A Sociopragmatic Analysis of Textual Metadiscourse Markers in English and Persian Scientific Texts

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Abstract
This study aimed to explore the function and frequency of textual metadiscourse markers (MDMs) in scientific English and Persian texts. Based on the qualitative and quantitative analysis of textual markers characterizing the selected genre, four different textbooks, two written in English and two in Persian were analyzed to identify the textual metadiscourse categories (including logical markers, code glosses, and sequencers) used in these texts and to determine the sociopragmatic differences existing in these languages, chi-square test was run and the findings suggested that textual MDMs were present in both English and Persian texts, but they differed in their frequency of occurrence. The contrastive comparison between the English and Persian texts revealed that the frequency of the textual MDMs was greater in the Persian texts. Therefore, it was concluded that such discrepancy could be attributed to the differing rate of explicitness in these two languages. The Persian writers were more interested in explicating their ideas for readers through the text via the use of textual markers (TMs) to a greater extent. It was further found that different factors may influence the use of MDMs, namely the culture, the writer's preferences, the text, and its genre. The implications could include the precaution that Iranian EFL writers ought to be advised to approximate their writing style, in terms of using MDMs, to that of native speakers of English while writing in English.

Keywords: metadiscourse markers, contrastive rhetoric, Persian and English scientific texts, sociopragmatics, genre

Writing is considered as a social engagement in which writers interact with their readers not only to convey messages, but also to help their receivers to understand them. It means that writers predict their readers' requirements and expectations, and respond to them. These expectations are within the bounds of their history, previous texts they have read, or the constrains of particular contexts. To communicate successfully, writers must recognize their readers' expectations, forms and constrains, and get the things done through them (Hyland, 2005).

According to Swale (1990), the pioneer of genre analysis, genre is defined as communicative events specified by a series of communicative purposes and features recognized by the members of the country. Texts can be classified into one genre or another based on their key linguistic or rhetorical features. Metadiscourse markers (MDMs) are among such features. Metadiscourse embodies the idea that communication is more than just the exchange of

information, goods or services, but also involves the personalities, attitudes and assumptions of those who are communicating (Hyland, 2005). Metadiscourse is classified into two macro-categories: textual and interpersonal. It is believed that "textual metadiscourse is used to organize propositional information in ways that will be coherent for a particular audience and appropriate for a given context " (Hyland, 2005, p. 7).

Interestingly, metadiscourse is discourse about discourse and refers to the author's or speaker's linguistic manifestation in his or her text to interact with his or her receivers (VandeKoppel, 1985). VandeKopple (1985) notes that many discourse types have at least two levels: on one level, we supply information about the subject of our text. On this level, we expand propositional content. On the other level, the level of metadiscourse, we do not add propositional material but help our receivers organize, classify, interpret, evaluate, and react to such material. Metadiscourse, therefore, is communication about communication.

Various definitions of metadiscourse have been proposed by different scholars (e.g., Crismore, 1983; Hyland, 1998, 2005; Mauranen, 1993; VandeKopple, 1985). Metadiscourse is defined as "the author's intrusion into the discourse, either explicitly or non-explicitly, to direct rather than inform the readers" (Crismore, 1983, p.4). VandeKopple (1985) defined metadiscourse as 'writing about writing' or 'discourse about discourse'. VandeKopple (1985) argued that metadiscoursive meanings do not expand the propositional information of a text. They do not make claims about states of affairs in the world that can be either true or false. In other words, he stated that MDMs can be analyzed isolated from ordinary discourse and analyzed separately. Hyland (2005) defines metadiscourse as the cover term for the selfreflective expressions used to negotiate interactional meaning in a text, assisting the writer to express a view point and engage with readers as members of a particular community.

MDMs are, no doubt, under the influence of society and culture. According to Kaplan (1966), language is produced in different cultures. Therefore, whatever an author writes would be the reflection of his/her society and place where s/he lives.

In the present investigation, based on Dafouz's (2003) taxonomy, MDMs have been considered as devices which not only assist writers to produce cohesive and coherent texts through the use of TMs but they also apply interpersonal MDMs to develop a relation with reader. The present research aimed at identifying the frequency and functions of textual MDMs used among scientific texts written by both English and Persian writers.

Literature Review

According to Mackey (1965), language analysis comprises language theory, language description, and language differences; in other words, theoretical, descriptive, and contrastive linguistics. Therefore, during the period of 1940 to1960, contrastive analysis was considered as a comparison of mere surface structure of languages.

From about 1970, the formalists were interested in the shift of linguistic theory towards discourse analysis, semantics, speech act theory, sociolinguistics, and pragmatics. In other words, linguists especially in Britain tried to take a lead in advancing more semantic, more social, or more communicative view of language. According to Hatch (1992), Cook (1989), and Brown and Yule (1983), discourse analysis is the analysis of language use beyond the level of the sentence. Thus, discourse analysis considers the communicative aspects of language rather than focusing merely on structural aspects of language. To some linguists, language cannot be studied anymore in isolation from the user and the context. Therefore, the study of the relation between language and society would be interesting for many linguists. The field of sociolinguistics was the result of the marriage between linguistics and the context which language produced.

