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AN INVESTIGATION OF METADISCOURSE MARKERS IN ENGLISH MEDICAL TEXTS AND THEIR PERSIAN TRANSLATION BASED ON HYLAND'S MODEL

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ABSTRACT: *This study was conducted to compare and contrast the metadiscourse markers in English medical texts and their Persian translation to investigate whether these markers function identically in English and Persian within the same genre and to find out if there are any significant differences between English medical texts and their Persian translation in terms of the number and types of metadiscourse markers. To this end, 35 English medical articles and their Persian translation, published in Sina Journal, were selected. To gather data, first, 4 consecutive paragraphs were extracted randomly from each of the selected articles and their Persian translation to collect 280 paragraphs, 140 paragraphs in English as the source text (ST) and 140 paragraphs in Persian as the target text (TT). This was followed by analyzing the frequency and types of metadiscourse markers in each text– which consisted of 4 consecutive paragraphs in ST and TT– in accordance with Hyland's (2005) taxonomy. Next, the total number of metadiscourse items in each of the texts was determined. Finally, the Kolmogorov-Smirnov test (KS-test) was used to report normally distributed data and the paired t-test and Wilcoxon signed-rank test were applied to compare the values of means of metadiscourse markers in English medical texts and their equivalent Persian translation and to study whether these markers function identically in English and Persian within the same genre. The statistical results suggest that there is a significant difference in the amount and types of metadiscourse markers in English medical texts and their Persian translation ($P<0.001$) and the distribution of different types of metadiscourse markers in English medical texts is not the same as their distribution in their Persian translation.*

KEYWORDS: Metadiscourse Markers, English Medical Texts, Hyland's Model, Persian Translation

INTRODUCTION

A considerable number of text analysis studies have been conducted during recent years. Among them, some studies have attempted to clarify characteristics of different genres or text types in terms of structural, discoursal, and metadiscoursal properties.

Metadiscourse is quite a new concept in the area of text analysis. In spite of having been investigated from different angles recently, metadiscourse is still unknown to many of those who are involved in the field of linguistics and translation. Thus, it deserves more investigation and warrants comprehensive research.

We use language to talk not only about the world and ourselves, but also to *talk about talk.* We sometimes refer explicitly to ourselves not only as experiencers in the world, but also as communicators. We may also comment on the situation of communicating in addition to the topic of situation (Ädel, 2006). Language acts to present information through the organization of the text itself and engage readers as to how they should understand it (Fuertes-Olivera et al., 2001). This is what metadiscourse involves itself with. In order to analyze a text, researchers may study metadiscourse elements based on their forms, meanings or functions among which functional studies have been more commonly used.

Statement of the Problem

In Hatim and Mason's (1997) words, translation is 'an act of communication' permanently dealing with at least two different languages along with a broad network of elements including cultural, historical, political, and ideological differences. Undoubtedly, in the era of communication and dialogue among civilizations, translation occupies a crucial role in transferring different ideas among different nations. This research points to metadiscourse markers as important means of facilitating communication, increasing readability and building a relationship with an audience. These features of written discourse play a significant role in writing instruction for academic purposes, as a way of helping both native and non-native speakers of English to convey their ideas and engage with their readers effectively. However, removing metadiscourse features would make the passage much less personal, less interesting and less easy to follow. As metadiscourse markers are relevant in guiding the interpretation of text (rather than contributing to the main propositional content), their precise meanings are often difficult to spell out. So, research on the way metadiscourse markers are used, can contribute to our understanding of their meanings and appropriate usage.

