

A comparative study of headings in theses and research articles in Applied Linguistics

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Abstract

This study examined the internal headings of theses and research articles in applied linguistics. Headings collected from 110 theses and headings selected from 500 research articles underwent quantitative and qualitative analyses. The goal was to investigate possible differences between the heading writing styles adopted by the writers of each genre in focus. Analyses revealed the higher incidence of functional headings in both genres, particularly in research articles. Virtually, all functional and conventional syntactic options used in headings testified to be significantly different. Moreover, deployment of functional headings evidenced to act as a gatekeeper alternative that might have enhanced the publication chance of research articles in prestigious ISI-indexed journals. The study provides assistance for the writers of style guide manuals and syllabus designers in paving the way for novice writers to gain recognition in academia as professionals.

Keywords: applied linguistics, conventional heading, functional heading, research article, thesis

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1. Introduction

The researchers' attempt for acceptability and getting published in highly influential journals is indicative of the presence of the filtering monitors, viz. journal editors and peer reviewers that define the conventions of the disciplinary communities (Swales, 1990). To the purpose of fulfilling the requirements of the filtering system, as well as precise delineation of their ideas, novice writers tend to master the techniques of academic writing. Generally speaking, the genre of academic discourse can simply be described as "the ways of thinking and using language which exist in the academy" (Hyland, 2009). With the knowledge of academic writing at their commands, novice writers stand to benefit from the widespread acceptance within the academia. Theses and research articles (RAs), as two scholarly genres of academic writing, act as media of idea dissemination and audience persuasion respectively within and across communities (Hyland, 2000).

Being "front matter", titles and, by association, headings are assumed to be placed on the threshold of the whole text and any given subsection of the text respectively. Titles and headings are "summary matters", that is, they are supposed to concisely and precisely introduce the subject of any given piece of text (Swales, 1990). Their thematic position underscores their close dependency upon the genres they are leading. Headings, like titles, cannot be examined as "separate grounds" unto themselves (Rath, 2010). To fulfill their particular communicative functions, these two concepts are dependent on the specific genres they are fronting and summarizing.

The genre of academic writing plays an extremely crucial role in graduate studies. Manuals of style are aimed at facilitating the daunting task of academic writing (McCutchen, 2011) on the part of graduate students through providing "characteristic features" of research writing (Bennett, 2009, p.44). Studies on different aspects of RAs and theses including titles, among other academic genres, have grown in abundance in academia. Literature encompasses wide-ranging studies on titles (Afful, 2004; Afful & Mwinlaaru, 2010; Anthony, 2001; Busch-Lauer, 2000; Buxton & Meadow, 1977; Cheng, Kuo, & Kuo, 2012; Cianflone, 2012; Dillon, 1982; Fortanet Gomez, Coll, Palmer, & Posteguillo, 1997; Haggan, 2004; Jalilifar, 2010; MedvedKrajnovic, 2012; Nord, 1995; Rath, 2010; Salager-Meyer & Angeles Alcaraz Ariza, 2013; Soler, 2007; Wang & Bai, 2007; Whissell, Abramson, & Barber, 2013; Yakhontova, 2002). Headings, however, have received scant attention in the mainstream of genre studies. Due to a dearth of the significant academic undertaking on headings, the nature and function of headings has still remained a matter of concern to many scholars and academicians.

There hardly exists any substantive work on headings and heading writing, hence a major disadvantage to style guide domain. Therefore, this aspect of RAs and also theses is in direct need of attention. Lack of awareness about heading formation styles, i.e. functional and conventional styles, may lead to second language writers' failed attempts in identifying themselves as a recognizable member of their own discourse community. To say the least, genre awareness is the basic stipulation for "transition from novice to expert" writing (Rath, 2010). Through providing assistance with heading-writing, this study seeks to enhance the chance of scholarly publication for novice second language writers, as well as their consequential attendance in the discourse community of their own fields. There is, in addition, one further significant purpose for this study to explain; a study on heading-writing would be advantageous to the authors of manuals of style as they manage to provide scholars and novice writers with more comprehensive style guides. This study will also provide the chance of comparing novice and professionals in designing section headings for their writing. Thus, the questions posed in this study are:

1. What is the common trend in adopting a functional or conventional heading formation style in applied linguistics Theses and RAs?

2. Is choosing between functional and conventional heading-writing styles a significant factor that impresses the publication chance of RAs?

2. Methodology

The study adopted a mixed-methods design to answer the questions posed in the research. The functional vs. conventional headings were counted in each genre in focus and compared with one another. On the other hand, the common features of functional headings such as structural patterns were extracted to be compared with the patterns of conventionally fixed headings. *Introduction, literature review, statement of the problem, the significance of the study, and methodology* are some instances of conventional headings. To meet the purpose of the structural analysis, the syntax of headings in the texts was analyzed based on the examination of phrasal vs. clausal information units. Phrasal units were realized in basic structures, and functional and conventional subcategories were further scrutinized for clarification of their semantic and textual dimensions.

Headings were analyzed based on their length (the number of constituent words of headings) and lexical density ("the amount of information conveyed" in each heading, in terms of the number of content words deployed) (Gesuato, 2009). Explicit textual devices, as identifiable components that act as cohesive and coherent ties within any given piece of text, can take a variety of forms such as punctuation and typographical marks such as underlining, capitalization, and exclamation marks. In this study, textual analysis refers to the study of explicit textual devices such as colon, semicolon, within the structure of academic headings (Hyland, 2007).