Contrastive rhetoric maintains that language and writing are cultural phenomena. Contrastive rhetoric was initiated by the American linguist Kaplan (1966). He asserted that each language has rhetorical conventions unique to it. Furthermore, Kaplan asserted that the linguistic and rhetorical conventions of the first language interfere with writing in the second language. It is fair to say that contrastive rhetoric was the first serious attempt by applied linguistics in the United States to explain second language writing. It is only within the past 20 years, however, that writing skills and the role of transfer in particular have been of interest to applied linguistics researchers. Kaplan's first study of contrastive rhetoric provided a model of writing for a theory of second language:
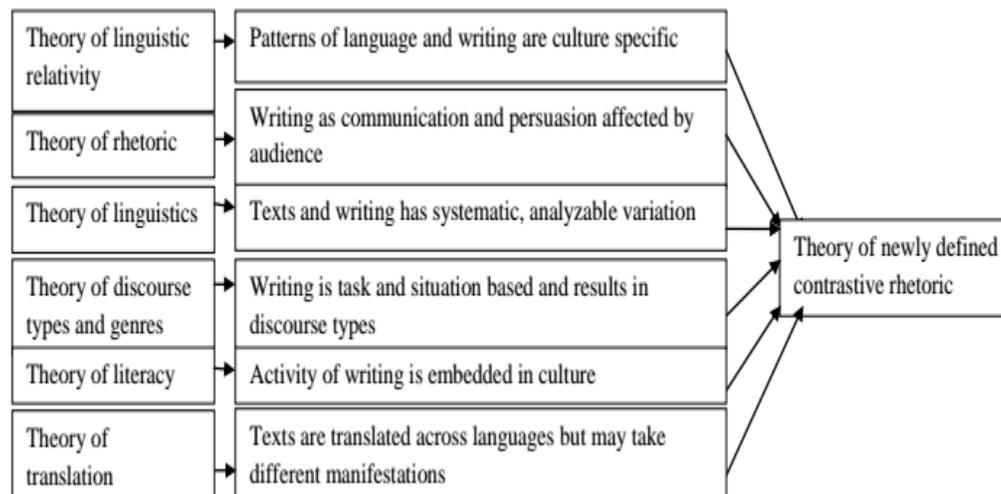

Figure 1. *Model of Contrastive Rhetoric by Kaplan (1966)*

Therefore, there would be some relation between the use of language and the ways that speakers of that experience the world and behave in it appears so clear as to be a truism (Wardhaugh, 1986). A theory of text linguistics provides a descriptive apparatus for describing textual cohesion, structures of texts, theme dynamics, and metatextual feature.

A number of taxonomies on MDMs have been proposed by different researchers (Dafouz, 2003; Halliday, 2003; Hyland, 1998; VandeKopple, 1985). VandeKopple grouped MDMs into two macrocategories, namely textual and interpersonal markers. Then, he considered (1) text connectives, (2) code glosses, (3) illocution markers and, (4) narrators as textual markers, and (5) validity/modality markers, (6) attitude markers, and (7) commentaries as interpersonal metadiscourse.

Halliday (2003), on the other hand, classified MDMs into textual and interpersonal macro-functions. The textual function is concerned with the creation of text, expressing the structure of information, and showing the relation of each part of the discourse to the whole and to the setting. In fact, TMs function at two levels: local and global levels. At the local level, they mark the relationship between propositions, and at the global level, they signal the relationship between the proposition which is under discussion and overall theme (Crismore & Farnsworth, 1990).

Dafouz (2003), like other functionalists, has devoted considerable attention to MDMs. Her model is based on Crismore et al.'s (1993). She classified MDMs into two macro-categories, namely textual and interpersonal MDMs. Textual metadiscourse refers to the organization of discourse, whereas interpersonal metadiscorse reflects the writer's stance towards both the

content in the text and the potential reader (Dafouz, 2003). A careful look at Dafouz's (2003) classification reveals that it contains several features not regarded in other taxonomies. For example, colons and parentheses are embedded under the category of code glosses. For Dafouz (2003), parentheses and colons lead the readers to understand the text and the writer's intention. Moreover, their presence in the texts is controlled by a mixture of both propositional content and persuasive effect (Dafouz, 2003).

