the four selected journals.

Journal	Vol./Issues	No. of titles
<i>TESOL Quarterly</i>	33(1)-42(3)	177
<i>The Modern Language Journal</i>	83(1)-92(4)	222
<i>Language Learning</i>	49(1)-58(4)	190
<i>Applied Linguistics</i>	20(1)-29(4)	207
Total		796

3.2. The procedure of data analysis

The classification of syntactic categories in the analysis was mainly based on a pilot study of 150 titles in two major applied linguistics journals (*TESOL Quarterly* and *The Modern Language Journal*). The pilot study yielded five categories, as illustrated below, and showed that this classification seemed able to cover appropriately the syntactic structures used in the titles of applied linguistics RAs. The categories used by previous studies (e.g., Soler, 2007; Haggon, 2004) were also consulted. Existing research revealed that nominal, compound, and full sentences are dominant syntactic structures in titles, while V-ing phrases and prepositional phrases are also present in RA titles, although they may constitute a smaller proportion. The definitions as well as examples of these five categories of syntactic structures of titles are given below.

- The compound structure: It consists of two parts separated by a colon, dash, question mark, or period, e.g., *Pointing Out Frequent Phrasal Verbs: A Corpus-Based Analysis*
- The nominal structure: It consists of one or more nouns (that is, a head or heads) that can be preceded by pre-modifiers or followed by post-modifiers, e.g., *The Effects of a Phonological Awareness Intervention on the Oral English Proficiency of Spanish-Speaking Kindergarten Children*
- The V-ing phrase structure: It is the -ing form of one or more verbs, followed by objects or modifiers of the verb(s), e.g., *Integrating Grammar in Adult TESOL Classrooms*
- The full-sentence structure: It comprises a complete sentence or clause, including both declarative structures, e.g., *When Grammar Instruction Undermines Cohesion in L2 Spanish Classroom Discourse*, and interrogative structures, e.g., *Is there an Academic Vocabulary?*
- The prepositional phrase structure: It starts with a preposition that is followed by the object of the preposition, e.g., *Toward a Socioliterate Approach to Second Language Teacher Education*

As we were conducting the pilot study, we realized that each constituent element of a compound title can be nominal or other structures. We made the decision to distinguish a category (such as nominals) within a compound title from this category in a complete title since the rhetorical

function and focus of the category, being at two different levels, can be different. In addition, double counting of nominal or other structures within compound titles and in complete titles can make the calculation of the frequency of each structural category confusing.

The first-phase analysis focused on the syntactic structures of complete titles. All of the titles in the corpus were analysed. At the second-phase, the constituent elements of the compound titles and the nominal titles were examined respectively since we found these two structures were dominant in the corpus.

We started the detailed analysis of the constituent elements of the compound titles using Anthony's (2001) classification of compound titles in computer science. His categorization encompasses five types: Name-Description, Description-Name, Topic-Description, Topic-Scope, and Topic-Method. The classification, however, was found not fully applicable to RA titles in applied linguistics. A modified classification consisting of eleven types of combinations in the compound titles was developed as the analysis proceeded. In the following, definitions as well as examples are given for these categories.

