A Cross-linguistic and Cross-cultural Study of Epistemic Modality Markers in Linguistics Research Articles

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Abstract

Epistemic modality devices are believed to be one of the prominent characteristics of research articles as the commonly used genre among the academic community members. Considering the importance of such devices in producing and comprehending scientific discourse, this study aimed to cross–culturally and cross-linguistically investigate epistemic modality markers as an important subcategory of hedges in linguistics research articles. To this end, three corpora of research articles written by Anglo-American and Iranian writers in English and Iranian writers in Persian were examined. The frequency occurrences of the markers were counted functionally. The data were analyzed using Mann-Whitney tests. The findings revealed that there were significant differences between all three corpora with respect to the total relative frequency of epistemic modality markers. That is, native English texts contained the highest proportion and native Persian texts included the lowest proportion of epistemic modality marker, and non-native English texts were placed in between. Furthermore, the statistical analysis of the data for each category of epistemic modality markers showed that the text groups differed significantly in containing some specific categories, but not the others. The possible interpretations of the results as well as some implications of the study have been discussed.

Keywords: cross-linguistic and cross-cultural variation, epistemic modality markers, Persian/English, research articles

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1. Introduction

Producing academic texts has been experiencing an increasing attention and has attracted lots of interests on the part of EFL as well as Native English researchers. Particularly, research articles seem to appear as the most favorite genre of academic discourse for them. On the other hand, the need for the research articles to be published internationally requires authors to use English as the lingua franca of the scientific communities. However, mastering the language and being a sophisticated writer is not necessarily sufficient. To be an established member of the academic community, it is crucial for them to be equipped with the general facets of scientific writing along with the particular features of research articles such as genre specific traits, and rhetorical patterns and strategies.

As a matter of fact, a great number of researchers especially in EFL situations, face exhausting challenges and difficulties when it comes to publishing their research articles in international leading journals. Among the abundant possible reasons is the lack of awareness of the rhetorical patterns and strategies of the specific genre (research article) through which they are to communicate their findings and ideas to their addressees. This provides sufficient incentives for some researchers to analyze the academic discourse to explore some identifying commonalities among such texts in different genres. For instance, research articles have been investigated from different dimensions. To this aim, some studies have worked on the research articles' traits which can be attributed to the disciplinary values, conventions, and principles (e.g. Vazquez & Giner 2008; Vold 2006), some have tried to uncover the genre-specific characteristics which are featuring research articles and should be observed by authors (e.g., Hyland 1996; Swales 1990), and some other have focused on the different cultural and linguistic backgrounds of the writers and their effects on the rhetorical patterns of the research articles (e.g. Shokouhi & Talati-Baghsiahi, 2009; Chen 2010; He & Wang 2013).

Since it is hypothesized that Iranian scholars and researchers might have problems understanding and producing texts with rhetorical systems and sources different from their own,   in line with the last mentioned group of the studies, the current paper is to investigate whether and to what extent they are different from their native counterparts in using one specific rhetorical feature of academic writing. More specifically, the present study is to analyze research articles with respect to the cultural and linguistic backgrounds of authors and their impact on the application and distribution of epistemic modality markers as a vital and prominent rhetorical

strategy. In other words, it aims at exploring the possible similarities and differences between the research articles written by English native, Persian native, and Persian EFL writers in terms of using epistemic modality markers.

2. Literature Review

2.1 Different Perspectives towards Academic Discourse

Generally, along the history of academic discourse research, one comes across two different perspectives. The first, which is the traditional and unfashionable one, looks at it as a set of real and scientific truths which are going to be expressed objectively and impersonally. According to this view, a piece of academic writing is a collection of facts which are to be added to the existing truth. The second view, that is more common, believes that academic discourse is a type of interaction between writers and readers (Hyland 2000; Sultan 2011). Consequently, writers and readers are needed to construct their meanings via using interpersonal potentials to establish coherent texts for communicating "their personality, credibility, reader sensitivity and relationship to the message" (Sultan 2011, p. 28).

According to the second view which is the focus of the present study, authors do not merely produce texts to communicate external realities, but they present the status of their assertions, express their words in a persuasive manner, and adjust certainty with caution (Hyland 2000). In other words, in order to be efficient academic writers, authors should assess their statements and allow alternative views since all statements require confirmation. This necessitates proper application of diverse rhetorical and interactive characteristics, of which hedges are among the most prominent (Hyland 2006).