Metadiscourse has been the target of a vast array of studies of both spoken and written texts, representing different genres, disciplines, and languages/cultures. The range of genres in which metadicourse studies have been carried out included parliamentary debates (Ilie , 2003), reading comprehension (Camiciottoli, 2003), course books (Hyland, 2005), science popularizations (Crismore & Farnsworth 1990; Hyland 2005), research articles (Abdi 2002; Breivega et al. 2002; Dahl, 2004; Hyland, 2005; Mauranen 1993; Peterlin, 2005; Valero-Garces 1996), doctoral theses (Bunton, 1999; Swales, 1990), undergraduate essays (Ädel, 2003; Crismore et al., 1993), slogans and headlines (Fuertes-Olivera et al., 2001), students' writings (Azizi, 2001; Petrice, 2005), opinion columns (Dafouz, 2008), newspapers (Noorian & Biria, 2010), and master's theses (Hyland & Tse, 2004).

An illustration of the studies on MDMs is Simin and Tavangar's (2009) which examined metadiscourse use in the writings of Iranian EFL students. Based on their Oxford Placement Test scores, the students were divided into three proficiency groups: upper-intermediate, intermediate, and lower intermediate. Their sample essays, written on argumentative topics assigned to them, were collected and analyzed using VandeKopple's (1985) taxonomy. The results indicated that there was a significant difference between the number of markers in the three proficiency groups and the difference was correlated to the students' proficiency levels. In other words, the more proficient students used more MDMs in their writings. Based on this study, they suggested a significant relation between linguistic competence and pragmatic competence in the use of MDMs. It was also found that logical markers were the most frequently used textual metadiscourse subtype.

In another research study, Zarei and Mansoori (2011) studied contrastively the use of metadiscourse in two disciplines (applied linguistics vs. computer engineering) across two languages (Persian and English). The selected corpus was analyzed through the model suggested by Hyland and Tse (2004). The results revealed the metadiscursive resources were used differently both within and between the two languages. As for the two courses, applied linguistics representing humanities relied heavily on interactive elements rather than interactional ones, compared with computer engineering representing non-humanities. The disciplines of applied linguistics and computer engineering were selected to represent two general streams of disciplines, namely humanities and non-humanities, respectively. The quantitative analysis pointed to the importance of metadiscoursal elements across the two disciplines and the two languages. The computer engineering texts representing non–humanities were carefully analyzed to unravel the nature of disciplinary distinctions in the two different languages. It was found that for Persian, comprehensibility of text overrides the relationship that is to be established between the writer and reader. In the same vein, Persian writers' greater use of 'transitions' further supported that the coherence of text is essentially important. Also, 'code glosses' appearing in the second position in Persian computer engineering and fifth in English indicated that Persian writers offer more interpretations of the results. To substantiate their positions, Persian writers provided more 'boosters', that is, they spoke out directly about their views, while English writers made their text more documented, and were more cautious by making greater use of 'evidentials' and 'hedges'. It is interesting indeed to notice that English humanities writers made the least use

of 'attitude markers', leaving the responsibility to the reader to make possible interpretation. English writers thus used evidentials, hedges, and engagement markers to a large extent while Persian writers used transitions, code glosses, and boosters more.

Another study on MDMs was conducted by Mauranen (1993) who explored cultural differences between texts written in English by Finnish and Anglo-American writers with respect to the use of metatext in papers from economics journals. The results indicated that Anglo-American writers used more meta-text than Finnish authors did. Based on these results, Mauranen (1993) argued that Anglo-American writers showed more interest in guiding and orienting readers, and they made their presence felt in the text more explicitly than Finnish authors did when writing in English. This indicated that the works of Anglo-American writers reflected a more reader-oriented attitude, a more positive notion of politeness, and a generally more explicit textual rhetoric consistent with this interpretation, Finnish writers showed a more negative kind of politeness and a greater tendency towards implicitness in their English for academic purposes (EAP) writing. She concluded that, although Finnish rhetorical strategies could be perceived as polite and persuasive in Finnish, their use might result in unintentionally inefficient rhetoric when transferred into English.

In the present study, the researchers tried to present a text-oriented study, analyze the corpora of scientific texts written by English and Persian writers with regard to the frequency of textual metadiscourse markers and discover the conventions in different genres as well as sociopragmatic functions of textual MDMs among scientific texts.

Methodology

Material

The corpora was extracted from four English and Persian scientific academic textbooks which were contrasted to find the frequency and function of textual MDMs and to specify this socio-pragmatic differences evoked by MDMs employed by English and Persian writers producing these texts. In this regard, textual MDMs in criminal law texts and materials and engineering texts, both in English and Persian were investigated based on Dafou's (2003) model of MDMs. Care was taken to make sure that both corpora had the same length. In fact, a total of nearly 40,000 words were selected from each corpus. In addition, the texts were matched for topics in order to ensure comparability. The followings depict the textual information of the selected corpora:

English scientific texts   **Persian scientific texts**

Criminal Law
Catherine Elliot and Frances Quinn
Edinburge Gate, Harlaw, England
Fourth Edition/2000

