Hedges and Boosters in Native and Non-Native Library and Information and Computer Science Research Articles

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ABSTRACT

The purpose of the present study is to compare and contrast the frequency of incidence of hedges and boosters used in Abstract, Introduction, and Conclusion sections of Library and Information (LI) and Computer Science (CS) research articles written by English native and non-native writers. Twenty research articles are selected from leading Iranian journals and international journals in two disciplines. The research articles are analyzed according to Holmes' (1988) lexical devices classification, focusing on hedges and boosters. The analysis shows that the overall distribution of hedges and boosters in Library and Information articles is higher than Computer Science articles. Moreover, there are significant differences between native and non-native writers use of hedges and boosters.

Keywords: hedges; boosters; native speakers; non-native speakers; research articles

INTRODUCTION

A writer's full awareness of the social structure and professional consequences of his/her writing is required for the act of academic communication. Hyland (2004) states that besides presenting propositional facts when writing research article, writers should also consider expectations of the reader and what they are likely to find interesting, credible, and intelligible.

Academic writing is created by considering specific conventions of different disciplines. These constraints ensure academic writers that their work is actually recognized by readers and accepted by specialists in that discourse community. One important way through which research articles represents the features of an underlying community is through the writer's use of metadiscourse. Metadiscourse refers to "the cover term for self-reflective expressions used to negotiate interactional meanings in a text, assisting the writer (or speaker) to express a viewpoint and engage with readers as members of a particular community" (Hyland 2005, p. 37).

Hyland and Tse (2004, p. 157) believe that writing is viewed as an engagement between writer and reader which possess a social and communicative basis; and metadiscourse is related to the "ways writer project themselves into their discourse to signal their attitude towards both the content and the audience of the text". Some of the major metadiscourse taxonomies that have been developed are as follows: Crismore et al. (1993), Hyland's taxonomy (1998, 1999), Van de Kopple's revised taxonomy (2002), and Hyland's

revised taxonomy (2004). Hyland (2004) developed a new taxonomy following the above-mentioned ones as the following:

I. Interactive Resources: These devices let the writer manage the information flow to provide preferred interpretations. These resources, according to Hyland (2004), contain the following:

1. *Transitions*: These devices mainly indicate additive, contrastive, and consequential steps in the discourse. Some examples are *in addition, but thus, and,* etc.
2. *Frame markers:* They indicate text boundaries or elements of schematic text structure, like *my purpose here is to, to conclude,* etc.
3. *Endophoric markers*: They refer to information in other parts of the text and make the additional material available for the readers. Some examples are *in Section 2, Noted above,* etc.
4. *Evidential:* They refer to sources of information from texts other than the current one, such as Z *states, According to X,* etc.
5. *Code glosses*: These devices show the restatements of ideational information, like in *other words, e.g.*, etc.

II. *Interactional resources*: These resources refer to a "focus on the participants of the interaction and seek to display the writer's persona and a tenor consistent with the norms of the disciplinary community" (Hyland 2004, p. 139). The interactional resources include:

1. *Hedges*: Indicate the writer's unwillingness to present propositional information categorically, such as about, *perhaps,* etc.
2. *Boosters*: These devices express certainty. Some examples are *it is clear that, definitely,* etc.
3. *Attitude markers*: They indicate the writer's appraisal of propositional information. Some examples are *I agree, surprisingly,* etc.
4. *Engagement markers:* They address readers explicitly, or make a relationship with the reader. Some examples are *you can see that, note that, consider,* etc.
5. *Self-mentions:* they refer to the extent of author presence in terms of first person pronouns and possessives. Some examples are *I, we, our, my,* etc.

In this study, we have focused on hedges and boosters, which are the two major categories of interpersonal metadiscourse. Hedges and boosters are communicative strategies for increasing or reducing the force of statements. They convey both epistemic and affective meaning in academic discourse. In other words, they not only carry the writer's degree of confidence in the truth of a statement, but also an attitude towards the audience.

Lexical devices used to signal the speaker's lack of confidence or to assert something tentatively are described as hedges such as *possible, might,* and *perhaps.* They function to show doubt and indicate that information is presented as opinion rather than fact, or it may be to convey difference, humility and respect for colleagues' views (Hyland 1998). Lexical devices used to express strong conviction are described as boosters such as *clearly, obviously,* and *of course*. Boosters allow writers to express conviction and assert a proposition with confidence. They also mark involvement and solidarity with an audience, stressing shared information, group membership, and direct engagement with readers (Hyland 1998).