2.2 Hedging and Epistemic Modality Markers

As Hyland (1995) elaborates, hedging has been applied to refer to the linguistic devices employed to qualify a writer's confidence in the truth of a proposition. In academic writing, hedging markers are vital rhetorical strategies since they convey the author's expectation of disagreement to their claims. Hedges perform three major roles in making readers admit claims. First, hedges permit authors to articulate claims more precisely whenever different interpretations can be made on the part of the readers. With this notion, hedges play an important role in expressing uncertain scientific propositions with sufficient caution. In fact, writers attempt to provide information completely, precisely and objectively via balancing act and evaluation in academic writings.

The second role has to do with the author's tendency to predict possible negative outcomes of not being ratified. Practicing the second role of hedges, authors do not take personal responsibility for assertions so as to save their reputation and reduce the harm which may arise out of categorical commitments (Hyland 1995).

Ultimately, hedges enhance the relationship between writers and readers via considering respect and collaboration for readers to accept claims. Using hedging devices, writers consider readers as intelligent community members who have the capability to make decision about the issues; they demonstrate that propositions are not categorical and provide the readers with alternative opportunities to accept them or not. This interpersonal function is supported by the scientific community conventions which expect the authors to be respectful to the peers and engage them in their arguments (Hyland 1995).

One of the main manifestations of hedging strategies is modality markers (Vazquez & Giner 2008). Linguistic elements signifying modality are expressions that authors exploit to negotiate their personal feelings, judgments, and opinions regarding specific assertions (Lorenzo 2008). Declerck (2006 cited in Lorenzo 2008, p. 10) defines modality as:

> a semantic category that comprises two types of meaning: the representation of the speaker's assessment of the likelihood that a proposition (i.e. the content of a clause) is true (or that the situation referred to by a proposition actualizes), and the representation of one of the factors affecting the (non)actualization of the situation referred to, such as (un)willingness, (im)possibility, (in)ability, obligation, necessity, advisability, permission, prohibition, volition, etc. Modality which has to do with the truth of the utterance is called epistemic modality. The other type is referred to as nonepistemic (or root) modality.

Since epistemic modality seems to be one of the distinctive features of English academic discourses (Kranich & Gast 2012), the focus of the present study is epistemic modality markers. According to Palmer (2007), epistemic modality shows the speaker's "judgments about the factual status of the proposition" (p. 10). Therefore, epistemic modality markers can be utilized as hedging devices so as to establish a more well-adjusted writer-reader interaction, in which the writer does not make the reader accept his assertions, but rather presents some opinions with the hope that they convince the reader of (Kranich & Gast 2012).

The fact that epistemic modality markers exist in academic writing is a positive evidence for the pragmatic aspects of such a discourse (Hyland 1994). More importantly, the writers' capability to manage the use of such devices appropriately in the text would enhance the pragmatic aspect of their discourse and may also reflect their high command of pragmatic proficiency in writing. Consequently, this ability can also indicate the authors' overall language proficiency (Chen 2010) since it contributes to a more successful interaction with the content and the reader (Hyland 1996).

Although epistemic modality markers are mostly known by its typical subcategory modal auxiliaries as the representative epistemic modality, they can appear in discourse by various linguistic forms and types including: epistemic modal auxiliaries (e.g., might, would), epistemic lexical verbs (e.g. seem, suppose), epistemic adverbs (e.g. possibly, perhaps), epistemic adjectives (e.g. likely, probable) and epistemic nouns (e.g. claim, view) (Rizomilioti 2006).

Kranich and Gast (2012, p. 4) also considered four major syntactic types of epistemic modal markers in English:

(i)   Modal auxiliaries (may, might, can, could, must)
(ii)   (Lexical) modal verbs (seem, appear)
(iii)   Modal adjectives or adverbs (likely, probably, perhaps, etc.)
(iv)   Modal periphrases (I would wager that …, I doubt if …, etc.)

In the present research, the commonalities between the two classifications have been considered as a criterion to select epistemic categories; that is, modal auxiliaries, (lexical) modal verbs, modal adverbs and modal adjectives have been chosen to be investigated through a contrastive analysis method.