حقُق کیفری اختصاصی جرایم علیَه اشخاص
دکتر حسین میر صادقی
دانشگاه شهید بهشتی
چاپ اول/۱۳۸۶

Elements of Material Science & Engineering
Lawrence H.VanVlack
The University of Michigan
Fourth Edition /2006

اشنایی با کامپوزیت های زمینه فلزی و پلیمری سرامیکی و فرایندهای ساخت

ن- سلطانی
دانشگاه شریعتی
چاپ اول/۱۳۸۷

To ensure further intertextual comparability, identical topics from each corpus were intentionally chosen. The following provides a parallel list of topics used in this study:

Englishtopics   Persian topics
Chapter 3: Murder
Chapter 4: voluntary manslaughter

فصل اول: جراین علیه نفس قتل

Chapter 1: Introduction to Materials: Selected
 Characteristics Chapter
 2: Chemical Bonding

فصل اول:هعرفی هناد کوپزیتی
فصل دوم: کاهبزیتهای ز هینه فلسی / کاهبزیتهای ز هینه پلیوری

The main reason for analyzing scientific books was that specialized content could be investigated from two different but complementary perspectives, namely register and genre analyses.

Procedure
First, four scientific books written by English and Persian writers were selected. Second, since specific parameters had to be controlled, variables such as the writers' native language, text topic, text difficulty level, and length were kept constant.

The authors' language was controlled to enhance the possible writers' threat to the internal validity of research. Accordingly, books written by nonnative English writers were eliminated from the study. As a consequence, to study textual MDMs only books used at the M.A and M.S. levels were utilized. This also helped to control for the difficulty level of the content. In addition, Gunning-Fog's formula was employed to guarantee that the texts had similar difficulty levels. Another variable which had to be controlled was the text length. For this purpose, 10,000 words were manually counted in each corpus.

Since the topic can influence the rhetorical structure of the text, the topics were also controlled purposefully. To many discourse analysts (e.g. Dafouz, 2003; Hyland, 1999; Thompson, 2001), the topic of a text may affect the research conclusion. As a result, the topics of the English scientific texts were matched with similar topics in Persian.

To measure and classify the textual metadiscourse corpora selected from the target textbooks, Dafouz's (2003) model of MDMs taxonomy was utilized. This model is based loosely on Crismore et al.'s (1993) but was modified considerably to be adjusted to the rhetorical functions characterizing persuasive texts. In this study, textual MDMs were analyzed based on the primary function of each element in its particular context (see Dafouz, 2003). Afterwards, the frequency and percentage of textual MDMs in English and Persian texts were computed. But in order to make a valid comparison and judgment about the significant differences between textual MDMs used in the selected corpora, the Chi-square test was employed.

The Theoretical Basis Underling the Analysis

Contrastive rhetoric is a complementary thread in the discourse analysis of written texts (Conner, 1996; Kaplan, 1996). Contrastive rhetoric has been concerned largely with the process of learning to write in a second language, particularly with how that process is affected by differences in text characteristics across languages and cultures (Conner, 1996). Over time, areas of overlap between contrastive rhetoric and ESP have begun to emerge with both focusing on genre-comparisons across languages (Conner, 1996). In other words, contrastive rhetoric concerns for how texts are culturally constructed and embedded.

This study was a contrastive investigation using English and Persian scientific texts. Both a textual and a rhetorical approach were adopted. Regarding the MDMs within texts, rhetorical framework was applied to explicate the differences and similarities between the English and Persian languages.

To Hyland (1999) and Mauranen (1993), the absence or presence of certain metadiscourse categories is closely related to the rhetorical context which they act and the pragmatic function they fulfill. That is, when researchers study MDMs, they address the rhetorical conditions which metadiscourse is present and focus on the communicative functions it satisfies in a piece of discourse.

Moreover, this study was based on the ESP theory that has adopted various approaches to text analysis, from register analysis to genre analysis. Thus, it can be seen that a generic description of language tends to view language from the view point of culture-specific pragmatic constraints (Swales, 1986). This study was done on scientific texts (English and Persian) which were selected in random in order to extract genre conventions. It has been of so much interest to the language teaching theorists in ESP that genre analysis has become a tool for teaching academic writing to students at the tertiary level (Swales 1986; Widdowson, 1983).