2.1 Data

This study is composed of two sets of data, namely, RA and thesis internal headings. The context of the situation for RAs is the ISI-indexed journals published at international levels addressing a broad audience while the theses all address the academic context of Iran exclusively. RA headings are drawn from a list of ISI journals in the field of Applied Linguistics across a span of four years (2010-2013). The selection process was carried out with the help of four experienced researchers at the English language department where the study was conducted. They were asked to select, from a list of highly influential ISI journals, 10 to 15 journals that they published in or they wish to get published in. Then the journals which took precedence over other journals in terms of preference by researchers formed the data base for this study. There was a consensus among all researchers about three ISI journals comprising *Journal of Pragmatics, Pragmatics, and Studies in Language*. Next, all the volumes of aforementioned journals published between 2010 and 2013 were downloaded. The papers were screened and only empirical and descriptive studies were selected for the next phase of the study. Theoretical papers, review articles, short communications, book reviews, notes and critiques fell outside the scope of this study. Finally, headings and subheadings of 500 articles published in the downloaded volumes were subjected to analysis for the type of heading writing.

Table 1 shows statistics for the studied RAs. In calculating the average number of words per RA, references, appendices, tables of contents, and abstracts were excluded. *Journal of Pragmatics*, being monthly, provides a significant number of RAs, that is, triple that of each of the two other quarterlies. *Pragmatics* displays the highest average number of internal headings per RA while this feature reveals to be fairly equal in the two other journals. The longest headings occur in *Pragmatics* (3.29 words) followed by *Journal of Pragmatics* and *Studies in Language*. Word count results proved the dominance of *Pragmatics* in an average number of words per RA. All journals evidence the same ratio of heading word count to RA word count. Therefore, RAs published in these journals devote similar proportions of their content to the headings.

Table 1. Statistics of Journals

Journals	No. of RAs	No. of RAs per Year	No. of Headings	Average No. of Headings per RA	Average No. of Words per Heading	Average No. of Words per RA	Proportion of Heading Word Count to RA Word Count
Journal of Pragmatics (Monthly)	300	75	4525	15.08	3.05	8150	0.0056
Pragmatics (Quarterly)	100	25	1600	16	3.29	9184	0.0057
Studies in Language (Quarterly)	100	25	1507	15.07	2.97	8602	0.0052
Total	500	125	7632	15.26	3.09	8447	0.0055

The other set of data contains internal headings and sub-headings taken from 110 MA and PhD Theses defended within the period of 2010 to 2013 in the departments of Applied Linguistics from three local Iranian universities that offer postgraduate programs. Collecting Theses required attendance at the above departments in person. Recency of Theses was the main criterion to choose their headings. Tables of contents of all MA and PhD Theses over a four-year span (2010-2013) were copied and then analyzed. As a rule of thumb, the postgraduate Theses written at the aforesaid departments are either reports of empirical studies or descriptive analyses which, for instance, require textual analyses. The information about the Theses is provided in Table 2. The Theses gathered from Isfahan University outnumber those of the two other universities. The largest number of internal headings, as expected, can be found in the dataset taken from Isfahan University. The average number of headings per Thesis varies from a maximum of 69.15 to a minimum of 64.50. The longest and shortest headings are 3.72 and 3, respectively. Based on the word count results, the richest Theses in terms of the number of words occur in Isfahan dataset, followed by Tehran and Shahid Chamran. As shown in Table 2, the Theses in all universities share a similar proportion of heading word count to Thesis word count.

Table 2. Statistics of Theses

Universities	No. of Theses	No. of Headings	Average No. of Headings per Thesis	Average No. of Words per Heading	Average No. of Words per Thesis	Proportion of Heading Word Count to Thesis Word Count
Isfahan University	45	3112	69.15	3.72	37500	0.0068
Shahid Chamran University of Ahvaz	30	1935	64.50	3	28630	0.0067
Tehran University	35	2285	65.28	3.11	30454	0.0066
Total	110	7332	66.65	3.27	32839	0.0066

2.2 Procedure

The RA and postgraduate Thesis headings underwent quantitative and qualitative analyses. Theses, owing to their detailed quality, tended to contain larger numbers of headings in comparison with RAs. Therefore, selecting an equal number of Theses and RAs could not to help reach normalized sets of data.

The proximity of word count results was regarded as the main criterion to decide on the number of Theses versus RAs as the materials of this study.

The RAs were downloaded and all headings and subheadings were extracted, listed and saved in a file in rich text format for further scrutiny for their generic and rhetorical characteristics such as length and syntactic structure. The next step was assigning headings and subheadings of RAs and Theses to one of the heading formation styles, namely, functional or conventional. Functional headings are directly related to the content of the heading. Stereotypical samples of headings including *introduction, literature review, method, results, discussion, and conclusion* were employed as points of departure for the analysis of conventional headings. In search for more emblematic and conventionally constructed headings, we encountered a variety of headings serving the same purpose as the above instances. Repetition of synonymous samples found in the corpus was the rule of thumb to set the extraction parameters of conventional headings. After counting the frequency of functional vs. conventional headings in each genre, the results were expressed in percentage terms for ease of comparison. These percentages were finally compared to find out the most frequent heading formation styles in terms of their length and all structural configurations found, namely, nominal phrase, verbal phrase, adjectival phrase, prepositional phrase, adverbial phrase, coordinated structures, and clauses.

For qualitative analysis, data was analyzed to uncover the potential characteristics of functional patterns. Due to their fairly fixed construction, conventional headings were analyzed with less difficulty. Conventional headings have come under qualitative analysis in order for their underlying patterns to be identified as well. Finally, a contrastive analysis of heading formation styles within each genre was carried out, which was then followed by another analysis through which the heading formation styles were compared and contrasted across the two genres.