2.3 The Related Studies

The history of contrastive linguistics has been witnessing diverse attempts to study epistemic modality markers in scientific texts. For instance, Vold (2006) studied the use of epistemic modality markers in English, French and Norwegian research articles in linguistics and medicine disciplines. She also investigated gender differences. The statistical analyses of the data showed that epistemic modality markers employed by the Norwegian- and English-speaking researchers were significantly more than those used by the French-speaking authors. Furthermore, the findings revealed that gender does not exert much influence on the frequency use of epistemic modality devices in academic texts. However, interesting differences were

observed between the disciplines regarding the different categories of markers applied by the authors. Ultimately, language and nationality were claimed to be two more prominent factors affecting the academic writers' handling of modality markers in discourse than disciplinary conventions. In a study conducted by Letica (2009), the use of epistemic modality markers were investigated within the spoken texts produced by Croatian speakers in both their L1 and English. The findings indicated that while the participants used a limited range of epistemic devices in both languages, the relative frequency of the markers was more in Croatian than in English. Letica attributed the lower use of epistemic modality markers in English to the low proficiency of the students and their failure to communicate nuances of language applying epistemic modality. Orta (2010) examined the use of modal verbs as epistemic stance markers in Spanish and English research articles. The findings of the study demonstrated that there were considerable differences between the native English writers and non-native Spanish writers in their making use of modal verbs in their research articles. Finally, he concluded that Spanish academic authors showed a deviant manipulating of modality resources as hedgers and boosters, and hence, he failed to establish a proper tenor. In a similar study, He and Wang (2013) examined epistemic modality markers in Chinese research articles and compared them with English, French and Norwegian. According to the statistical analysis of the data obtained in the study, they concluded that 1) the relative frequency use of epistemic modality markers in Chinese research articles were not affected by the disciplinary limitation and conventions; 2) cultural values and frameworks significantly affected the proportion of epistemic modality markers in scientific writings in such a way that the western research articles were less hedged than Chinese ones, statistically. Sameri and Tavangar (2013) worked on a corpus of English and Persian research articles consisting of two sub-corpora of hard and soft sciences written by three groups of writers with different linguistic and/or cultural background. They tried to uncover whether there exists any relationship between cultural and disciplinary variations, and epistemic modality use. The results revealed that, regarding the disciplinary variation, the authors of soft science research articles used epistemic modality more frequently than their hard science counterparts in all three corpora. Furthermore, they also reported that hard science texts contained more certainty markers than possibility and probability marker, whereas, soft science texts made use of certainty markers far less than possibility and probability markers. It was also revealed that there was significant difference between the native English writers and native Persian writers in employing both certainty and possibility markers in their

discourse with English writers using more possibility and certainty markers than their Persian authors.

Scrutinizing the related literature, it is divulged that research in the area of contrastive rhetoric, regarding epistemic modality markers as the writers' rhetorical strategies in producing academic discourse appears to be scant in English and Persian texts. The few studies which have been done in this area have mostly focused on generalities of rhetorical features of the two languages. For instance, Sameri and Tavangar (2013) worked on hard and soft sciences in general without concentrating specifically on a special discipline. Moreover, they analyzed the texts from the perspective of possibility, probability and certainty without having a close look at the different categories of epistemic modality markers including modal auxiliary verbs, modal lexical verbs, modal adverbs, modal adjectives, modal nouns, and modal periphrases as uncertainty markers. Since the proportion of use of different categories and the way they are distributed in native academic texts are of great importance in delineating the rhetorical strategies native writers use in their texts, the current research aims at examining epistemic modality markers as uncertainty devices more closely from the perspective of their different categories. Additionally, as it is believed that disciplinary factor plays an important role in writers' making use of epistemic modality markers as rhetorical paradigms in their text (Vazquez & Giner 2008; Vold 2006), the present study has chosen to work on one scientific discipline, that is, linguistics on which, to the best knowledge of the researchers, has not been worked before in Persian language. The reason behind this choice lies in the fact that the authors of the study assumed that the linguistic authors' inevitable awareness of language features may approach them to the standards of English academic writing features. The motive behind working on one discipline is to narrow done the scope of the study in order to analyze the data more precisely and to reach more detailed and accurate outcomes. Accordingly, this paper is to report a study on the cross-cultural and cross-linguistic differences in the employment of epistemic modality markers as one type of hedging devices in research articles. To this aim, three different corpora of research articles, i.e., English articles written by native English (NE) writers, English articles written by Iranian non-native English (NNE) authors and Persian papers written by native Persian (NP) writers, have been analyzed to explore the interrelationship between them regarding the frequency use of the selected epistemic modality markers. Accordingly, two research questions were posed to be answered:

1. Are there any significant differences among the three corpora (NE, NNE, and NP texts) in terms of the frequency use of epistemic modality markers?
2. Are there any significant differences among the three corpora (NE, NNE, and NP texts) with respect to the frequency use of the subcategories of epistemic modality markers; that is, modal auxiliaries, modal verbs, modal adverbs, and modal adjectives?