Data Analysis

In this study, we employed qualitative and quantitative analysis simultaneously. Regarding the function of textual MDMs found among the texts in different languages, qualitative analysis was employed. The functions have been explained more in Table 1 based on Dafouz's (2003) textual metadiscourse categories and their functions:

Table 1. *Dafouz's (2003) Textual Metadiscourse Categories and Their Functions*

Macro-category	Subcategory	Examples
1.Logical markers: indicate semantic and structural relationships between stretches of discourse	Additive Adversative Consecutive Conclusive	and, furthermore, in addition ... but, however, or … as a result , therefore … finally , in any case , …
2. Code glosses: explain, rephrase expand or exemplify textual material	Parentheses Punctuation devices Reformulates Exemplifiers	when (as with the Tories now) tax evasion: it is deplored in others but not in oneself in other words, that is, for example, for instance …
3. Sequencers: mark particular positions in a series		first, secondly …
4. Reminders: refer back to		let us return to , as was

previous sections in the text in order to retake an argument , amplify it or summarize some of the previous argumentation		mentioned before …
5. Topicalisers: explicitly indicate topic shifts so that the argumentation can be easily Followed		in political terms, in the case of the NHS …
6.Illocutionary markers: explicitly name the act the writer performs		I end, I propose …
7. Announcements: refer forward to future sections in the text to prepare the reader for prospective argumentation		As we'll see later .

All the results were categorized based on Dafouz's (2003) taxonomy. Dafouz (2003) classified all of these markers based on functions that they play in the text. On the other hand, quantitative analysis helped the researchers count the frequency of the occurrences of these devices within the texts as well as reveal metadiscoursive styles and patterns which different writers applied to create various texts in different cultures. As mentioned previously, Gunning-Fog formula and Chi-Square test were used in this investigation. Gunning fog formula was employed in order to calculate the difficulty level of the Persian and English texts. We also calculated the percentage of the results but to make the conclusions more robust, the Chi-Square test was conducted.

Results

Findings for Textual Metadiscourse Markers in Law Texts

A detailed look into the categories and subcategories that comprised the textual taxonomy revealed similarities and differences regarding their frequency of occurrence between English and Persian texts (Table 2). Moreover, the results revealed that the Persian texts have employed more TMs than the English texts (377 occurrences in the Persian sample versus 358 occurrences in the English sample). More noticeably, logical markers were the most frequently used metadiscoursal elements in the two languages.

Within the category of logical markers, additive and adversative markers were used the most in both sets of data. As seen in Table 2, the Iranian law text writers used additive metadiscourse (n = 162, 56.3%) and English writers applied additive markers (n = 126, 43.8%). Moreover, the Iranian writers employed less adversative metadiscourse (n = 59, 45%) than the English writers (n = 72, 55%).

It, therefore, can be inferred that while Iranian law- text writers preferred to apply additive markers to link ideas, English law text writers used adversative markers to construct argument. Linguistically speaking, 'and' as an additive marker and 'but' as an adversative one were the most frequent markers within texts. Other additive and adversative markers were found but in low or even rare frequency. In regard with consecutive markers within texts, Iranian used these markers less than English writers (n = 35, n = 51 respectively). Linguistically speaking, the findings revealed that consecutive markers such as 'thus' , 'so', and 'consequently' were the most frequent markers, but 'as a result', 'thereby' and 'hence' were less frequent or rare in the corpus .

Table 2. *Results for Textual Metadiscourse Markers in Law Texts*

Category	Iranian No. of markers	English No. of markers	Pearson Chi-square
Logical markers	256	251	.000
Code glosses	114	81	
Sequencers	7	26	
Total	377	358	
Additive	162	126	.013
Adversative	59	72	
Consecutive	35	51	
Conclusive	0	2	
Total	256	251	
Exemplifiers	51	24	.000
Reformulators	30	23	
Parentheses	30	15	
Punctuation	3	19	
Devices	114	81	
Total			

Conclusive markers were also analyzed among law texts. The English law texts contained two conclusive markers but Iranians applied nothing. In general, statistically the relation between logical markers was significant (p = .013).

Code glosses were the second most frequent category for both Persian and English law texts (Iranian 58.5%, English 41.5%). Considering p = .000, there would certainly be a relation between code glosses and writers from different cultures. Among subcategories within code glosses, exemplifiers were the most frequent markers in both texts (Persian texts n=51, English texts n=24). The most frequent exemplifier was 'for example' (n=17) and tokens for other exemplifiers like 'such as, as an example' were less in frequency.

The second most frequently used code glosses in both texts was formulators. The data revealed that the Persian texts have employed more formulators than the English texts (30 exemplifiers in Persian texts but 23 tokens in English texts). In regard with visual MDMs, both parentheses and punctuation markers as implicit devices were applied by both Persian and English writers. However, a considerable discrepancy was found among the frequency of these two corpora. While Iranian favored the use of parentheses (n = 30), English writers preferred punctuation devices (n =19).

As for the rest of the textual markers, the analysis reveals that sequencers were also numerous in English texts with 26 instances versus 7 in the Persian data. As a whole, the difference between code glosses and languages was statistically significant (.000 < .05).

Findings for Textual Markers in Materials-Engineering Texts

The results showed that logical markers occurred highly in both sets of data. In fact, logical markers in comparison to other TMs comprised a large proportion of textual metadiscourse used by both groups of writers (Iranians 56.2%, English writers 43.8%). In addition, within the category of logical markers additive (62.1%) and adversative (19.3%) were applied the most in both sets of data (see Table 3).