2.3 Pilot Study

As the risk of potential human errors in manual analyses calls for reliability assurances, the study was first piloted based on around 20% of the data. The selected data were quantitatively and qualitatively analyzed by one of the researchers on two occasions; the second examination of the headings occurred after a three-week interval. First of all, 20 Theses and 90 RAs were randomly chosen. Afterwards, for the convenience of data checking, internal headings of Theses and RAs, except for the tables of contents and reference pages, were separately categorized under a classification inspired by APA five-level heading formation taxonomy. The criteria for word counting and coding system were drawn from the methods earlier utilized by Haggan (2004), Soler (2007), Gesuato (2009), and Jalilifar (2010). The result of Cronbach's alpha reliability test (0.83) guaranteed that the coding scheme had been applied uniformly to the whole piloted data. The remaining parts of data were studied and coded accordingly.

The results obtained from the initial analysis were indicative of dominance of functional headings in both genres in focus. However, the higher frequency of functional headings in RAs (83.30%) in comparison with the occurrence of functional headings in Theses (57.86%) was noticeable. Syntactic analysis of headings revealed the popularity of Noun Phrase (NP) headings among writers in both genres. Semantically, headings were examined based on their length and lexical density. The length of headings was measured in terms of the number of their constituent words. Non-hyphenated compounds, upper-case abbreviations, numerical strings, and the combination of upper-case abbreviations and numbers were considered as single words. Hyphenated words were counted as multiple words, provided that each of their single constituents could function independently within a clause. On the other hand, they were regarded as single units if their constituents functioned as bound morphemes (Gesuato, 2009). Lexical density was measured in terms of the density of a given string of words. Given the abundance of content words in comparison with function words, counting the number of function words appeared to be more logical. Articles, conjunctions, prepositions, pronouns, possessives, question words, demonstratives, and auxiliaries were considered as function words unless these were mentioned as topics of research. From a semantic perspective, RAs and Theses evidenced to share an approximately equal percentage of content words; around 75% of the words in the headings of

Theses, and 73% of words in RA headings revealed to be content words. Overall, headings in both genres enjoyed the same level of semantic adequacy. Based on the results of word counting, longer headings occurred in Theses. Headings were also textually analyzed to find the explicit textual devices such as colon, semi-colon, and other punctuation markers used to divide units of headings. Therefore, the existence of two or multi-unit headings in the corpus can be regarded as the sign of utilization of textual devices.

3. Results and Discussion

This study aims at addressing the less-charted issue of heading writing to trace the prevalence of heading styles in Theses and RAs. To pursue this goal, the texts were examined, and the findings were presented in the subsequent sections along with a discussion on how these results make contributions to the goal of this study. Structural analysis of data creates a ground to respond to the first research question, and the second research question is answered in the textual analysis section.

3.1 Structural Analysis

Syntactically explored, a variety of heading units were identified in the corpus of this study, namely, noun phrases (NP), verb phrases (VP), prepositional phrases (PP), adjectival phrases (AP), adverbial phrases (AdvP), clauses and combinations of the above. The basic constructions mentioned can be linked to build a coordinated structure or be expanded to make pre- or post-modified phrasal units. Close inspection of data evidenced the precedence of functional headings over conventional headings in both genres in focus, although there was a marked difference between the percentage of exploiting functional headings in RAs (81.72%) versus Theses (55.22%) (See Table 3).

Table 3. Number of Functional and Conventional Headings in RAs vs. Theses

No. of Heading Units	RAs (%)	Theses (%)
Functional	7289 (81.72)	4390 (57.72)
Conventional	1630 (18.28)	3217 (42.28)
Total	8919 (100)	7607 (100)

Table 4 shows the frequency and distribution of conventional and functional heading units over their syntactic realizations across the two genres in focus. Data analysis expressed a strong tendency toward NP heading units. NP heading units accounted for 78.46% of the data, which confirmed findings on titles (Soler, 2007; Gesuto, 2009; & Afful & Mwinlaaru, 2010). The other encoding options were less frequent. NP and coordinated structures were the most appealing in the whole corpus. In the current study, both RA and Thesis writers tended to deploy NPs and then coordinated structures far more than other structures, except for functional Theses in which VPs were preferred to coordinated structures. RAs, contrarily, showed a higher incidence of coordinated structures, and NP patterns constituted the second option. The frequency of the syntactic options for encoding heading units in this study was NP > Coordinated > VP > Clause > PP > Unclear, for the corpus as a whole and for other sub-corpora as well. The frequency hierarchy in functional Thesis headings was slightly different: NP > VP > Coordinate > Clause > PP > Unclear. These main syntactic structures showed different distributional preferences: noun phrases were the most common in conventional as well as functional headings of Theses and RAs. Coordinated and then VP structures were the second and third most frequent in all categories apart from functional Thesis headings in which VP stood immediately below NP and above coordinated structures in rank. Clause and prepositional phrases came next in all categories of frequency hierarchy.

Ambiguous or unclear structures were the slightest in rank and were only found in functional Thesis headings.

Table 4. Functional and Conventional Heading Units in RAs and Theses

Syntax	RAs		Theses		Total Corpus
	Conventional	Functional	Conventional	Functional	
NP	1357 (15.21)	5520 (61.89)	2870 (37.73)	3220 (42.33)	12967 (78.46)
VP	20 (0.22)	635 (7.12)	20 (0.27)	550 (7.24)	1225 (7.42)
PP	0	9 (0.10)	0	46 (0.60)	55 (0.33)
Coordinated	253 (2.83)	1010 (11.33)	327 (4.29)	470 (6.17)	2060 (12.46)
Clause	0	115 (1.29)	0	82 (1.08)	197 (1.19)
Unclear	0	0	0	22 (0.29)	22 (0.14)
Total		8919 (100)		7607 (100)	16526 (100)

The chi-square test results revealed a noticeable difference between RAs and Theses in the syntactic options exploited in their headings. The observed value (120.304) was greater than the critical value (3.84), thus being statistically significant (df= 1, Sig= 00.00).