Metadiscourse

Metadiscourse often characterized as simply 'discourse about discourse' or 'talk about talk' that can also be seen as "the author's linguistic manifestation in a text (Hyland, 1999: 5). Metadiscourse is a widely used term in current discourse analysis and language education, referring to an interesting approach to conceptualizing interactions between text producers and their texts and between text producers and users. As Vande Kopple (1985) and Crismore (1989) indicate, writing involves two levels: discourse level and metadiscourse level. On the first level the reader is provided with propositional content and on the second level, the reader is guided through the text. Metadiscourse refers to the pragmatic use of language to comment reflexively on discourse itself. Metadiscourse shifts the focus of attention from ongoing communication, putting some stretch of discourse in a context or frame designed to influence the meaning and practical conduct of communication. Metadiscourse is a term which describes a range of open class lexical items (words and expressions), each of which has a relatively stable pragmatic role, and whose main function is to enhance communicative efficiency. It has been important in writing instruction for academic purposes, as a way of helping both native and non-native speakers of English to convey their ideas and engage with their readers effectively. With the growth of discourse analysis as a key tool in understanding language use, the importance of interaction in writing as much as in speech has become ever more obvious, and metadiscourse has emerged as a way of bringing these interactional features to prominence. Based on this view, not only do authors produce a text to convey ideation content, i.e. information, but also they want to make certain that what they express is comprehensible and reasonable. Hence, they can attract their audience's attention and communicate effectively. In other words, by

anticipating their audience's expectation, needs, interests, and abilities authors try to engage them in their texts and influence their comprehension (Hyland and Tse, 2004; Hyland, 2005).

The term metadiscourse was coined by Zelling S. Harris in 1959 to offer a way of understanding language in use, presenting a writer's or speaker's attempts to guide a receiver's perception of a text (Hyland, 2005). He coined the term "metadiscourse" to better express the pragmatic relationship between writer and reader several decades ago (Beauvais, 1989). Metadiscourse is seen as interpersonal resources to organize a discourse or a writer's stance toward either its content or the reader (Hyland, 2000). The idea of metadiscourse closely follows Halliday's formulation of the macrofunctions of texts consisting of ideational, textual and interpersonal elements. The concept has been further developed by writers such as Williams (1981), Vande Kopple (1985) and Crismore (1989), and collects together a range of discoursal features such as hedges, connectives and various forms of text commentary to show how writers and speakers intrude into their unfolding text to influence their interlocutor's reception of it (Hyland, 2005; Intaraprawat & Steffensen, 1995). Williams (1981) defines metadiscourse as 'whatever does not refer to the subject matter being addressed'. Similarly Vande Kopple (1985) defines metadiscourse as 'the linguistic material which does not add propositional information but which signals the presence of an author', and Crismore (1983) refers to it as 'the author's intrusion into the discourse, either explicitly or non-explicitly, to direct rather than inform, showing readers how to understand what is said and meant in the primary discourse and how to "take" the authors'. Crismore et al. (1993 cited in González, 2005: 37) have defined metadiscourse as "non-propositional aspects of discourse which help to organise the prose as a coherent text and convey a writer's personality, credibility, reader sensitivity and relationship to the message". *Metadiscourse* can be defined as "text elements which comment about the main information of a text, but which themselves contain only inessential information" (Hui & Na, 2008).

Metadiscourse Markers

As Hui and Na (2008) state, "when we talk about the use of metadiscourse in a text, we are talking about metadiscourse features. They are actually those linguistic markers which, while not inherently necessary to the topic, show that the writer is aware of the needs of the audience in order to communicate the semantic content". However, Hyland (2004, 2005) and Hyland and Tse (2004) offered a more potent interpersonal view of metadiscourse: ''all metadiscourse is interpersonal in that it takes account of the reader's knowledge, textual experiences, and processing needs [...]''(p.161). Accordingly, they give up the Hallidayan textual and interpersonal levels of discourse and take up Thompson's (2001) explanation of interactive and interactional resources being as two inter-related modes of interaction. In line with this view of metadiscourse, scholars' discourse choices through the text are developed out of the relationship between the author(s) and their peers within a particular discourse community. Therefore, both interactive metadiscourse features (sought to organize the material with regard to the readers' needs and expectations) and interactional metadiscourse features (intended to depict the scholars as authors and to unite writer and reader together) are a reply to the interpersonal element of writing. Using metadiscourse allows readers to understand discourse texture and intertextuality, to share pragmatic presuppositions, to infer intended meanings, and to interpret the institutional and ideological ties underlying the text (Pérez-Llantada, 2003). However, removing metadiscourse features would make the passage much less personal, less interesting and less easy to follow. As metadiscourse markers are relevant in guiding the interpretation of text (rather than contributing to the main propositional content), their precise