Table 3 shows that Iranians used additive markers (n = 174) more than English writers (n = 90). Linguistically speaking, English writers applied "and" in a large amount in the text (n = 55) and then 'also' has been used a lot (n = 17). On the other hand, regarding adversative markers, English writers applied adversative markers (61%) more than Persian writers (39%). The percentages show a significant difference regarding the use of adversative markers between two groups. From a linguistic point of view, we found 'however' as the most frequent marker within English texts (n = 20), then 'but '(n = 12) and 'or' (n = 5) were used numerously by English writers to show the contrast. Overall, while Iranians showed a preference to apply additive markers, English writers employed adversatives to argue:

Table 3. *Results for Textual Metadiscourse Markers in Materials-Engineering Texts*

Category	Iranian No. of markers	English No. of markers	Pearson Chi-square
Logical markers	239	186	.009
Code glosses	164	112	
Sequencers	18	32	
Total	421	330	
Additive	174	90	.000
Adversative	32	50	
Consecutive	32	41	
Conclusive	1	5	
Total	239	186	
Parentheses	83	43	013
Exemplifiers	64	43	
Punctuation	13	15	
devices	4	11	
Reformulators	164	112	
Total			

Consecutive and conclusive MDMs were analyzed in the corpus. In regard to consecutive markers, English texts contained consecutive markers (56.2%) more than Iranians' texts (43.8%). It is worth noting that English materials engineering textbooks included 'therefore' 16 times whereas the other adversative markers such as thus, consequently, so, hence, and as a result were found less in the corpus. Statistically speaking, the difference between the two languages is not significant and both English and Persian writers employed them within their texts.

Code glosses were the second mostly used TM in both languages (n = 276). Based on this outcome, the importance of code glosses in Persian and English academic texts would become evident. Regarding the subcategories of code glosses, the parentheses (n = 126) and the exemplifiers (n = 107) were the most frequent devices which writers in both languages used to guide the readers through the texts. But, comparing the groups with regard to the parentheses application, Iranians employed more parentheses (65.9%) than English writers (34.1%). Besides, the exemplifier frequencies (n = 64) showed that Iranians intended to apply them more than English writers (n = 43). Interestingly, parentheses as well as exemplifiers were used with similar proportions by English materials engineering writers (n = 43). From the linguistic point of view,

the markers for example (n = 15), such as (n = 10), like (n = 7), e.g. (n = 5), as (n = 3), such (n = 2) and, as an evidence (n = 1) were distributed within the English texts.

To Dafouz (2003), parentheses and punctuation devices are implicit markers; on the other hand, reformualtors and exemplifiers are explicit ones. Table 3 showed that while English writers employed punctuation devices (53.6%) and reformulators (73.3%), Iranians applied parentheses (65.9%) and exemplifiers (59.8%) more. As a result, it was found out that both English and Persian writers paid attention to both explicit and implicit devices to convey the meaning. However, this discrepancy of the use would be attributed to the discipline.

Finally, the findings disclosed that sequencers were the least used type of TMs in the texts produced by Iranians and English writers (6.7%). The results showed, moreover, that the English writers used sequencers (n = 32) more frequently than Iranians (n = 18) and this difference between the two groups was statically significant.

Discussion

The general findings from this study revealed that textual MDM was an important feature of professional rhetorical writing in English and Persian. MDMs were used by the writers to persuade their readers and this finding, based on the obtained results, supports Dafouz's (2003, 2008) idea that the presence of metadiscourse within texts makes the texts definitely persuasive.

A detailed look into the subcategories that comprise the textual taxonomy revealed further interesting similarities. For instance, within textual markers in both Persian and English texts, logical markers occupied the first place, code glosses the second, and sequencers the third. These results coincided with Dafouz 's (2003) study and somehow Noorian and Biria 's (2010) study on journals written by American and Iranian EFL authors.

Considering the subcategories in both English and Persian, the results disclosed that both Persian and English writers employed the additive and adversative markers more than other two groups (consecutive and conclusive). This finding was in line with Noorian and Biria's investigation (2010) and Simin and Tavangar's (2009) research. Moreover, the data showed that both Persian and English writers were aware of the use of consecutive devices and employed them within their texts; however, the frequency of the occurrence of these markers was less than additive and adversative in both languages.

Regarding the high number of code glosses, especially exemplifiers, in Persian and English texts, this result coincided with Dafouz's (2008) study. It suggested that the writers were aware of the broad audience they were addressing; therefore, the presence of these makers was believed to show a writerresponsible attitude in both cultures.