To recognize any significant difference between the heading styles adopted in RAs and Theses, all syntactic types deployed in both genres were divided into functional and conventional sub-sections and were quantitatively analyzed. Table 5 shows how heading units are distributed across NP structures in RAs and Theses.

Table 5. Most Frequent Types of NP Structures (heads are underlined)

NP	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
<u>NP</u> without Pre- & Post-modification	3047 (34.86)	424 (4.86)	1117 (26.43)	1456 (34.45)
<u>NP</u> with Pre- & Post-modification	416 (4.75)	440 (5.04)	17 (0.40)	101 (2.38)
<u>NP</u> with Pre-modification	1050 (12.02)	1206 (13.79)	184 (4.36)	481 (11.37)
<u>NP</u> with Post-modification	1007 (11.53)	1150 (13.15)	39 (0.93)	832 (19.68)
Total	5520 (63.16)	3220 (36.84)	1357 (32.10)	2870 (67.90)
Total sum		8740 (100)		4227 (100)

The frequency of non-modified NP (34.86%) proved to be remarkably higher than other possible NP patterns in functional RA headings. On the other hand, non-modified NP-patterned headings (4.86%) revealed to be the least probable NP structure in Theses. NP with pre-modification (13.79%) enjoyed the highest popularity among NP-structured Thesis headings. Moreover, post-modified NP, with a slightly lower percentage (13.15%) and NP with pre- and post-modifications (5.04%) were sequentially the next common NP structures after post-modified NPs in Theses. As regards the frequency of NP patterns in functional RA headings, pre-modified NP (12.02%), post-modified NP (11.53%), and NP with pre- and post-modifications (4.75%) were respectively the next patterns utilized in functional RA headings. In sum, functional NP styles of heading writing proved to be of higher preference among RAs (63.13%) compared with Theses (36.84%). Based on the results of the chi-square test, the observed value

(1501.859) was greater than the critical value (7.81), alluding to a significant difference between RAs and Theses in the case of functional NPs (df= 3, Sig= 00.00).

In relation to the analysis of conventional patterns, as Table 5 shows, non-modified NPs were the most frequent type of NP structure in both RAs (26.43%) and Theses (34.45%). NP with pre-modification (4.36%) and NP with post-modification (19.68%) accounted for the highest frequencies in RAs and Theses respectively. Pre-modified NPs (11.37%) and then NP with pre- and post-modifications (2.38%) were the least common in Theses. RA headings revealed to have the lowest occurrence of NP with pre- and post-modification structure (0.40%), and post-modified NP with a slightly higher percentage (0.93%) sat above NP with pre- and post-modifications. Overall, Theses (67.90%) outweighed RAs (32.10%) in the deployment of conventional NP headings. Chi-square analysis proved the existence of a remarkable difference between RAs and Theses in the case of conventional NPs. The observed value (478.887) exceeded the critical value (7.81) hence the difference being significant (df= 3, Sig= 00.00). Table 6 delineates the frequency and distribution of heading units across pre-modified NP structures in RAs and Theses.

Table 6. Most Frequent Types of Pre-modified NPs (heads are underlined)

Pre-modification of <u>NP</u>	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
1Adj+ <u>NP</u>	497 (22.03)	342 (15.15)	40 (6.01)	142 (21.35)
≥2Adj+ <u>NP</u>	17 (0.75)	12 (0.54)	5 (0.75)	10 (1.50)
1N+ <u>NP</u>	430 (19.07)	509 (22.56)	112 (16.85)	279 (41.96)
≥2N+ <u>NP</u>	44 (1.95)	110 (4.87)	6 (0.90)	41 (6.17)
Adj+ N+ <u>NP</u>	22 (0.97)	19 (0.86)	0	0
V+ <u>NP</u>	40 (1.77)	214 (9.48)	21 (3.15)	9 (1.36)
Total	1050 (46.54)	1206 (53.46)	184 (27.66)	481 (72.34)
Total sum	2256 (100)		665 (100)	

As with the results of quantitative analysis of functional pre-modified NP patterns, presented in Table 6, functional headings of both genres under study shared the same pattern diversity. Nevertheless, pattern distributions are different. Single adjectival pre-modification (22.03%) and single noun pre-modification (19.07%) were the first and second highly favored patterns exploited in functional RA headings. These two patterns can be seen at the top of preference rank order of Thesis headings as well. Single nouns (22.56%) preceded single adjectives (15.15%) in rank, though. Multiple noun pre-modification (1.95%) stood at the third rank among RA headings, and NP with verbal pre-modification (9.48%) proceeded single nouns and single adjectives in Theses. Compared with Theses, verbal pre-modification of NP rarely occurred in RA headings; 1.77% of NP structures was verbally pre-modified, and this pattern evidenced to be the fourth on the frequency hierarchy. It appeared that multiple noun pre-modification (4.87%) was the fourth in the Thesis pre-modified NPs. Adj+N pre-modification and multiple adjectival pre-modification were the least probable patterns in both genres in focus and sat at the lowest ranks in the hierarchy. On the whole, Theses proved to favor functional headings compared with RAs. 46.54% of RAs and 53.46% of Theses headings tapped into functional pre-modified NP patterns.

According to the results of the chi-square test, the observed value (173.890) outran the critical value (11.07), hence RAs and Theses being significantly different in the case of functional pre-modified NPs (df= 5, Sig= 00.00).

