

A Pragmatic Analysis of Hedges in Articles on Chemistry, Linguistics and Economics

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Abstract: This study examines the use of hedges in the introduction sections of scientific articles in three disciplines, namely Chemistry, Linguistics and Economics, based on Lakoff (1973), Hyland (1998), Varttala (2001) and Salager-Meyer (1994). The aim of this research is to discover the distribution of hedges in the introduction sections of those articles written by male and female writers. Data were collected from 6 articles consisting of 2 articles on Chemistry, 2 articles on Linguistics and 2 articles on Economics selected from reputable international journals. This study indicates that the total percentages of hedges are Economics (7.59%), Linguistics (6.27%) and Chemistry (3.1 %). In terms of gender, the total percentages for males are 8.35% and females 8.61%. This study confirms Hardjanto (2016) who states that the use of modal auxiliaries (hedges), tends to be more common in soft sciences (economics and linguistics) than in hard sciences (chemistry). Meanwhile, this study refutes Yeganeh and Ghoreyshi (2015) that hedging has been claimed to be a strategy that is used mostly by female writers than male writers. In this study, male writers hedged as much as females, probably because the genre of the texts is similar, namely academic texts.

1 INTRODUCTION

Studies of hedges in scientific articles have long been conducted by linguists. Their linguistic features have been investigated from various aspects. Generally, however, most studies on hedges aim to investigate at least the types and frequencies of hedges that occur in scientific articles. Some distinguishing viewpoints are (a) the disciplines of sciences in which hedges are examined, such as humane studies, health and law; (b) the parts of articles that are examined; (c) the subjects of study, namely the profiles of writers; (d) the genre or media in which hedges are used, namely spoken or written.

Afshar, Moradi and Hamzavi (2014) explored the types and frequencies of hedges in humane studies' articles. Musa (2014) compared the use of hedges in Chemistry theses and English theses. Rabab'ah (2013) compared the use of hedges in the fields of Nursery and English education. Aquino (2014) investigated the use of hedges in journalistic articles written by students in campus newspapers. Hashemi and Shirzadi (2016) examined the use of hedges in linguistics articles using a triangulation of

three research methods, namely qualitative, quantitative, and mixed methods.

Tran and Duong (2013) compared the use of hedges contained in sub-chapters of research articles, such as results and discussion in articles written in Applied Linguistics and Chemical Engineering. Afshar and Bagherieh (2014) compared and contrasted the frequencies of hedges in abstracts in Persian Literature and Civil Engineering. Hashemi and Shirzadi (2016) examined the use of hedges in the discussion sub-chapter in linguistic articles.

Hinkel (2005) analyzed the types and frequencies of hedges in essays written by native speaker writers and non-native speaker writers in English. Yagiz and Demir (2014) investigated the strategies of using hedges between English native speakers and non-native speakers.

Samaie, Khosravian, and Boghayeri (2014) analyzed the types and frequencies of hedges in the sub-chapter of introduction written by English native speaker writers and non-native speaker writers. Afshar, Asakereh and Rahimi (2014) compared the frequencies of the use of hedges in the discussion

sub-chapter written by English native speakers and non-native speakers.

Riekkinen (2009) researched hedges in oral interactions in the context of academic discourse. Dousti and Rasekh (2016) studied the differences in the use of hedges in interpersonal interactions between male students and female students.

2 RESEARCH QUESTIONS

The research questions of the study are as follows:

1. What are the distributions of hedges in the introduction sections of the six articles in the fields of Economics, Linguistics, and Chemistry?
2. What are the total percentages of hedges used in the introduction sections of articles written by male and female writers in the those three disciplines?

3 DATA COLLECTION

This study investigates the distributions of hedges in the introduction sections of economics, linguistics, and chemistry articles. Two articles for each field were selected, namely by one male author and one female author from peer-reputable international journals from 2010 to 2014. There were 6 articles analyzed consisting of 2 articles on Chemistry, 2 articles on Linguistics and 2 articles on Economics.