3. Method

3.1 Materials

A corpus compiled of a set of research articles from linguistics discipline was selected from the speech communities of English and Persian. The corpus was tried to be extracted from the most widely-read, well-recognized, and leading academic journals (see the list of journals in table 1 below). Via a random sampling, 30 articles from the corpus were selected. Ten of them were written in English by native researchers (both American and British) and published in international journals, ten were written in English by Iranian authors and published both in national and international journals, and ten were written in Persian by Iranian scholars and published in national journals (see Table 1). For the corpus of the present study to be representative of native English and Persian scientific writing, the authors of research articles were required to have Angelo-American and Iranian last names, respectively, and to be associated with the universities in countries where these languages are spoken as first language. Besides, it is tried to select not more than one paper by the same author. All the papers were published between 2009 and 2014.

In the present study only the body of the papers were concerned and abstracts, notes, bibliographies, quotations, tables and figures were excluded. Due to the uneven number of words in the three corpora, the relative frequency of markers rather than the number of occurrences were taken into consideration.

Table1.

The Sources of the Three Corpora

Corpus	words	sources/journals	no. of articles
ET		Language Sciences	6
		Language & Communication	1
		Journal of Pragmatics	2
		lingua	1

Total	89196	10
ET(Iranian)	Language Sciences	2
	International Journal of Lexicography	1
	Iranian Journal of Applied Language Studies	6
	Studia Linguistica	1
Total	55091	10
PT	فصلنامه پژوهش هاي زبان و ادبيات تطبيقي	3
	دو ماهنامه جستارهاي زباني	1
	پژوهش هاي زبانشناختى درزبان هاى خارجى	1
	پژوهش هاى زبان شناسى تطبيقى	1
	مجله پژوهش هاى علوم انسانى	2
	مجله پژوهش هاى زبان شناسى	1
	پژوهش هاى زبانى	1
Total	38801	10
Totals	183088	30

4. Procedure

For the articles constituting the corpus, all occurrences of epistemic modality elements of the four types (modal auxiliaries, modal verbs, modal adverbs, and modal adjectives) were counted in the three text groups using the Acrobat Reader software. In order to be considered an epistemic modality marker, the marker had to qualify explicitly the truth value of a particular propositional content and also be a lexical or grammatical unit. Since differences in meaning which can be assigned to each modal arise from their contexts of use, a meticulous manual analysis was carried out with taking the functional meaning into consideration. In other words, all papers were gone through looking for the specified markers, so that the frequency of the occurrences would be functional but not mechanical since epistemic modality markers seem to be multifunctional and their exact function depends on the context. The following examples from the three corpora will clarify the point:

1. For example, the utterance I saw you, which **could** have the illocutionary force of an accusation, may acquire a different force in a different context. (NE corpus, Text 9, possibility)

2. Each group watched the film twice in a row so that it **could** be remembered more easily.
        (NE corpus, Text 9, ability)

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3. The reason for this non-raising **can** be the "shared feature" of the vowel /@/ and glottal consonants, since both are [-high]. (NNE corpus, Text 6, possibility)

4. Beavers (2008) suggests that compounding languages, such as Japanese, be categorized in the same class, since they **can** combine path encoding affixes to manner verbs. (NNE corpus, Text 1, ability)

۵.   با قبول چنین فرضیه ای می توان اینگونه نتیجه گیری کرد.........

(bä ghabool-e chenin farziye-ei mitavän ingoone natije-giri kard …..)

5. By accepting such a hypothesis, it **can** be concluded that
…… (NP corpus, Text 4, possibility)

۶.   من البته به سبب در اختیار نداشتن آزمایشگاه زبانشناسی و نداشتن علم زبانشناسی، نمیتوانم ثابت کنم که در کدام کاربرد دوگانه ی یاد شده(پِژوهش و پژوهش)، انرژی کمتری مصرف میشود.