Conventional pre-modified NP patterns testified that the most frequent pre-modification types were single nouns, and single adjectives in both sub-corpora but the distribution of other pre-modified patterns varied across the data sets. Theses displayed the most limited occurrences of *V+NP* while this structure was the most common type after single nouns and single adjectives in RAs. The frequency hierarchy of NP with pre-modification in RAs was *1N+NP* > *1Adj+NP* > *V+NP* > *2N+NP* > *2Adj+NP*, and in

Theses it was 1N+NP> 1Adj+NP> 2N+NP> 2Adj+NP> V+NP. Generally speaking, popularity of conventional pre-modified NP patterns turned out to be outstanding among Theses (72.34%) in comparison with RAs (27.66%) (see Table 6). Chi-square analysis evidenced that the observed value (35.448) exceeded the critical value (9.48), leading to the conclusion that the difference between RAs and Theses in the case of conventional pre-modified NPs was significant (df= 4, Sig= 00.00). The frequency and distribution of heading units across post-modified NP structures are presented in Table 7.

Table 7. Most Frequent Types of Post-modified NP (heads are underlined)

Post-modification of <u>NP</u>	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
<u>NP</u> + 1PP	601 (27.86)	920 (42.66)	28 (3.21)	691 (79.34)
<u>NP</u> + ≥2PP	228 (10.57)	175 (8.12)	2 (0.22)	133 (15.27)
<u>NP</u> + Complement	150 (6.95)	17 (0.78)	9 (1.04)	8 (0.92)
<u>NP</u> + VP+ post-	28 (1.30)	38 (1.76)	0	0
Total	1007 (46.68)	1150 (53.32)	39 (4.47)	832 (95.53)
Total sum	2157 (100)		871 (100)	

A vast majority of post-modified NP headings revealed to deploy a single prepositional post-modification pattern, that is, 27.86% of RAs and 42.66% of Theses. Both groups of texts seemed to share fairly similar preferences across their syntactic realizations. Multiple prepositional phrases were the second favored post-modified NP structure in RAs and Theses as well. Other post-modified NP patterns comprising complemented NPs and NP + post-modified VP were less-observable structures as shown in the table above. 6.95% of RAs post-modified NP headings utilized complement. While NP + post-modified VP (1.30%) indicated the lowest frequency among possible patterns of post-modified NP in RA headings, it tended to be the third structure with a virtually low percentage of occurrence (1.76%) in the other sub-corpora. Altogether, Theses (53.32%) outstripped RAs (46.68%) in the utilization of functional post-modified NP structures. These percentages of use repeat those of functional pre-modified NPs in RAs and Theses. Chi-square analysis was indicative of a significant difference between RAs and Theses in the case of functional post-modified NPs. The observed value (172.590) was more than the critical value (7.81) hence, the difference being significant (df= 3, Sig= 00.00).

The most common form of conventional post-modification was single prepositional phrase both in RAs (3.21%) and Theses (79.34%). Theses displayed a higher preference for sequences of prepositional phrases (15.27%) after single PP. Complement expansion of NP (1.04%) fell immediately below single prepositional structure in frequency hierarchy of RAs. Sequences of PPs (0.22%) and complement structures (0.92%) were the least frequent types of pre-modifications in RAs and Theses respectively. All in all, Theses (95.53%) prominently surpassed RAs (4.47%) in employing conventional post-modified NP structures. The observed value (13.278) outran the critical value (3.84). Both Pearson Chi-square Test and Fisher's Exact Test proved a significant difference between RAs and Theses in the case of conventional post-modified NPs (df=1, Sig = 0.007< 0.05 and Exact Sig = 0.008< 0.05). Table 8 depicts the frequency and distribution of heading units across VP structures in RAs and Theses.

Table 8. Most Frequent Types of VP Structures (heads are underlined)

<u>VP</u>	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
<u>VP</u> without Pre- & Post-modification	54 (4.55)	98 (8.27)	16 (40)	18 (45)
<u>VP</u> with Pre- & Post-modification	30 (2.54)	31 (2.62)	0	0
<u>VP</u> with Pre-modification	28 (2.36)	243 (20.50)	0	0
<u>VP</u> with Post-modification	523 (44.13)	178 (15.03)	4 (10)	2 (5)
Total	635 (53.58)	550 (46.42)	20 (50)	20 (50)
Total sum	1185 (100)		40 (100)	

Analysis of functional patterns evidenced that post-modification of VP was adopted in a host of VP structures in functionally constructed RA headings. An absolute majority (44.13%) of VP headings in RAs revealed to be shaped into one of post-modified VP structures. The afore-mentioned pattern showed a high frequency in Theses sub-corpus as well; post-modified VP with the percentage of 15.03% was the second preferred structure in Theses. The most frequent VP pattern in Thesis headings was VP with pre-modification (20.50%). As with the VP patterns of RA functional headings, non-modified VP (4.55%) proceeded post-modified VP pattern. VP with pre- and post-modification (2.54%) and pre-modified VP (2.36%), with a slightly different percentage of use, were the next patterns in frequency hierarchy. In the case of VP patterns of Theses, non-modified VP and VP with pre- and post-modification showed the lowest occurrences. It was demonstrated that functional VP headings were generally more preferable in RAs (53.58%) compared with Theses (46.42%). Chi-square analysis indicated that the observed value (348.816) outweighed the critical value (7.81). Therefore, the difference between RAs and Theses in the case of functional VPs was significant (df= 3, Sig= 00.00).

Conventional VP patterns, presented in Table 8, were quantitatively analyzed. VP structure showed the most limited occurrence in conventional headings. Non-modified VP was the most preferred option in both text samples, accounting for 40% of RAs and 45% of Theses headings. Prepositional pre-modification of VP and VP with the nominal object were other possible VP structures that appeared in the corpus though infrequently. Overall, conventional VP headings displayed the same popularity with RA and Thesis writers. The results of chi-square (Sig. = 0.376 > 0.05) showed that the observed value (0.784) exceeded the critical value (3.84) when df= 1, and also Exact Sig. = 0.661 > 0.05, assuring the researchers that there is no significant difference between RAs and Theses in the case of conventional VPs. Table 9 shows the frequency and distribution of heading units across pre-modified VP structures in RAs and Theses.