To reiterate, the present study aims to compare and contrast the frequency of use of hedges and boosters in three rhetorical sections (Abstract, Introduction, and Conclusion) of Library and Information (LI) and Computer Science (CS) research articles of English native and non-native writers. Therefore the major issues to be addressed in this study are:

1) What are the differences between LI and CS research articles in the use of hedges and boosters across their different rhetorical sections?
2) What are the differences between native and non-native writers of English in the use of hedges and boosters across the different rhetorical sections of LI articles?
3) What are the differences between native and non-native writers of English in the use of hedges and boosters across the different rhetorical sections of CS articles?

METHOD

DATA AND DATA SELECTION CRITERIA

The data for the present study consists of 20 research articles: ten articles belonging to LI and ten articles belonging to CS. From ten articles in each discipline, five articles belong to native writers and five articles belong to non-native writers. The articles were selected from leading Iranian and International journals published during the recent seven years (2004-2011). This study focused on three rhetorical sections of research articles: Abstract, Introduction, and Conclusion.

DATA ANALYSIS

Two main objectives are followed in this study: the first aim is to investigate the frequency of occurrence of hedges and boosters across two disciplines of LI and CS and three rhetorical sections of research articles: Abstract, Introduction, and Conclusion. The second aim is to find the similarities and differences between native and non-native writers in the use of hedges and boosters across these two disciplines and three rhetorical sections of research articles. To meet these objectives, three rhetorical sections of twenty research articles consisting of 14833 words were analysed.

In this study, Holmes' (1988) classification of the lexical devices expressing hedges and boosters was used. Holmes classifies the lexical devices into five grammatical devices: modal verbs, lexical verbs, adjectives, adverbs, and nouns. The frequency of hedges and boosters in three rhetorical sections of the research articles was calculated. Since the size of research articles in each discipline and across three rhetorical sections varied, the frequency of hedges and boosters was calculated for every 1,000 words. The frequency of incidence of each category of hedges and boosters for 1,000 words and their percentages were calculated in each discipline to find out the differences in the category distribution of hedges and boosters between two disciplines.

RESULTS AND DISCUSSION

This section discusses the distribution of hedges and boosters in LI and CS research articles of native and non-native writers according to the research questions. The first part presents the result for rhetorical distribution.

RHETORICAL DISTRIBUTION

The frequency of hedges and boosters was calculated per 1,000 words in three rhetorical sections of LI and CS articles: Abstract, Introduction, and Conclusion. Table 1 indicates the total number of words, the total frequency of hedges and boosters, and their frequency in

three sections of LI research articles. The results show that the highest incidence of hedges is in the Conclusion section at 47.10 percent per 1,000 words and boosters occur mostly in the Conclusion section too at 20.24 percent per 1,000 words.

TABLE 1. Frequency of hedges and boosters across three sections of Library and Information Science research articles

Total Word	Abstract		Introduction		Conclusion		Total	
	1940		3244		2420		7604	
	H	B	H	B	H	B	H	B
Total Devices	84	33	118	38	114	49	316	120
F Per 1000	43.29	17.01	36.37	11.71	47.10	20.24	41.55	15.78

F= Frequency, H= Hedge, B= Booster

Table 2 represents the distribution of hedges and boosters in three rhetorical sections of CS articles. According to the table, the Conclusion section is mostly hedged at 40.45 percent per 1,000 words and boosters occur mostly in the Conclusion section in CS articles too at 11.92 percent per 1,000 words.

TABLE 2. Frequency of hedges and boosters across three sections of Computer Science research articles

Total Word	Abstract		Introduction		Conclusion		Total	
	1829		3472		1928		7229	
	H	B	H	B	H	B	H	B
Total Devices	58	10	123	34	78	23	259	67
F Per 1000	31.71	5.46	35.42	9.79	40.45	11.92	35.82	9.26

F= Frequency, H= Hedge, B= Booster

The results in Tables 1 and 2 show that in both LI and CS articles, hedges and boosters occur in the Conclusion section more than in the Introduction and Abstract sections. This result is consistent with the findings of Hyland (1996) on hedging in biology research articles, Varttala's (2001) study on the distribution of hedges in three disciplines, Falahati's (2006) study on hedges in three disciplines, and Farrokhi and Emami's (2008) study on hedges in two disciplines. Different purposes served by rhetorical sections of a research article contribute to the variation within these sections (Farrokhi & Emami 2008). As seen in the corpus of this study, some hedges and boosters are used to present the summary of the results in the Abstract section of the articles.