- Topic-Scope: The first part shows the main research concern, followed by information indicating the focus of the study, e.g., *The Development of Practices for Action in Classroom Dyadic Interaction: Focus on Task Openings*
- Topic-Method: The main research concern is given in the first part, followed by information indicating the research design/methodology adopted, e.g., *Effects of Study-Abroad Experiences on EFL Writers: A Multiple-Data Analysis*
- Topic-Description: The main research concern is given in the first part, followed by an explanation or description of the concern, e.g., *Differences in Language Skills: Heritage Language Learner Subgroups and Foreign Language Learners*
- Topic-Source: The first part indicates the main research concern, followed by information indicating the source of data, such as participants or locality from which data are collected, e.g., *Syntactic Transfer: Evidence from the Interlanguage of Hong Kong Chinese ESL Learners*
- Metaphor-Topic: A metaphorical expression of the research concern is given first, then the research concern is unveiled, e.g., *Slicing the Onion Ethnographically: Layers and Spaces in Multilingual Language Education Policy and Practice*
- Topic-Question: The first part indicates the main research concern, followed by an interrogative statement, e.g., *Second Language Listening: Listening Ability or Language Proficiency?*
- Question-Method: An interrogative statement is given in the first part, followed by the research design/methodology adopted, e.g., *Inhibition or Compensation? A Multidimensional Comparison of Reading Processes in Dutch and English*
- Topic-Method + Source: The first part gives the main research concern, followed by information depicting both the research design/methodology and the source of data, such as participants or locality from which data are collected, e.g., *Pronunciation Issues and EIL Pedagogy in the Periphery: A Survey of Greek State School Teachers' Beliefs*
- Metaphor-Question: A metaphorical expression of the research concern is given, followed by an interrogative statement, e.g., *Dueling Philosophies: Inclusion or Separation for Florida's English Language Learners?*
- Question-Method + Source: An interrogative statement is given, followed by information depicting both the research design/methodology and the source of data, such as participants or locality from which data are collected, e.g., *What Level of English Proficiency Do Elementary School Teachers Need to Attain to Teach EFL? Case Studies from Korea, Taiwan, and Japan*
- Name-Method: An acronym is given first, followed by information indicating the research design/methodology of the study, e.g., *CALL: A Survey of K-12 ESOL Teacher Uses and Preferences*

A second-phase analysis was also performed on the nominal titles, focusing on the heads and the pre- and post-modifiers of heads. We identified the syntactic structures that frequently form the pre- and post-modifiers, examined the words that are used as heads, and analysed the rhetorical information frequently contained in the modifiers.

4. Results and discussion

4.1. Syntactic structures of RA titles in applied linguistics

The analysis of the syntactic structures of RA titles in the corpus shows that compound titles have the highest percentage (53.89%) of all types of title structures, followed by nominal titles (39.20%), as presented in Table 2. Together, these two structures constitute 93.09%, while the other three structures – V-ing phrases, full sentences, and prepositional phrases – account for only 6.91% of all titles. The high frequency of compound titles is consistent with Hartley's (2007a) finding that compound titles abound in the disciplines of arts and humanities.

Table 2. Syntactic structures of titles.

	Occurrences	Percentage (%)
Compound structure	429	53.89
Nominal structure	312	39.20
V-ing phrase structure	37	4.65
Full sentence structure	9	1.13
Prepositional phrase structure	9	1.13
Total	796	100

Research in applied linguistics tends to explore the complicated relationships among a number of key elements such as social context, data source, participants, method, scope, etc. Therefore, the indication of a specific research focus in titles, in addition to a general topic, is often needed. The reason why compound titles are frequently used in applied linguistics is probably that this structure renders RA writers the possibility to construct titles with two foci, often the research topic and a specific aspect of research, such as research method or source of data. In other words, when constructing titles, applied linguistics researchers tend to indicate the research topic of the study in one part of the compound title, and narrow down the topic to a distinctive feature of the study in the other part; for example, in *From Receptive to Productive: Improving ESL Learners' Use of Vocabulary in a Post-reading Composition Task*, the first part presents the general topic, while the second part unveils the focus of the study on using a post-reading composition task to improve ESL learners' vocabulary.

Nominal titles are also prevalent in the corpus. As indicated previously, nominal group construction provides a compressed structure, enabling RA writers to include as much specific information as possible by means of pre- and post-modifiers, which qualify the head(s), the focus of research. For instance, in *The Effect of Frequency of Input Enhancements on Word Learning and Text Comprehension*, the head, *The Effect*, shows the research focus, the two post-modifiers, *of Frequency* and *of Input Enhancements* reveal specific information about the source of the effect, and a third post-modifier, *on Word Learning and Text Comprehension*, informs readers about the receiver of the effect. It can be noted that an effective nominal title, therefore, uses modifiers that not only pack a maximum of information, but help organize the information in a way that explicitly shows the relationship between the head and the modifiers.

This is different from compound titles, in which the two constituent elements are juxtaposed and the relationship between the two elements is not syntactically explicit. For instance, a compound title can be constructed on the basis of the above nominal title, *Frequency of Input*

Enhancements: Effect on Word Learning and Text Comprehension. We can observe that the relationship between *Frequency of Input Enhancements* and *Effect on Word Learning and Text Comprehension* in the constructed compound title is not given in a linear sequence as in the nominal structure.