Table 9. Most Frequent Types of Pre-modified VP Structures (heads are underlined)

Pre-modification of <u>VP</u>	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
N + <u>VP</u>	8 (2.95)	104 (38.37)	0	0
Adj + <u>VP</u>	18 (6.64)	116 (42.80)	0	0
V+ <u>VP</u>	2 (0.73)	13 (4.80)	0	0
Adj + N + <u>VP</u>	0	10 (3.70)	0	0
Total	28 (10.33)	243 (89.67)	0	0
Total sum	271 (100)		0	

Analysis of functional patterns depicted in Table 9 showed that single adjectival pre-modification of VP headings was the most prominent pattern in both genres in focus. VP with single noun pre-modification was the second highly favored syntactic pattern in both genres. The least frequent encoding option in RAs was verbal pre-modification (0.73%), and VP with Adj+Noun pre-modification, being the least common syntax in Theses, was totally absent from RAs. Verbal pre-modification of VP (4.80%) was next to last syntactic option in Theses. Apart from the absence of VP with Adj+N pre-modification, both genres displayed the same distributional preferences. However, RAs generally showed very limited occurrences of pre-modified VP syntax in the corpus in comparison with Theses. A significant difference was observed between RAs and Theses in the use of functional pre-modified VPs. When df= 1, and Sig. = 0.048 < 0.05, the observed value (112.096) exceeded the critical value (3.84), hence the difference being significant. Analysis of conventional patterns in Table 9 showed that the corpus was entirely devoid of conventional headings employing pre-modified VP structures. Table 10 presents the frequency and distribution of heading units across post-modified VP structures in RAs and Theses.

Table 10. Most Frequent Types of Post-modified VP Structures (heads are underlined)

Post-modification of <u>VP</u>	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
<u>VP</u> + Obj N + PP	140 (19.97)	38 (5.42)	0	0
<u>VP</u> + PP	56 (7.99)	27 (3.85)	1 (16.66)	0
<u>VP</u> + Obj N	230 (32.82)	82 (11.70)	3 (50)	2 (33.34)
<u>VP</u> + pre- + Obj N	20 (2.85)	6 (0.85)	0	0
<u>VP</u> + pre- + Obj N + PP	47 (6.70)	0	0	0
<u>VP</u> + Obj NP + Complement	23 (3.28)	3 (0.43)	0	0
<u>VP</u> + pre-(NP) + Obj VP + PP	0	10 (1.42)	0	0
<u>VP</u> + Obj VP + PP	7 (0.99)	12 (1.72)	0	0
Total	523 (74.60)	178 (25.40)	4 (66.66)	2 (33.34)
Total sum		701 (100)		6 (100)

The encoding options recognized in functional post-modified VP structure outnumbered conventional ones. Functional headings in RAs, compared with those of Theses, showed a higher potential for the deployment of fairly all post-modified VP structures. In both genres, VP with object NP, VP with post-modified object NP, and then VP with prepositional post-modification, in a descending order, held the most appeal. VP with pre-modified object NP (2.85%) and then VP with post-modified object VP (0.99%) revealed to be the least preferred options. The former was next to last encoding pattern in Theses (0.85%). On the whole, a clear-cut distinction was observed between RAs and Theses in the deployment of functional post-modified VP structures. Functional post-modified VP headings in RAs (74.60%) took precedence over those in Theses (25.40%). Based on chi-square analysis, Sig = 00.00 < 0.05 when df= 5, the observed value (31.751) was more than the critical value (11.07), hence a significant difference between RAs and Theses in the case of functional post-modified VPs. Conventional post-modified VP patterns displayed very rare occurrences. Prepositional post-modification of VP and VP with the nominal object were the only possible conventional VP structures that appeared in the corpus. Analogous to the results of functional headings stated above, conventional post-modified VP headings revealed to mostly happen in RAs (66.66%) (See Table 10). Both chi-square test and Fisher's exact test testified that there was no significant difference between RAs and Theses in the case of conventional post-modified VPs (Sig = 0.439 > 0.05, df= 1; the observed value (0.600) being less than the critical value (3.84).

Table 11 summarizes the details of heading units across coordinated structures in RAs and Theses.

Table 11. Most Frequent Types of Coordinated Structures (heads are underlined)

Coordinated Structures	Functional		Conventional	
	RAs (%)	Theses (%)	RAs (%)	Theses (%)
<u>NPs</u>	404 (27.30)	73 (4.93)	208 (35.87)	219 (37.76)
<u>NP</u> + <u>NP</u> + post-	52 (3.53)	29 (1.94)	4 (0.69)	22 (3.79)
<u>NP</u> + post- + <u>NP</u>	4 (0.27)	10 (0.67)	0	0
<u>NP</u> + post- + <u>NP</u> + post-	4 (0.27)	14 (0.95)	1 (0.17)	15 (2.59)
Pre- + <u>NP</u> + <u>NP</u>	97 (6.56)	13 (0.87)	3 (0.52)	28 (4.83)
<u>NP</u> + pre- + <u>NP</u>	70 (4.74)	40 (2.70)	32 (5.52)	8 (1.37)
Pre- + <u>NP</u> + pre- + <u>NP</u>	92 (6.21)	98 (6.63)	2 (0.34)	16 (2.76)
Pre- + <u>NP</u> + <u>NP</u> + post-	89 (6.02)	20 (1.36)	0	0
<u>NP</u> + post- + pre- + <u>NP</u>	16 (1.08)	4 (0.28)	1 (0.17)	5 (0.87)
Pre- + <u>NP</u> + post- + pre- + <u>NP</u>	25 (1.69)	8 (0.54)	0	0
Pre- + <u>NP</u> + post- + pre- + <u>NP</u> + post-	0	18 (1.21)	0	0