According to West (1980) the main rhetorical function of the Introduction is to justify the reason for investigation. This can be done by showing the gap in the previous research and emphasizing the significance of their own work, which the writers have done. Therefore, boosters are not used in this section. On the other hand, the most useful strategy to make a cautious approach in introducing their views towards other studies is provided by hedging. The function of the Conclusion is to comment on the information presented in the articles, summarize the results and put forward claims about the future events. Therefore, the high incidence of hedges and boosters in the Conclusion can be related to this function of the Conclusion section.

CATEGORICAL DISTRIBUTION

For the comparative analysis on the differences or similarities in the distribution of five categories of hedges and boosters in Library and Information and Computer Science articles, the frequency of hedges and boosters in each category per 1,000 words and their percentages were calculated in these two disciplines. According to Table 3, modal verbs (31.32%), lexical verbs (21.20%), and adverbs (20.25%) are the most used categories as hedges, while modal verbs (40.49%) and lexical verbs (35.53%) are the most used categories as boosters in LI research articles.

TABLE 3 Distribution of different categories of hedges and boosters in Library and Information Science research articles

Category	Hedge			Booster		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number
Modal verbs	13.01	31.32	99	6.44	40.49	49
Lexical verbs	8.81	21.20	67	5.65	35.53	43
Adjectives	7.10	17.08	54	1.31	8.26	10
Adverbs	8.41	20.25	64	2.10	13.22	16
Nouns	4.20	10.12	32	0.39	2.47	3
Total	41.53	100	316	15.89	100	121

F= Frequency, W= Words

The distribution of the five categories of hedges and boosters in CS research articles is presented in Table 4. It shows that modal verbs (27.41%), nouns (22.39%), and lexical verbs (21.62%) are the most used categories as hedges while modal verbs (40.90%), adverbs (24.24%), and lexical verbs (22.72%) are the most used categories as boosters in CS research articles. The results show that in both disciplines, a higher proportion of hedges and boosters used are modal verbs and lexical verbs.

TABLE 4. Distribution of different categories of hedges and boosters in Computer Science research articles

Category	Hedge			Booster		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number
Modal verbs	9.82	27.41	71	3.73	40.90	27
Lexical verbs	7.74	21.62	56	2.07	22.72	15
Adjectives	5.80	16.21	42	0.82	9.09	6
Adverbs	4.42	12.35	32	2.21	24.24	16
Nouns	8.02	22.39	58	0.27	3.03	2
Total	35.8	100	259	9.1	100	66

F= Frequency, W= Word

RHETORICAL DISTRIBUTION

Table 5 presents the total number of words, the distribution of hedges and boosters across three sections of LI articles written by native writers, and their total frequencies. This table shows that the highest incidence of hedges is in the Abstract section at 42.69 percent per 1,000 words.

TABLE 5. Frequency of hedges and boosters in Library and Information Science research articles of native writers

Total Words	Abstract		Introduction		Conclusion		Total	
	890		1318		1232		3440	
Total Devices	H	B	H	B	H	B	H	B
	38	14	34	16	47	28	119	58
F per 1000 W	42.69	15.73	25.79	12.13	38.14	22.72	34.59	16.86

F= Frequency, H= Hedge, B= Booster

Table 6 presents the total number of words, the distribution of hedges and boosters across three sections of LI articles written by non-native writers, and their total frequencies. This table indicates that the Conclusion section as 56.39 percent per 1,000 words in the articles of non-native writers is mostly hedged and the highest incidence of boosters occurs in the Abstract section as18.09 percent per 1,000 words of the articles of non-native writers.