(man albate be sabab-e dar ekhtiyär nadashtan-e äzmayeshgah-e zabänshenäsi va nadäshtan-e elm-e zabänshenäsi, nemitavänam säbet konamke dar kodäm kärbord-e dogäne-ye yäd shode (pazhoohesh va pezhoohesh), enerzhi-ye kamtari masraf mishavad.)

6. Due to lack of linguistics laboratory as well as lack of enough linguistic knowledge, I **cannot** prove …………. (NP corpus, Text 8, ability)

As the examples above illustrate, the underlined markers in examples 1, 3 and 5 have been realized in their epistemic notion, whereas, the underlined devices in examples 2, 4 and 6 have been applied in their deontic meaning (ability) which cannot be considered as hedging devices.

5. Data Analysis

To obtain the aim of the study, all occurrences of epistemic modality markers were counted under the four categories of modal auxiliaries, modal verbs, modal adjectives and modal adverbs, adopted from Rizomilioti (2006) and Kranich and Gast's (2012) classifications. After counting and recording the total number of the occurrences of epistemic modality markers according to the function they play in the discourse, the relative frequency of epistemic modality markers per one thousand words was computed for each text group and each category separately. The reason why the relative frequency per thousand words was calculated was the fact that the comparison within the corpora and categories will be possible in equal sizes as the

sample sizes were inevitably unequal (NE = 89196 words, NNE = 55091 words, NP = 38801 words).

To probe whether there are significant differences among the three corpora concerning the relative frequency per thousand words of total epistemic modality markers as well as the relative frequency per thousand words of epistemic modality markers in the four subcategories, Mann-Whitney Tests were applied.

6. Results

To analyze the relevant data in the current paper, the Statistical Package for Social Sciences (SPSS), version 22 was applied. The level of significance was set at 0.05. Table 1 demonstrates the outcoming results for the three corpora, that is, NE, NNE, and NP texts. The first column indicates the categories of markers; the next three columns display the data for the three corpora, each of which has been divided into two smaller columns. The first one illustrates the total number of the occurrences of epistemic modality markers, and the second one shows the relative frequency per thousand words (See Table 2).

Table 2.

Epistemic Modality Markers in the Three Corpora

Categories	NE		NNE		NP	
	No.	f/1000	No.	f/1000	No.	f/1000
	944	10.58	261	4.73	196	5.05
Modal Auxiliaries	500	5.60	197	3.57	62	1.59
	380	4.26	172	3.12	46	1.18
Modal Verbs	126	1.41	29	.52	14	.36
Modal Adverbs						
Modal Adjectives						
Total	1950	21.86	659	11.96	318	8.19

As Table 2 demonstrates, the total relative frequency of epistemic modality markers per 1000 words utilized by NE writers (21.86) is considerably different from those employed by the other two groups (NNE: 11.96, NP: 8.19), with NE writers employing approximately twice as many markers as those used by NNE writers and more than twice as many markers as those used by NP writers. Additionally, the

NNE writers (11.96) tend to apply more epistemic modality markers than their NP counterparts (8.19).

Modal auxiliaries appear to be the most frequent type of markers in each corpus. In this category, NE writers hold the first position (10.58), NP writers hold the second position (5.05) and NNE writers hold the third one (4.73). Modal verbs are the second most frequent class in all three groups, with NE texts having more than NNE texts (5.60 vs. 3.57) and NNE texts possessing more than NP texts (1.59). Modal adverbs have been appeared in all three corpora as the third most frequent type of devices, with the same pattern as the previous categories, i.e., NE the first (4.26), NNE the second (3.12) and NP the third (1.18). Modal adjectives are the least frequent epistemic devices in all three corpora (NE = 1.41, NNE = .52, NP = .36) with the same pattern as modal verbs and adverbs.

To explore if there are significant differences among the three groups of texts concerning the relative frequency per thousand words of total epistemic modality markers, Mann-Whitney Test was run. The results revealed that there were significant differences between NE and NNE groups (U = 11, p < .05), NE and NP groups (U = 1, p < .05) as well as NNE and NP groups (U = 16, p < .05) (see Tables 3 & 4).

Table 3.