Pre- + <u>NP</u> + post- + <u>NP</u> + post-	14 (0.94)	4 (0.28)	0	0
Pre- + <u>NP</u> + pre- + <u>NP</u> + post-	17 (1.14)	0	0	0
<u>VPs</u>	3 (0.20)	20 (1.36)	0	0
<u>VP</u> + <u>VP</u> + PP	0	7 (0.48)	0	0
<u>VP</u> + <u>VP</u> + Obj NP	5 (0.33)	8 (0.54)	0	0
Pre- + <u>VP</u> + pre- + <u>VP</u>	12 (0.82)	4 (0.28)	0	0
<u>VP</u> + PP + <u>VP</u> + PP	12 (0.82)	3 (0.20)	0	0
<u>VP</u> + Obj NP + <u>VP</u> + PP	23 (1.55)	0	0	0
Pre- + <u>VP</u> + pre- + <u>VP</u>	2 (0.13)	6 (0.40)	0	0
<u>NP</u> + <u>VP</u>	23 (1.55)	24 (1.63)	2 (0.34)	14 (2.41)
<u>VP</u> + Obj N + <u>NP</u>	1 (0.07)	5 (0.33)	0	0
<u>VP</u> + pre- + <u>NP</u>	0	17 (1.15)	0	0
<u>NP</u> + pre- + <u>VP</u>	1 (0.07)	7 (0.48)	0	0
Pre- + <u>VP</u> + <u>NP</u>	2 (0.13)	9 (0.60)	0	0
Pre- + <u>VP</u> + pre- + <u>NP</u>	0	5 (0.33)	0	0
<u>VP</u> + pre- + <u>NP</u> + post-	3 (0.20)	11(0.74)	0	0
<u>VP</u> + <u>VP</u> + Obj N+ PP	15 (1.01)	0	0	0
<u>APs</u>	2 (0.13)	9 (0.60)	0	0
<u>AdvPs</u>	22 (1.48)	4 (0.28)	0	0
Total	1010 (68.24)	470 (31.76)	253 (43.62)	327 (56.38)
Total sum		1480 (100)		580 (100)

A remarkable diversity of functionally coordinated encoding options can be seen in the table above. Coordination of NPs enjoyed a prominent position in frequency hierarchy of RAs. Theses displayed a high occurrence of coordinated NPs as well. Coordinated pre-modified NP pattern was not only a dominant form in Theses but also in the whole functional coordinated dataset. Post-modified VPs showed the most restricted occurrence in Theses, and two modified forms of coordination of VP and NP, i.e., NP coordinated with pre-modified VP, and VP with nominal object coordinated with NP were the least common patterns in RAs. Apart from several patterns which were absent from RAs or Theses, other patterns were fairly equally distributed across the sub-corpora. In general, functional coordinated structures evidenced to be highly favored in RAs. According to the chi-square test, since the observed value (281.867) exceeded the critical value (26.29), the difference between RAs and Theses in the use of functional coordinated structures was significant (df= 16, Sig= 00.00).

Analysis of conventional coordinated patterns depicted was indicative of the remarkable popularity of coordinated NPs in both RA and Thesis headings (35.87% and 37.76%, respectively). Except for NP coordinated with pre-modified NP, which was the second common pattern in RAs, and pre-modified NP coordinated with NP, which was the second frequent in Theses, other coordinated syntactic realizations accounted for the virtually similar percentage of conventional headings. Contrary to functional coordinated patterns, conventional patterns were mostly preferred in Theses (56.38%) rather than RAs (43.62%). To sum up, coordinated conventional patterns enjoyed less popularity as against functional patterns. Functional RA headings included the most coordinated options. Chi-square Analysis evidenced that the observed value (48.079) outran the critical value (7.81). Therefore, there was a significant difference between RAs and Theses in the case of conventional coordinated structures (df= 3, Sig= 00.00).

Table 12 reports the frequency and distribution of functional and conventional heading units across other structures found in RAs and Theses. Only functional headings enjoyed a diversity of syntactic options though the difference was not statistically significant (the observed value (2.467) was less than the critical value (3.84), df=1, Sig= 0.116).

Table 12. Other Structures Found in the Corpus

Other structures	Functional		Conventional	
	RAs	Theses	RAs	Theses
PP structures	9	46	0	0
Clause	115	82	0	0
Unclear	0	22	0	0

3.2 Semantic analysis

Table 13 provides quantitative information on the number of content and function words, and also the average number of words per RA and Thesis heading in the sample headings in focus. Content words outnumbered function words in the whole dataset. The findings are in line with Gesuto's (2009) that considered content words to be legion, both in the whole corpus and the sub-corpora. Headings as miniature texts condense a lot of information in linguistically squeezed structures. Thus, elements thematically of minor importance become inconspicuous. Therefore, content words, due to their crucial role as the carrier of thematic loads, outweighed function words in headings which tend to comprise the general idea of their subsequent text.

Table 13. Function and Content Words in RA and Thesis Headings

No. of words	RA heading(%)	Average no. of words per RA heading (%)	Thesis headings(%)	Average no. of words per Thesis heading (%)	Total
Function words	6333 (26.79)	0.82 (26.53)	6042 (25.20)	0.82 (25.07)	12375 (25.98)
Content words	17305 (73.21)	2.27 (73.47)	17940 (74.80)	2.45 (74.93)	35245 (74.02)
Total	23638 (100)	3.09 (100)	23982 (100)	3.27 (100)	47620 (100)

Table 14 shows the total number of words, units, and headings, and the average length per unit heading in the data. The length or average number of words per unit varied from a minimum of 2.65 in RAs to a maximum of 3.15 in Theses. The average longest headings occurred in Thesis (3.27 words) and RA headings, showing the average length of 3.09 words, revealed to be slightly shorter. A 14-word heading revealed to be the longest in the Theses, and the longest heading in the RAs consisted of 10 words. The findings of the current study acknowledge Soler's (2007) study, which proved the economy in titles in disciplines and genres. The economy principle is likely to be applicable to the headings as well. RA headings, due to the restrictions imposed by journal authorities on writers, are expected to be short. As regards Theses, deployment of short headings might be reasonably unexpected. Given the generalization of the findings of studies on titles to headings, one may reasonably assume that Thesis headings must be outstandingly longer than RA headings.