TABLE 6. Frequency of hedges and boosters in Library and Information Science research articles of non-native writers

Total Words	Abstract		Introduction		Conclusion		Total	
	1050		1926		1188		4164	
Total Devices	H	B	H	B	H	B	H	B
	46	19	84	22	67	21	197	62
F per 1000 W	43.80	18.09	43.61	11.42	56.39	17.67	47.31	14.88

F= Frequency, H= Hedge, B= Booster

The results indicate that the lowest incidence of hedges and boosters in the articles of both groups occurs in the Introduction section. The Abstract section of articles written by native writers and the Conclusion section of non-native writers contained the highest incidence of hedges but the highest incidence of boosters occurs in the Conclusion section of articles written by native writers and the Abstract section of the non-native writers.

CATEGORICAL DISTRIBUTION

Table 7 shows the categorical distribution of hedges in the articles of native and non-native writers in LI. This was done to find out the differences and similarities between native and non-native writers in the use of five categories of hedges and boosters in LI articles. It is found that modal verbs (32.77%) and lexical verbs (24.36%) in the article of native writers and modal verbs (30.45%) in the article of non-native writers are the most frequently used categories of hedges.

TABLE 7. Categorical distribution of hedges in Library and Information Science research articles of native and non-native writers

Category of hedges	Native			Non-native		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number

Continued

Continued

Modal verbs	11.33	32.77	39	14.40	30.45	60
Lexical verbs	8.43	24.36	29	9.12	19.28	38
Adjectives	4.36	12.60	15	9.36	19.79	39
Adverbs	7.26	21	25	9.36	19.79	39
Nouns	3.19	9.24	11	5.04	10.65	21
Total	34.57	100	119	47.28	100	197

F= Frequency, W= Word

The distribution of five categories of boosters in LI articles of native and non-native writers is shown in Table 8. Both native and non-native writers use modal verbs and lexical verbs as boosters: (44.06%, 38.98%) in native and (37.09%, 32.25%) in non-native articles.

TABLE 8. Categorical distribution of boosters in Library and Information Science research articles of native and non-native writers

Category of boosters	Native			Non-native		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number
Modal verbs	7.55	44.06	26	5.52	37.09	23
Lexical verbs	6.68	38.98	23	4.80	32.25	20
Adjectives	0.58	3.38	2	1.92	12.90	8
Adverbs	2.03	11.86	7	2.16	14.51	9
Nouns	0.29	1.69	1	0.48	3.22	2
Total	17.13	100	59	14.88	100	62

F= Frequency, W= Words

RHETORICAL DISTRIBUTION

Table 9 shows the total number of words, the distribution of hedges and boosters across three sections of CS articles written by native writers, and their total frequencies. The table shows that the highest incidence of hedges is in the Conclusion section as 47.30 percent per 1,000 words and the highest occurrence of boosters is in the Introduction section as 12.26 percent per 1,000 words.

TABLE 9. Frequency of hedges and boosters in Computer Science research articles of native writers

Total Words	Abstract		Introduction		Conclusion		Total	
	1203		1630		1226		4059	
Total Devices	H	B	H	B	H	B	H	B
	44	3	66	20	58	14	168	37
F per 1000 W	36.57	2.49	40.49	12.26	47.30	11.41	41.38	9.11

F= Frequency, H= Hedge, B= Booster

The distribution of hedges and boosters in CS research articles of non-native writers is shown in Table 10. As the table shows Introduction section of non-native writers is mostly hedged as

30.94 percent per 1,000 words and Conclusion section contains the most boosters as 12.82 percent per 1,000 words. The results show that there is a similarity between native and non-native writers in the use of hedges in CS articles. The highest incidence of hedges is in the Conclusion and the Introduction sections and the lowest in the Abstract section. But there is a significant difference in the use of boosters in both groups of writers. The highest incidence of boosters occurred in the Introduction followed by the Conclusion and Abstract sections of native writers but in the articles of the non-native writers the tendency is Conclusion followed by Abstract and Introduction.

TABLE 10. Frequency of hedges and boosters in Computer Science research articles of non-native writers

Total Words	Abstract		Introduction		Conclusion		Total	
	626		1842		702		3170	
Total Devices	H	B	H	B	H	B	H	B
	14	7	57	14	20	9	91	30
F per 1000 W	22.36	11.18	30.94	7.60	28.49	12.82	28.70	9.46

F= Frequency, H= Hedge, B= Booster

CATEGORICAL DISTRIBUTION

Frequency of hedges and boosters per 1,000 words in five categories and their percents were calculated to find out similarities and differences between native and non-native writers in the use of each category of hedges and boosters in CS articles. Table 11 shows the categorical distribution of hedges in the articles of native and non-native writers. The results reveals that nouns (29.16%) and modal verbs (26.78%) in the articles of native writers and modal verbs (28.57%) and adjectives (26.37%) in the articles of non-native writers are the most frequently used categories of hedges.