Rank Table for the Three Groups Concerning the Occurrence of Epistemic Modality Markers

	Groups	N	Mean Rank	Sum of Ranks
Total	NE	10	14.40	144.00
	NNE	10	6.60	66.00
	Total	20		
Total	NE	10	15.40	154.00
	NP	10	5.60	56.00
	Total	20		
Total	NNE	10	13.90	139.00
	NP	10	7.10	71.00
	Total	20		

Table 4. Test Statistics for the Difference among the Three Groups Concerning the Occurrence of Epistemic Modality Markers

		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Total	NE NNE	11.000	66.000	-2.948	.003

Total	**NE**	1.000	56.000	-3.704	.000
	NP				
Total	**NNE**	16.000	71.000	-2.570	.010
	NP				

To identify whether there exist any significant differences among the three corpora regarding each category of epistemic markers, i.e., modal auxiliaries, modal verbs, modal adverbs, and modal adjectives, running Mann-Whitney Tests were also extended to each of them in turn. Consequently as for the modal auxiliaries, the results revealed that there were significant differences between NE and NNE groups (U = 3, p < .05), and NE and NP groups (U = 4, p < .05). However, there was no significant difference between NNE and NP groups (U = 47, p > .05) (see Tables 5 & 6).

Table 5.

Rank Table for the Three Groups Concerning the Occurrence of Epistemic Modal Auxiliaries

	Groups	**N**	**Mean Rank**	**Sum of Ranks**
Modal Auxiliaries	**NE**	10	15.20	152.00
	NNE	10	5.80	58.00
	Total	20		
Modal Auxiliaries	**NE**	10	15.10	151.00
	NP	10	5.90	59.00
	Total	20		
Modal Auxiliaries	**NNE**	10	10.20	102.00
	NP	10	10.80	108.00
	Total	20		

Table 6.

Test Statistics for the Difference among the Three Groups Concerning the Occurrence of Epistemic Modal Auxiliaries

		Mann-Whitney U	**Wilcoxon W**	**Z**	**Asymp. Sig. (2-tailed)**
Modal Auxiliaries	**NE**	3.000	58.000	-3.553	.000
	NNE				
Modal Auxiliaries	**NE**	4.000	59.000	-3.477	.000
	NP				
Modal Auxiliaries	**NNE**	47.000	102.000	-.227	.821
	NP				

Concerning the modal verbs category, the results indicated that there were significant differences between NE and NP groups (U = 6, p < .05), and NNE and NP

groups (U = 14, p < .05). However, there was no significant difference between NE and NNE groups (U = 31, p > .05) (see Tables 7 & 8).

Table 7.

Rank Table for the Three Groups Concerning the Occurrence of Epistemic Modal Verbs

	Groups	N	Mean Rank	Sum of Ranks
Modal Verbs	**NE**	10	12.40	124.00
	NNE	10	8.60	86.00
	Total	20		
Modal Verbs	**NE**	10	14.90	149.00
	NP	10	6.10	61.00
	Total	20		
Modal Verbs	**NNE**	10	14.10	141.00
	NP	10	6.90	69.00
	Total	20		

Table 8.

Test Statistics for the Difference among the Three Groups Concerning the Occurrence of Epistemic Modal Verbs

		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Modal Verbs	**NE** **NNE**	31.000	86.000	-1.436	.151
Modal Verbs	**NE** **NP**	6.000	61.000	-3.326	.001
Modal Verbs	**NNE** **NP**	14.000	69.000	-2.721	.007

With respect to the modal adverbs, the findings demonstrated that there were significant differences between NE and NP groups (U = 0, p < .05), and NNE and NP groups (U = 10, p < .05). However, there was no significant difference between NE and NNE groups (U = 26, p > .05) (see Tables 9 & 10).

Table 9.

Rank Table for the Three Groups Concerning the Occurrence of Epistemic Modal Adverbs

	Groups	N	Mean Rank	Sum of Ranks
Modal Adverbs	**NE**	10	12.90	129.00

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	NNE	10	8.10	81.00
	Total	20		
Modal Adverbs	NE	10	15.50	155.00
	NP	10	5.50	55.00
	Total	20		
Modal Adverbs	NNE	10	14.50	145.00
	NP	10	6.50	65.00
	Total	20		

Table 10.