The results were much more interesting when we considered the linguistic-cultural differences between the two corpora. In this regard, the results of the contrastive analysis reached us to this fact that unlike the English writers, the Persian writers employed more textual markers and among TMs logical markers were found more within Persian texts. The difference between the two groups in the use of TMs (especially logical markers) might show that Persian writers intended to establish more coherent text, hence providing more guidance for the reader to comprehend the purpose of the text. Zarei and Mansoori's (2011) study lends support to this result.

Regarding the logical markers, the statistical results showed an insignificant difference between the two corpora; however, Persian writers employed larger amount of logical markers within their texts. Consequently, Persian authors focused on creating more cohesive texts rather than writing texts to interact with readers more. Noorian and Biria (2010) in their study on MDMs found out that Persian writers used more logical markers within texts and stated that it

might be due to the influence of the L1. The results in this study revealed the impact of first language on the use of MDMs in second language by Persian writers.

Among the subtypes of logical markers, numerically, Persian writers made more use of additive markers compared to English writers. The results, therefore, suggest that the Iranian writers built their argumentation using a progressive strategy that entailed moving forward in the establishment of ideas and adding evidence to the original claim. By contrast, English writers exhibited a retrogressive strategy, based on the reconstruction of an argument using the pros and cons of an opinion. As for English writers, several studies have indicated that they favored the use of adversative markers in their text (Dafouz, 2003, 2008; Mauranen, 1993; Noorian & Biria, 2010).

Comparing English and Persian textbooks revealed the fact that consecutive and conclusive markers were present in both corpora, but there were variations as to the distribution and composition of such markers. For instance, while English writers tried to make a balance among the TMs within texts, Persian writers favored additive markers most. Thus, regarding the persuasive effect of metadiscourse, a balanced number of both textual and interpersonal markers were necessary to render the text persuasive and readeroriented. In other words, English writers attempted to make a friendly relation with readers by the balanced use of markers in their texts. This finding coincided with Dafouz's (2008) investigation. The analysis of the obtained data also showed that English texts were characterized by the use of more consecutive and conclusive markers but less additive and adversative markers. The reason could be that consecutive relations between discourse stretches naturally occurred less than additive and adversative relationships in text or it might be the use of because, for, since which signal causal relation instead. This finding was in line with Noorian and Biria's (2010) study.

Code glosses explain, rephrase, expand or exemplify propositional content. Overall, they reflect the writer's expectations about the audience's knowledge or ability to follow the argument (that is, in other words, for instance). Code glosses, as the second most frequently used TMs in both disciplines, demonstrate that the principal concern of writers is to present information clearly, explicitly and persuasively. However, there were variations in their use from one language to the other, in general, and one discipline to the other, in particular. Zarei and Mansoori's (2011) study also disclosed this discrepancy between languages and disciplines.

As for the use of code glosses, in general, and exemplifiers and parentheses, in particular, it was found that Persian writers used them more within their texts. It might originate from this reason that they applied these markers in an amount to ensure that the text was read as intended by the writer (Dafouz , 2008). It was discovered by Zarei and Mansoori's (2011) study that English used evidentials, hedges, and engagement markers in a large amount while Persian used transitions, code glosses, and boosters more.

On the other hand, English writers applied punctuation devices more than Iranians. These results indicate that unlike the Persian writers who used exemplifiers as explicit devices to make the text clear, the English writers employed implicit markers (Dafouz, 2008). These non-verbal signals along with others (e.g., underlining, capitalization, italics, etc.), are regarded and classified as visual metadiscourse (a term put forth by Kumpf, 2000), which shows their importance in the analysis of text. This finding coincided with Noorian and Biria's (2010) investigation in which they indicated that both Iranian and American writers seemed to prefer the use of parentheses and they used them much more than punctuation devices (e.g. colons).

 Likewise, the findings on code glosses disclosed an interesting fact. The analysis of the differences in the application of code glosses could be explained by resorting to object and nature of disciplines. The field of Materials-Engineering can be categorized under 'hard science' in

which the setting of the experiments is more controlled and the material and procedures can be closely measured. On the other hand, 'soft sciences', such as Law do not have a firm theoretical foundation, and this tentative nature and subjective evaluation result from the conditions under which the research carried out are not fully in the control of researchers. According to Hyland (1998), in the soft fields, there is less control of variables and more diversity of research outcomes. This discipline may require more persuading resources such as TMs generally and code glosses particularly to structure the text. Therefore, based on what Hyland (1998) mentioned, in this study, we found that English and Persian writers of ME considered as hard science applied more code glosses than English and Persian law text writers.

As for sequencers, the results disclosed the fact that higher number of sequencers that their main duty is to organize the text was seen in English texts. More interestingly, Materials-Engineering as a hard science was a more structured discipline than law as a soft science regarding sequencing devices. This study was in line with Farrokhi and Ashrafi's (2009) research. Therefore, it seemed that English writers tried to create more organized texts than Persian authors, and the use of these markers seemed to be necessary for them to assist the readers through the text.