TABLE 11. Categorical distribution of hedges in Computer Science research articles of native and non-native writers

Category of hedges	Native			Non-native		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number
Modal verbs	11.08	26.78	45	8.20	28.57	26
Lexical verbs	8.62	20.83	35	6.62	23.07	21
Adjectives	4.43	10.71	18	7.57	26.37	24
Adverbs	5.17	12.5	21	3.47	12.08	11
Nouns	12.07	29.16	49	2.83	9.19	9
Total	41.37	100	168	28.69	100	91

F= Frequency, W= Words

The categorical distribution of boosters in the articles of native and non-native writers of CS is shown in table 12. As the table shows, modal verbs (44.44%) and adverbs (27.77%) in the articles of native writers and modal verbs (36.66%) and lexical verbs (30%) in the articles of non-native writers are the most frequently used categories of boosters.

TABLE 12. Categorical distribution of boosters in Computer Science research articles of native and non-native writers

Category of boosters	Native			Non-native		
	F per 1000 W	Percent	Raw number	F per 1000 W	Percent	Raw number
Modal verbs	3.94	44.44	16	3.47	36.66	11
Lexical verbs	1.47	16.66	6	2.83	30	9
Adjectives	0.73	8.33	3	0.94	10	3
Adverbs	2.46	27.77	10	1.89	20	6
Nouns	0.24	2.77	1	0.31	3.33	1
Total	8.84	100	36	9.44	100	30

F= Frequency, W= Words

CONCLUSION

Given that the main goal of the present study is to find the differences in frequency and types of hedges and boosters, three major questions need to be considered in attempting to explain the results. The first question examined the differences between LI and CS research articles in the use of hedges and boosters across their different rhetorical sections. It is found that in both LI and CS articles, the Conclusion section contained more hedges and boosters than the Introduction and the Abstract sections. The occurrence of hedges and boosters in LI articles is higher than CS articles. Moreover, there was a broad agreement in the use of modal verbs and lexical verbs as hedges and boosters in LI and CS articles. In LI articles, boosters have been presented mainly through modal verbs but in CS articles, adverbs have been used to show boosters.

The differences between native and non-native writers of English in the use of hedges and boosters across the different rhetorical sections of LI articles were examined in question two. It has been revealed that the highest incidence of hedges in the LI articles of native writers was in the Abstract section but the highest incidence of hedges for non-native writers was in the Conclusion section. But interestingly the trend about the incidence of boosters was the opposite: the Conclusion section of LI articles of native contained the highest hedge and the Abstract section of non-natives contain the highest boosters. Besides, the Conclusion sections of LI native writers' articles and the Conclusion sections of CS non-native writers' articles contain the highest incidence of boosters.

In the third question, the focus is to examine the differences between native and non-native writers of English in the use of hedges and boosters across the different rhetorical sections of CS articles. The findings show that the Conclusion section of CS articles of native writers contain high percent of hedges and the Introduction section contains high percentage of boosters. But the highest occurrence of hedges is in the Introduction section of non-native and the highest occurrence of boosters is in the Conclusion section. Meanwhile, in both disciplines, native and non-native writers mainly used modal verbs as hedges.

Considering the importance of hedges and boosters in academic writing, there might be a need for greater and more systematic attention to be given to these important interpersonal strategies (Hyland, 1994). This implies that recognition and the effective use of hedges and boosters must be taught to students especially to non-native English speakers, who are probably not familiar with hedges and boosters and therefore find them difficult to

use appropriately (Hyland 1995).

It has been stated by Salager-Meyer (1997) that foreign language readers frequently tend to give the same weight to interpretations and opinions as to facts. Therefore, it is of great importance that students be able to recognize hedges and boosters in written texts. By contrasting the various kinds of discourse learners could be led to consider not only the frequency and different forms of hedges and boosters, but also the various reasons underlying the use or nonuse of hedges and boosters in different texts (Varttala 2001).

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