4.2. Constituent elements of compound titles

The analysis of the two parts of all compound titles identified eleven types of combinations, as shown in Table 3. The top six combinations are Topic-Scope, Topic-Method, Topic-Description, Topic-Source, Metaphor-Topic, and Topic-Question, accounting for 96.74 % of all occurrences of compound titles. In comparison with Anthony (2001), who found five types of combinations (Name-Description, Topic-Scope, Topic-Method, Description-Name, and Topic-Description) in computer science compound titles, our results showed that there are a much wider variety of the combinations in applied linguistics. This suggested a wider range of research topics and aspects of concern in this discipline.

Table 3. Rhetorical combinations in compound titles.

	Occurrences	Percentage (%)	Rank
Topic : Scope	123	28.67	1
Topic : Method	90	20.98	2
Topic : Description	67	15.62	3
Topic : Source	48	11.19	4
Metaphor : Topic	46	10.72	5
Topic : Question	41	9.56	6
Question : Method	6	1.40	7
Topic : Method + Source	4	0.93	8
Metaphor : Question	2	0.47	9
Question : Method + Source	1	0.23	10
Name : Method	1	0.23	10
Total	429	100	

A comparison of the constituent elements of compound titles between applied linguistics and computer science further revealed that some compound combinations may be discipline-specific. For instance, Topic-Description and Topic-Source combinations prevail (ranking third and fourth, respectively) in applied linguistics; nevertheless, Topic-Description compound titles have a low frequency and Topic-Source compound titles do not occur at all in computer science. In applied linguistics, researchers may often need to indicate a general research topic accompanied by an explanation about how the topic is addressed in the title. The Topic-Description combination provides the structure to meet this need. For example, in *Assessment in English for Academic Purposes: Putting Content Validity in Its Place*, the research topic is *Assessment in English for Academic Purposes*, and *Putting Content Validity in Its Place* provides a description of the topic from the perspective of content validity. In addition, the source of data is often critical in studies in this discipline. Writers need to inform readers of their research site, social context, or participants of the study in titles, as exemplified in *Syntactic Transfer: Evidence from the Interlanguage of Hong Kong Chinese ESL Learners*. In contrast, Name-Description has the highest frequency in computer science but in our corpus, we did not find any title using this combination. In computer science, research often proposes an

innovative technique, a new model, a device, etc., which is often coined with a specific name, such as *KLAIM: A Kernel Language for Agents Interaction and Mobility* (Anthony, 2001, p. 191), in which the part of Description in the compound describes what the Name, KLAIM, represents. Constructing titles with the Name-Description combination can clearly tell readers what their invention is. However, in applied linguistics, such a combination did not occur in the data.

Metaphor-Topic and Topic-Question are also recurrent combinations in our corpus, ranking fifth and sixth, respectively, but they do not occur in computer science compound titles (Anthony, 2001). The Metaphor-Topic compound titles are particularly interesting to us. A metaphor is usually used to refer to a rhetorical figure of speech, denoting the use of an implied analogy between two objects or ideas to achieve a forceful effect of comparison. Since the use of a metaphor can greatly arouse readers' curiosity, the juxtaposition of a metaphor with the real research topic in a compound title seems a clever construction that can attract readers to think about the association between them. For instance, when readers read the first element in *Slicing the Onion Ethnographically: Layers and Spaces in Multilingual Language Education Policy and Practice*, they may first feel puzzled, but attracted by the metaphorical expression of *Slicing the Onion Ethnographically*. As they read the other part of the compound title, *Layers and Spaces in Multilingual Language Education Policy and Practice*, which reveals the research topic, they realize what is implied in the metaphor. The use of this construction can often make a strong impression on readers.

Similar to Metaphor-Topic titles, Topic-Question titles can also arouse readers' interests by the use of a question. In *Second Language Listening: Listening Ability or Language Proficiency?* the first part of the compound title indicates the research topic – *Second Language Listening*, and the second part presents a question – *Listening Ability or Language Proficiency?* Upon reading such a title, readers may have their curiosity aroused and wish to read the contents to find an answer to the question.