4 DATA ANALYSIS

Data were analyzed using following features and categories synthesized from the features of hedges of Lakoff (1973), Hyland (1998), Varttala (2001) and Salager-Meyer (1994) as follows:

- a. adverb-based hedge:
roughly, relatively, technically, ... etc.
- b. pronoun-based hedge: somewhat
- c. adjective-based hedge:
possible, substantial, reasonable, ... etc.
- d. verb-based hedge:
appear, seem, verb-based hedge, ... etc.
- e. noun-based hedge:
prediction, implication, possibility, ... etc.
- f. modal verb-based hedge:

can, could, may, ... etc.

The above hedges were computed in terms of disciplines, namely the distribution of hedges across different disciplines and gender, namely the distribution of the use of hedges by both male and female writers to discover which gender used more hedges. These distribution figures were expressed in percentages.

5 FINDINGS AND DISCUSSION

Following is the findings and discussion of the study. The findings are presented in tabular form. After that these findings are discussed by comparing them to the findings of previous studies which investigated a similar topic. Table 1 describes the total percentages of hedges in the introduction sections of economics, linguistics and chemistry. The table shows that every subject in this research used hedges in their introduction sections of the research articles with varying percentages.

With regard to discipline differences, economic articles were found to be hedged more than the two other disciplines, namely, linguistics and chemistry. The table shows that the distribution of hedges in the introduction sections of economics articles is 7.59 %. Although the number of hedges in economics is greater than in linguistics (6.27%), this difference is slight as both economics and linguistics belong to the soft sciences category. Meanwhile, chemistry articles which are considered "a hard science" has the least number of hedges (3.1 %).

This study confirms Hardjanto's (2016) study which states that the use of modal auxiliaries, or hedges in general, tends to be more common in soft sciences (economics and linguistics) than in hard sciences (chemistry). Hard sciences such as chemistry are not expected to hedge as much as social science and linguistics because it is expected to present its findings based on pure experiments with greater certainty. Meanwhile, soft sciences, namely linguistics and economics tend to be more discursive and interpretive, more tentative and more cautious in presenting knowledge claims. The following table is the distribution of hedges found in the introduction section of Economics, Linguistics and Chemistry written by male and female writers:

Table 1: The distribution of hedges in the introduction sections of the three disciplines.

No.	Subject Code	Gender	Discipline	No.	Types of Hedges	Hedges Percentages	The Total Percentages of Hedges in the Introduction Sections of the three disciplines
1.	EcM	Male	Economics	1.	adverb-based hedges	1.36 %	3.06 %
				2.	adjective-based hedges	0.68%	
				3.	modal verb-based hedges	0.51%	
				4.	noun-based hedges	0.34 %	
				5.	verb-based hedges	0.17 %	
2.	EcF	Female	Economics	1.	modal verb-based hedges	1.71 %	4.53 %
				2.	verb-based hedges	0.97%	
				3.	noun-based hedge	0.85 %	
				4.	adverb-based hedge	0.84 %	
				5.	adjective-based hedge	0.24 %	
Total Distribution of Hedges in the Introduction Sections of the Economics Articles							7.59 %
3.	LiM	Male	Linguistics	1.	noun-based hedge	2.1%	4.03%
				2.	modal verb-based hedge	0.65%	
				3.	adverb-based hedge	0.64%	
				4.	verb-based hedge	0.32%	
				5.	adjective-based hedge	0.32%	
4.	LiF	Female	Linguistics	1.	noun-based hedge	0.91%	2.24%
				2.	modal verb- based hedge	0.67%	
				3.	verb-based hedge	0.44%	
				4.	adjective-based hedge	0.22%	
Total Distribution of Hedges in the Introduction Sections of the Linguistics Articles							6.27%
5.	ChM	Male	Chemistry	1.	modal verb-based hedge	0.54%	1.26%
				2.	verb-based hedge	0.36%	
				3.	adjective-based hedge	0.36%	
6.	ChF	Female	Chemistry	1.	adverb-based hedge	0.92%	1.84%
				2.	adjective-based hedge	0.69%	
				3.	noun-based hedge	0.23%	
Total Distribution of Hedges in the Introduction Sections of the Chemistry Articles							3.1 %