Conclusions, Implications, and Limitations

There would be various factors which influence the use of MDMs. One of these significant factors is cultural phenomena. In other words, different writers from different cultures select various rhetorical systems in writing and this outcome would strengthen the contrastive rhetoric hypothesis. There are two kinds of rhetoric: writer-responsible rhetoric and reader-responsible rhetoric. In the former, the writer is responsible to make the text clear to the reader by using appropriate signposts, but in the latter, it is the responsibility of the reader to understand what the writer intended to say.

As a result, different cultural thought patterns of both groups can be the reason for the differences in writing rhetorical systems. English writers may view science or scientific findings as a phenomenon which should be stated in an argumentative style not explicit enough to the reader. Therefore, they might employ an explicit way of communicating the findings; however, what made them different from their Iranian counterparts would be the discrepancy in the rate of explicitness. Therefore, it seems that Persian writers are more interested in using overt textual metadiscourse through which they guide and persuade readers and make their presence more explicit in the texts. Of course, both of these preferences for rhetorical strategies reflect very different notions of politeness.

Therefore, it can be concluded that English writers considered readers as intelligent human beings to whom nothing much needed to be explained. Saying too obvious things might seem to be scornful to the reader. The English writers in comparison to Persian ones, thus, selected less explicit language to leave the reader to struggle with the ideas.

The second factor which certainly influences the frequency of occurrence or function of MDMs could be the disciplinary conventions. According to Hyland (2004), metadiscourse can reveal the rhetorical and social distinctiveness of disciplinary communities. It is considered that the use of metadiscourse resources in academic writing consists of disciplinary variations. Hyland (2001) rejects the unitary discourse of the academy by asserting that "disciplines have different views of knowledge, different research practices, and different ways of seeing the world, and as a result, investigating the practices of those disciplines will inevitably take us to greater specificity" (p.10). We also reached this conclusion through the analysis of the results which hard sciences consisted of more, for example, sequencers than soft sciences. And more

interestingly, the contrastive analysis showed that the texts created by the English writers were in a highly structured format.

The next conclusion is that these variations of the use of MDMs would sometimes be attributed to the writers' preferences and their idiosyncrasies. Therefore, the results showed that not only the writers from different countries might have different styles to create texts, but writers of the same language and even with the same cultural background would also write texts in various patterns.

Furthermore, the results disclosed the fact that there were some discrepancies in the distribution of MDMs between the writings of Persian and English writers. While the Persian writers stuck to applying extensively some special metadiscoursive devices within their texts, English writers tried to make a use of all kinds of MDMs and made a balance among these devices. As a result, this conclusion would have some implications for teaching English as a second language to learners.

Although the results from this study suggested that the MDMs would be under the influence of various factors, such as writers' cultural background, writer's preferences, and text genres, more contrastive rhetoric studies must be done on them to assist contrastive analysts to find other effective factors and consequently help them to draw more firm conclusions regarding MDMs within texts written in different languages.

In the domain of writing, the results of the present study can demonstrate the language discrepancy and how writings may evolve to answer the social needs. In writing courses, the EFL teachers can benefit from the results of the study in the way that the learners are made aware of language discrepancy in regard to rhetorical structures. Publishing research articles in international journals in English is obviously very important to Iranian researchers; however, many of them may not be aware of possible differences in rhetorical conventions between English and Persian, and may consequently use Persian writing conventions in their English research articles. Investigations like this study will provide a framework for second and foreign language learners to write like a native English writer (Hyland, 2002; Swales, 1990). According to Hyland (2004), the writer's cultural and rhetorical preferences can affect the use of MDMs and the style of discourse organization. It can be concluded that, in order to produce successful texts in a foreign language, L2 writers must also become familiar with the cultural conventions of metadiscourse use in the target language.

Additionally, the studies on MDMs enable second and foreign language students to read effectively and to get more out of the text (Swales, 1990). It is particularly useful in helping non-native speakers of English with the difficult task of grasping the writer's persuasive stance when reading challenging texts. This ability to follow the rhetorical moves of the author enables non-native learners of English to more effectively understand the writer's line of reasoning in more demanding texts.

The analysis of discourse and other features of any given genre in the field can provide course designers with a manageable and meaningful framework within which to construct courses that can offer the learner tools with which to engage in any of the structural aspects of the professional life. The complexities of a genre and the evolutionary changes which can occur need to be taken into consideration when teaching genre conventions to apprentices with different language backgrounds and when applying generalized models in research, especially if the models are taken from the literature.

This study was limited by the fuzziness that existed between the boundaries of various metadiscourse categories and the multifunctionality of many metadiscourse categories and the fact that they can serve several functions simultaneously in a given context. Future studies can be

carried out expanding the corpus size to see if the same results are obtained. Other contrastive studies may be conducted to compare English and Persian textbooks in other genres and disciplines.

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