Table 14. Number of Words, Units, and Headings, and Length Per Unit and Heading

Genre	Total no. of words	Total no. of units	Total no. of headings	Length per unit	Length per heading
RAs	23638	8919	7632	2.65	3.09
Theses	23982	7607	7332	3.15	3.27
Total	47620	16526	14964	2.88	3.18

3.3 Textual Analysis: A Response to Research Question 2

The results of textual analysis of the corpus can corroborate the positive response to the second research question of the current study. This question calls for the influence of choosing between functional and conventional headings on the publication chance of RAs. To provide a principled answer to this question, the textual aspect of the headings was explored.

Table 15 shows the frequency and distribution of headings in the corpus and the total number of heading units per corpus component. One- and two-unit headings account for most of the data. One-unit headings were favored in both RAs (72.97%) and Theses (93.86%). It is noteworthy that Thesis headings were virtually dominated by one-unit headings. Two-unit headings were the second preferred in both text samples under study as well. Four-unit and then three-unit headings were the last options in both heading texts.

Table 15. Unit Headings Across RAs and Theses

Genre	One-unit headings	Two-unit headings	Three-unit Headings	Four-unit headings	Total No. of units	Total No. of headings
RAs	6509 (72.97)	1025 (22.98)	32 (1.08)	66 (2.97)	8919 (100)	7632
Theses	7140 (93.86)	137 (3.60)	27 (1.07)	28 (1.47)	7607 (100)	7332

Table 16 shows the distribution of functional and conventional styles across one- and multiple-unit headings of RAs. While the functional style was utilized in all types of RA heading units, the conventional style occurred only in one- and in very rare cases in two-unit headings. Results showed that three- and four-unit headings appeared only in the functional units.

Table 16. Frequency of Style Usage Across RA Headings

Types of RA headings units	Functional	Conventional	Total
One-unit headings	4887	1622	6509
Two-unit headings	1021	4	1025
Three-unit headings	32	0	32
Four-unit headings	66	0	66
Total	7289	1630	8919

Since the current study aims at assisting the authors of style manuals with establishing a framework for academic heading writing, the distinguishing criteria for the headings need to be clear. A widely acknowledged research involving titular colonicity (Dillon, 1982) declared deployment of punctuation marks in RA titles to be the clue of scholarship. Based on the results of this study, the colon emerged as the main correlate of scholarship, evidenced primarily in publication chance of an article. Owing to novice writers' endeavor to promote their academic careers, as well as their desire to have their studies published in highly respected ISI indexed journals, this study sought to streamline the process of novice-to-professional transition through textual inspection of data. For the purpose of textual analysis of data, the headings of Theses and RAs were screened to identify the occurrence of explicit punctuation markers, namely, colons, semicolons, full stops, or dashes within headings. Punctuation usage in titles, because of marking strong internal pauses (Anthony, 2001, p. 189), is considered as a sure sign of the presence of structural units. If we generalize this attribute to headings, multi-unit headings, containing two or more units of information, are indicative of the presence of punctuation markers. However, other punctuation marks such as commas, parentheses, or punctuation marks inside other punctuation marks, due to not specifying internal boundaries within headings, were not counted in the textual exploration of headings.

The findings seem to confirm Dillon's (1982), in which 72% of published RAs revealed to be divided by a colon. The colon emerged as the primary correlate of scholarship that increases publication chance of RAs. Taking into account the credibility of the cases inspected as publishable in ISI-indexed journals, one can realize the potential of functional styles for constructing RA headings in multi-unit formats through utilization of dividing punctuation marks, as a sign of scholarship. Therefore, heading style selection, as an impressive factor, can help the novice writers be in control of their academic destinies and take the frequency of functional heading usage in RA dataset of this study as a rule of thumb to enhance the publication chance of their RAs through the employment of functionally constructed headings.

4. Conclusion

The findings of the study suggest that choosing the functional headings plays a crucial role in increasing the publication chance of RAs in international journals. The results provide novice writers in the realm of Applied Linguistics with insights into how published RA headings are syntactically, semantically, and textually constructed, and consequently, streamline the process of their transition to professional writers. The findings are also beneficial to the authors of manuals of style, as they manage to heighten scholars' and novice writers' awareness of the most appropriate heading formation styles by developing more comprehensive style guides. The results of the study also have a potential application to academic writing courses in terms of syllabus content.

The study bears potential weaknesses as well. A limiting factor imposed on the study has taken root in the restricted context of Theses in comparison with RAs. The thesis headings in this study were selected only from the studies conducted in Iran and might merely reflect the rhetorical, syntactic and lexical choices made by Iranian graduates, confirmed by Iranian professional academicians. On the other hand, RAs utilized in the dataset of the current study can be regarded as global samples of studies which achieved publication through meeting the criteria set by ISI journal authorities. However, restricting the Theses to the context of Iran can make Iranian academicians aware of common heading styles employed in Theses defended in Iranian universities and help them outline the process of heading formation.

Finally, the results of the present study can only be used as a platform for further research in this field, and are far from conclusive to arrive at any generalization. Accordingly, more studies need to be carried out to substantiate the findings reported in this study.

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