Test Statistics for the Difference among the Three Groups Concerning the Occurrence of Epistemic Modal Adverbs

		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Modal Adverbs	NE NNE	26.000	81.000	-1.814	.070
Modal Adverbs	NE NP	.000	55.000	-3.781	.000
Modal Adverbs	NNE NP	10.000	65.000	-3.025	.002

Ultimately, the Mann Whitney Test results for the modal adjective markers illustrated that there were significant differences between NE and NNE groups (U = 12, p < .05), and NE and NP groups (U = 16, p < .05). However, there was no significant difference between NNE and NP groups (U = 43, p > .05) (see Tables 11 & 12).

Table 11.

Rank Table for the Three Groups Concerning the Occurrence of Epistemic Modal Adjectives

	Groups	N	Mean Rank	Sum of Ranks
Modal Adjectives	NE	10	14.30	143.00
	NNE	10	6.70	67.00
	Total	20		
Modal Adjectives	NE	10	13.90	139.00
	NP	10	7.10	71.00
	Total	20		
Modal Adjectives	NNE	10	11.20	112.00

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	NP	10	9.80	98.00
	Total	20		

Table 12.

Test Statistics for the Difference among the Three Groups Concerning the Occurrence of Epistemic Modal Adjectives

		Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Modal Adjectives	**NE** **NNE**	12.000	67.000	-2.874	.004
Modal Adjectives	**NE** **NP**	16.000	71.000	-2.590	.010
Modal Adjectives	**NNE** **NP**	43.000	98.000	-.541	.589

7. Discussion and Conclusion

The current study was to cross-culturally and cross-linguistically investigate the use of epistemic modality markers in linguistics research articles. Accordingly, three corpora written by NE writers, NNE writers, and NP writers were studied. The findings revealed that there were significant differences between NE and NNE texts, between NE and NP texts as well as between NNE and NP texts with respect to the total relative frequency of epistemic modality markers. The research also examined the relative frequency of the four subcategories of epistemic devices, i.e., modal auxiliaries, modal verbs, modal adverbs, and modal adjectives. The results revealed that there were significant differences between NE and NNE texts as well as between NE and NP texts in terms of the relative frequency of modal auxiliaries. However, no significant difference was found between NNE and NP corpora in this regard. Concerning modal verbs, the results demonstrated significant differences between NE and NP texts as well as between NNE and NP texts, but no significant difference between NE and NNE texts. In terms of modal adverbs, the same pattern as modal verbs was observed, that is, there were significant differences between NE and NP texts as well as between NNE and NP texts, but no significant differences between NE and NNE texts were detected. For modal adjectives, the results showed significant differences between NE and NNE texts as well as between NE and NP texts, but no significant differences between NNE and NP corpora were observed.

As far as the total relative frequency of epistemic modality markers is concerned, the findings of the study is compatible with the findings of some previously conducted studies (e.g. Chen 2010; He & Wang 2013; Orta 2010; Vold 2006), in that, they found NE and NNE authors employed epistemic modality markers more frequently in English RAs than authors with other languages in research articles written in their native language. The findings, with respect to the total relative frequency of epistemic modality markers, are also compatible with the results of Sameri and Tavangar (2013) who investigated the effect of cultural and disciplinary variations on epistemic modality use across soft and hard disciplines in English RAs written by NE and NNE speakers and Persian research articles written by NP writers. Their findings showed that English research articles had the most and Persian research articles had the least relative frequency of epistemic devices and NNE texts located somewhere in the middle.

The fact that the NNE texts written by Iranian writers are located somewhere between the Persian texts and the English texts in terms of containing epistemic modality markers as hedges, could signify that the usage of these markers are under the control of both language and culture (Vold 2006). On the one hand, the Iranian English writers' rhetorical strategies may be affected by the structural limitations and properties of language they use since the Iranian English writers have employed significantly more epistemic devices than the time they have written in Farsi. On the other hand, these strategies can be directed and controlled by the writers' cultural values and conventions, and their educational backgrounds since the relative frequency of the epistemic modality markers in their texts were not as frequent as those existed in the native English texts. Furthermore, the limited use of the modality markers on the part of the NNE writers can be attributed to their English proficiency (Letica 2009) which has been mostly acquired in the EFL situation. Due to their unawareness of semantic and pragmatic nuances signified by the epistemic modality markers in general and modal auxiliaries in particular (Palmer 1990; Perkins 1983), they are supposed to avoid applying them as frequently as the NE writers. Another interpretation does also exist. The Iranian writers might also have less knowledge regarding the common characteristic features of the academic writing and particularly of research articles as a specific genre, than the NE authors. This, of course, rises as the result of the lack of a systematic academic writing instruction in the education system in the country or perhaps the lack of explicit instruction of epistemic modality markers in the writing classes and EAP textbooks.