Despite disciplinary differences, some types of combinations in compound titles are common in both applied linguistics and computer science. For example, Topic-Scope and Topic-Method are two prevalent combinations in both disciplines, suggesting that such relationships between the two constituent elements are essential in both disciplines.

As mentioned in Section 2, a compound title consists of two parts, each of which can be a nominal, V-ing phrase, or other syntactic structures. We conducted a further analysis of the structures of the two parts of all compound titles in the corpus. The results showed five types of structures: nominal, V-ing phrase, full sentence, prepositional phrase, and other structures such as clauses, imperatives and sentence fragments. Nominals constituted a majority (74.7%) of all the structures, followed by V-ing phrases and full sentences (including declaratives and interrogatives, in both complete and reduced forms), accounting for 13.5% and 8.3%, respectively. Both the categories of prepositional phrases and of other structures account for less than 2% respectively. The results thus suggested the dominant role nominals play in compound titles in applied linguistics RAs. Most nominals indicate the research topic, method, or source. It was also observed that metaphors are formed by complete declarative sentences or sentence fragments, such as the left part of the following compound title – *I'm Tired. You Clean and Cook. Shifting Gender Identities and Second Language Socialization*. We can note from the example that the second part of the compound title helps readers understand what the metaphor in the first part means.

4.3. Nominal titles in applied linguistics

Although second to compound titles, nominal titles constitute almost two-fifths of the titles in the corpus, not including those that form part of the compound titles. 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). For example, in *Recasts as Feedback to Language Learners*, the head, *Recasts*, indicates the general topic of research and the post-modifier, *as Feedback to Language Learners*, specifies that recasts are studied when they serve as feedback to language learners. Dividing all nominal titles into uni-head, bi-head, and multi-head nominals (Wang &

Bai, 2007), we found that uni-head nominal titles (as shown in the above example) account for the largest proportion of all nominal titles (75.3%). The bi-head and the multi-head groups constitute 18.9% and 5.8%, respectively. The multi-head group consists of three-head and four-head nominals. The relationship between or among the various nouns in the bi-heads or multi-heads denotes the main concern of the research article. For example, *Computer Anxiety and Students' Preferred Feedback Methods in EFL Writing* is a bi-head nominal title. The article using this title is concerned with how computer anxiety may be related to students' preferred feedback methods in EFL writing. Because of the consideration of the total length of titles, most multi-head nominal titles have either very short or no modifiers, such as *Teacher Motivation Strategies*, *Student Perceptions*, *Student Motivation*, and *English Achievement*.

The analysis of the nouns used as heads in nominal titles revealed two types of heads: discipline-specific and non-discipline-specific heads. Table 4 shows high-frequency heads in each category. Discipline-specific heads, such as *language*, *learning*, or *acquisition*, may reflect prevalent research topics in applied linguistics, while non-discipline-specific heads, such as *effect(s)*, *analysis*, or *role(s)*, suggest abstractions of research foci that may be common across various disciplines. Consistent with Wang and Bai (2007), we found most heads are abstract nouns. A number of non-discipline-specific heads identified in the present study, such as *effect*, *role*, *influence*, and *study*, also occur in their study on medical RA titles. A majority of the discipline-specific heads are compound nouns, such as *language learning*, *motivation strategies*, and *discourse analysis*. This is reasonable since compound nouns are compressed expressions and characterize disciplinary writing.

Table 4. Discipline-specific and non-discipline-specific heads.*

Discipline-specific heads	Freq.	Non-discipline-specific heads	Freq.
language	36	effect(s)	31
learning	16	analysis	15
acquisition	7	role(s)	13
strategy (strategies)	7	development	10
feedback	6	relationship(s)	9
transfer	5	study	7
discourse	5	use	5
perceptions	5	knowledge	5
anxiety	5	influence	5

*The heads listed here are those having a frequency equal to or higher than five.

The prevalence of the nominal structure in titles may be attributed to the fact that it allows writers to use a number of pre-modifiers or post-modifiers to compact information in an economical way (Wang & Bai, 2007) and precisely present the topic of research. For instance, example 1 below contains a noun as the head, followed by a prepositional phrase as a post-modifier. The second example presents a nominal construction with an adjective as a pre-modifier and two prepositional phrases as post-modifiers. Example 3 shows a more complex structure by using a number of pre-modifiers and post-modifiers. In this title, the head and its pre-modifiers reveal the specific research method adopted by the study, that is, combining corpus analysis and systemic-functional analysis, and the post-modifiers indicate both the source of data and the target discourse pattern investigated. Such a title, therefore, provides a complete picture of the study to be reported in the paper, as illustrated in the following examples.