Economics and linguistics belong to social sciences, also known as “soft” sciences, as they deal with variables which characterize human behaviour. It is known that on the rhetorical and stylistic level, economists tend to mitigate expressions, especially in the presence of negative judgements. Writers in linguistics also rely more on personal projections because data in soft sciences are abstract and appear to be subjectively analysed. Writers in applied linguistics are likely to show fuzziness and leave space for negotiation whereby a sense of politeness is shown (Tran and Duong, 2013).

This discipline-based variation in the distribution of hedges in the introduction sections economics,

linguistics, and chemistry seems to have been caused mostly by different characteristics between soft and hard sciences. Varttala (2001, p.248) states that “different disciplines may not be altogether uniform when it comes to frequency, forms, and variety of hedges”. It may be validly stated that chemistry articles need to argue their claims more strongly as they are based on pure facts and experiments. Yet economics and linguistics are considered to be softer areas of research and it could be more difficult to make stronger claims in presenting findings in these two disciplines.

In addition, Hyland (2008) believes that discipline specificity lies in the use of language. He

argues that different disciplines value different kinds of arguments and also vary in what their readers already know and how they might be persuaded. Accordingly, Hyland (2008) believes that chemists do not write like linguists or economists. He suggests that disciplines make up a continuum with

hard sciences like natural sciences, for example chemistry, on the one end and soft sciences such as economics and linguistics on the other.

Table 2 presents a distribution of hedges across various disciplines employed by both gender types.

Table 2: The total percentages of hedges in the introduction sections of articles written by male and female writers.

Gender	No.	Subject Code	Percentages of Hedges	Total Percentages of Hedges
Male	1.	LiM	4.03%	8.35%
	2.	ChM	1.26%	
	3.	EcM	3.06 %	
Female	1.	ChF	1.84%	8.61%
	2.	EcF	4.53 %	
	3.	LiF	2.24%	

Table 2 shows that there is slight difference between percentages of hedges of male and female subjects. Female subjects tend to hedge more than males but the difference is only 0.26 % and it is not significant. It can be stated that this study refutes Yeganeh and Ghoreyshi (2015) that hedging has been claimed to be a strategy that is used mostly by female writers than male writers.

In this study, male writers tend to hedge as much as females, probably apparently because the genre of the texts is similar, namely scientific texts which have the same convention that should be followed by both male and female authors.

6 CONCLUSIONS

This study showed that the distribution of hedges in the introduction sections of economics, linguistics, and chemistry which vary due to different characteristics between soft and hard sciences. In terms of the number of hedges' percentages, the first highest is economics (7.59%), the second is linguistics (6.27%) and the last is chemistry (3.1 %).

This study confirms Hardjanto (2016) who states that the use of modal auxiliaries, or hedges in general, tends to be more common in soft sciences, such as economics and linguistics than in hard sciences, such as chemistry. Meanwhile, based on the types of hedges, it was revealed that the frequencies of the use of hedges vary from highest to lowest: noun-based hedges (4.43%), modal verb-based hedges (4.08%), adverb-based hedges (3.76%), adjective-based hedges (2.51%) and verb-based hedges (2.26%). Finally, in terms of gender,

the total percentages of hedges showed that male subjects is 8.35% and female subjects is 8.61%.

This study opposes Yeganeh and Ghoreyshi's (2015) findings that state hedging has been claimed to be a strategy that is used mostly by female writers than male writers. In this study, male writers tend to hedge as much as females, probably because the genre of the texts is similar, namely scientific texts which have the same convention that should be adhered to by both male and female authors.

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