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NP writers also appear, regarding the results of the study, to write within the academic community using far less epistemic modality markers as hedging devices than their NE counterparts. In addition to the justification presented for the NNE writers, and out of them, language properties and limitations, and cultural conventions are of considerable importance. Persian language, in contrast with English, contains fewer epistemic auxiliaries and lexical verbs (see Tavangar & Amouzadeh 2009), while English enjoys a wide range of modal auxiliaries and verbs. This may provide the English writers with more opportunities and alternatives to hedge their statements.

Unlike significant differences among the three groups of texts regarding the frequency of occurrences of epistemic markers, there appears that they have followed a general similar pattern which is approximately consistent in all three corpora. In other words; all three groups of writers employed the four categories of epistemic modality with almost the same rank order in terms of the relative frequency of the markers; that is, first modal auxiliaries, second modal verbs, third modal adverbs and the last modal adjectives, which is supported by Holmes' (1988) and Lorezo's (2008) findings. This feature, regardless of the language and culture, can be interpreted by the common characteristics of the genre framework within which they have written their texts i.e., research articles.

With regard to the differences and similarities probed in the usage of each epistemic category among the three corpora, some discrepancies are explored. The results showed that there is no significant difference between the NE and NNE writers in employing modal lexical verbs and modal adverbs. One interpretation, for this to occur, can be that the English markers falling into these two grammatical categories seems to be easier for the Persian writers to learn and use than the English auxiliaries which are believed to be polysemous and vague (Hyland 1996; Palmer 1990; Perkins 1983). This interpretation seems also to be confirmed by the fact that no significant difference was detected between the NNE and NP texts in enjoying the modal auxiliaries. It might indicate that the NNE writers resort to an avoidance strategy when it comes to the use of epistemic modal auxiliaries, or they may transfer their L1 rhetorical pattern to compensate for their lack of knowledge and difficulty in learning the pragmatic application of modal auxiliaries. This can justify more specific contrastive work in future on epistemic modal auxiliaries in both languages. Concerning the epistemic adjective markers, the results of this study showed no significant difference between NNE and NP texts, this cannot be plausibly justified

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due to the very small size of the adjective marker occurrences in the two corpora (see Table 2) and it needs to be explored in a much bigger corpora in future studies.

In general, as the outcomes of the research illustrated, unlike the research assumption about the effect of linguistics writers' unavoidable awareness of hedging devices on approaching their writing products to the natives', it seems that this possible awareness does not play much part in appropriate employment of such devices. However, there may be another plausible justification, that is, Iranian linguistics scholars may be unaware of the importance of such a rhetorical feature of academic discourse (i.e. modality markers). In order to claim more rigorously about the issue, it is proposed that in future research, the texts in the discipline of linguistics will be compared with the texts in other disciplines to find out their proximity to standards of English academic writing.

Therefore, it can generally be concluded that the Persian academic writers in the discipline of linguistics are less reader- and content-oriented than the native English scholars. The findings of the study can also imply not only the importance of the epistemic modality markers in construction of an acceptable rhetorical structure in academic discourse for the writers to be efficient and established academic writers, but also the necessity of the establishment of a systematic and comprehensive academic writing instruction program at least for the post-graduate students to make them consciously aware of the rhetorical properties of academic writing and research article genre features through explicit teaching of epistemic modality markers (see Hyland 2003). In addition, the study can also be beneficial for the Persian research article writers by offering positive evidence in supporting the view that language is more than the phonological, semantic and syntactic properties for the learners to master. It enjoys an important other part which is an interdependency between the language and the culture orientation of the language speakers called pragmatics (Chen 2010).

Yet, this study may suffer from some limitations. In employing epistemic modality markers in academic writings, many factors including age of the writers, their level of proficiency, years of academic experience, gender, etc., may be at work that were not considered in the present research due to the feasibility issues. Accordingly, other researchers are suggested to conduct further research while considering such elements. Furthermore, it is suggested that later studies, thanks to the potential of the modality markers and their importance in academic writing, work

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more specifically on each category as a unique study on much bigger data to shed more light on the exact part they play in discourse.

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