- (1) *Anxiety in the College Japanese Language Classroom*

- (2) *Disciplinary Variation in the Use of Theme in Undergraduate Essays*
- (3) *A Combined Corpus and Systemic-Functional Analysis of the Problem-Solution Pattern in a Student and Professional Corpus of Technical Writing*

We found that prepositional phrases are widely used as post-modifiers in nominal titles (accounting for 90.06% of all occurrences of post-modifiers). Other structures serving as post-modifiers, as identified in the corpus, include participial phrases (e.g., *Factors Affecting How Second Language Spanish Students Derive Meaning from Context*), infinitive phrases (e.g., *A Native-Like Ability to Circumlocute*), adverbial phrases/clauses (e.g., *Issues Arising when the Professional Workplace is the Site of Applied Linguistic Research*). This is largely consistent with the conclusion of previous studies that the use of prepositional phrases as noun post-modifiers is characteristic of academic writing (Biber et al., 1999; Biber & Gray, 2010). Biber et al. (1999) indicated a number of recurrent prepositional phrases as noun post-modifiers in academic prose, such as *of*-phrases, *between*-phrases or *to*-phrases. In our nominal title corpus, however, we found that *of*-phrases occur most frequently (e.g., *L2 Acquisition of Conflation Classes of Prenominal Adjectival Participles*), followed by *in*-phrases (e.g., *Age Differences in Negotiation and Feedback in Classroom and Pairwork*). These phrasal modifiers are used as grammatical devices for elaboration, thereby providing more specific information about the heads.

In fact, the use of pre- or post-modifiers in nominal titles clearly reflects the compressed discourse style of academic writing. As indicated in Biber and Gray (2010), academic writing discourse is structurally compressed, characterized by extensive use of embedded phrases rather than dependent clauses for structural elaboration. They identified common types of embedded phrases in academic writing, including adjective as noun pre-modifier, noun as noun pre-modifier, prepositional phrase as noun post-modifier, and prepositional phrase as adverbial. These compressed, phrasal expressions, as Biber and Gray indicated, “are more economical, and they allow for faster, more efficient reading” (p. 11).

With respect to the rhetorical information contained in nominal titles, we found that a majority of nominal titles emphasize the research topic of the study, particularly in the head(s). However, some nominal titles flag the research methodology, rather than the topic, such as *A Combined Corpus and Systemic-Functional Analysis of the Problem-Solution Pattern in a Student and Professional Corpus of Technical Writing*. Such titles, therefore, highlight the distinctiveness or importance of the specific method to the study. It is also interesting to note that the source of data, that is, the participants or the locality, is often indicated in the titles in our corpus of applied linguistics RA titles, such as *Teachers’ and Learners’ Reactions to a Task-Based EFL Course in Thailand*. This may be a disciplinary feature of titles in applied linguistics.

Comparing nominal structure and compound structure, we can observe that each has its structural distinction in informing readers of the major content of RAs. A nominal title characterizes a single focus which is often modified by pre- and post-modifiers that provide specific information about the focus, while a compound title splits the focus into two parts – usually the topic and a specific aspect of the topic.

4.4. Other structures

The V-ing phrase titles, full-sentence titles, and prepositional phrase titles, constitute 4.65%, 1.13%, and 1.13%, respectively, of all titles in the corpus. A V-ing phrase title often aims to highlight the research activity in the study, represented by the V-ing. If we compare example 4, which is a V-ing phrase title from the corpus, with example 5, which is a nominal title constructed as an alternative title to example 4, we realize that example 4 focuses on *Testing the Effects*, while example 5 highlights *The Effects*.

- (4) *Testing the Effects of Regional, Ethnic, and International Dialects of English on Listening Comprehension*
- (5) *The Effects of Regional, Ethnic, and International Dialects of English on Listening Comprehension*

Therefore, RA writers must choose an appropriate and effective title structure depending upon the focus of their studies.

With respect to the frequency of full-sentence titles, we found only nine occurrences of this structure in our corpus, which is consistent with Soler's (2007) finding that research articles in social sciences do not frequently use this construction. As Soler (2007, p. 99) explained, "The presentation of results via the full-sentence construction in the biological sciences seems to be easier as evidential ... In contrast, the social sciences ... (citing Hyland, 2004: 145) 'require elaborate exposition and considerable tentativeness in expressing claims.'" The full-sentence construction "allows researchers to present the general findings of their research both conclusively and synthetically in one sentence" (Soler, 2007, p. 98); however, as Soler indicated, for social sciences, it may not be as suitable as compound or nominal structure, which enables researchers to "focalize on the study of a specific aspect of the object of study" (Soler, 2007: 99). As a matter of fact, seven of the nine full-sentence titles in our corpus are in the interrogative form, which may bear the rhetorical value of arousing readers' curiosity. For instance, example 6 attracts readers to read the article itself in order to find an answer to the question raised in the title:

(6) *Is There an "Academic Vocabulary"?*

There are also nine occurrences of prepositional phrase titles in the corpus. According to Haggan (2004, p. 310), this structure features "a rather succinct focusing of topic by the preposition *on*..." and the low frequency of this structure, particularly in science, is "because they are not informative enough for the scientist's purpose." Prepositions other than *on* were found in this category – *toward* and *from*, as shown in the following examples.

(7) *Toward a Sociocognitive Approach to Second Language Acquisition*

(8) *From Movement to Metaphor with Manner-of-Movement Verbs*

To sum up, although compound titles and nominal titles are much more frequently used than the other structures in applied linguistics, these other structures 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. V-ing phrase structures emphasize the research activity. Prepositional phrase structures offer an explicit focus on the research topic.

5. Conclusion

A title highlights the essence of a research article. In this study, we compiled and analysed a corpus consisting of all the titles of research articles published in ten years in four internationally renowned journals in applied linguistics. The frequency analysis of the syntactic structures of titles shows that compound titles have the highest percentage, followed by nominal titles. This result suggests that, different from studies on RA titles in some other disciplines such as medical science (Wang & Bai, 2007), applied linguistics researchers prefer the compound structure to the nominal structure, probably because the former makes it possible to juxtapose two major elements of a study in a title, and hence, provides greater flexibility in organizing information. We also found that metaphors or questions occur often in the titles in this discipline, reflecting RA writers' attempt to use more linguistic strategies in titles so as to attract readers to read complete articles.

Moreover, the analysis of the two constituent parts of compound titles yields eleven types of combinations of the two parts. A comparison of the results with Anthony's (2001) analysis of compound titles in computer science reveals disciplinary variation. Applied linguistics RA titles seem to have a much wider variety of combinations for the two constituent elements and some of them, such as Topic-Description, Topic-Source, Metaphor-Topic, and Topic-Question are discipline-specific.

On the other hand, further analysis of the heads and modifiers in the nominal titles shows that most heads are abstract nouns and a majority of the discipline-specific heads are compound

nouns. With respect to post-modifiers, prepositional phrases are used much more frequently than other syntactic structures.

The V-ing phrase structure, full-sentence structure, and prepositional phrase structure are also used in applied linguistics RA titles, though accounting for a small percentage. It seems these structures are not as flexible and informative as the compound or nominal structure in presenting more than one research focus or elaborating the research topic concisely and effectively.

The pedagogical implications of this study should be considered. First, since different syntactic structures offer writers different ways to organize and report research information, novice RA writers should be informed of their respective features and functions. Moreover, disciplinary variation should be noted. Compound titles are more prevailing than nominal titles in applied linguistics. The combinations of the two constituent parts in compound titles may differ from discipline to discipline. EAP instructors should tell students the commonly used combinations in the students' disciplines. For researchers in a specific discipline, the analysis of a representative title corpus provides useful information about popular research topics, focused subfields, and recurrent themes.

Nevertheless, our study is not without limitations. A larger corpus containing titles from a wider range of journals in the same discipline would offer more convincing results. Future research may also compare the structures of titles in other genres so as to identify generic variation in the construction of titles.

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