meanings are often difficult to spell out. So, research on the way metadiscourse markers are used, can contribute to our understanding of their meanings and appropriate usage.

Identification of Metadiscourse Markers

Metadiscourse is a fuzzy concept, since it lacks definite boundaries and sometimes it may happen that it would be difficult to make a distinction between metadiscoursal and non-metadiscoursal categories (Ädel, 2006). It is necessary, therefore, to make explicit the criteria by which metadiscoursal markers can be identified in the text.

One of the criteria for identifying metadiscoursal markers is explicitness; that is, "the explicit commentary of the text on itself" (Mauranen, 1993: 158 cited in Ädel, 2006). Contrary to some scholars who consider some phenomena such as italics and boldface as metadiscourse, these are not considered metadiscoursal here, since they do not supply additional meanings with the help of words themselves.

The other factor which should be considered in identifying data is whether the text deals with the items of the ongoing discourse or whether the focus is on the objects external to the text, that is, not the world of discourse but the real world. As it is clear from metadiscourse definition, only devices which are related to the world of discourse can be considered as metadiscoursal. Similarly, markers which focus on the reader are considered metadiscoursal, only if the reference is to the current reader and not to the readers of other texts. Dafouz-Milne (2008) identified which metadiscourse markers characterized opinion columns in newspapers and which markers functioned more effectively.

One may encounter problems in identifying metadiscoursal markers in the text or in discriminating between its subgroups, since there are some overlaps between metadiscoursal and non-metadiscoursal groups as well as between different subgroups of metadiscourse. Thus, at times it is impossible to decide "in what function a writer has used a particular item" (Markkanen, Steffensen, & Crismore, 1993). Here, however, the interpretation which is the most likely one has been considered true.

Metadiscourse Typology

Hyland (2005) divides metadiscourse into two broad categories:

- *Interactive* — features used to organize propositional information in ways that the target reader should find coherent and convincing (2005: 50).
- *Interactional* — features that draw the reader into the discourse and give them an opportunity to contribute to it and respond to it by alerting them to the writer's perspective on propositional information and orientation and intention with respect to that reader (2005: 52).

Interactive Metadiscourse

There are five interactive features, which are briefly defined and exemplified below.

Code glosses supply additional information by rephrasing, illustrating or explaining. They reflect the writer's assumptions about the reader's cognitive environment.

Examples: *called, defined as, e.g., in other words, specifically*

Endophoric markers refer to other parts of the text in order to make additional information available, provide supporting arguments, and thus steer the reader toward a preferred interpretation.

Examples: *(in) (this) Chapter; see Section X, Figure X, page X; as noted earlier*

Evidentials are metalinguistic representations of an idea from another source and help to establish authorial command of the subject.
Examples: *(to) quote X, according to X*

Frame markers are used to sequence parts of the text or order arguments in the text. They serve four specific purposes:
(a) to sequence — *(in) Chapter X, first, next, lastly, I begin with, I end with*
(b) to label stages — *all in all, at this point, in conclusion, on the whole*
(c) to announce goals — *my focus, goal, objective is to, I seek to*
(d) to shift topic — *back to, in regard to, return to, turn to*

Transition markers are primarily conjunctions and conjunctives that help the readers determine the logical relationships between propositions. Authorities have proposed a number of categorizations, including Halliday and Hasan (1976):
(a) additive — *moreover, for example* (also an endophoric marker), *similarly*
(b) causal — *therefore, as a result, it follows that*
(c) adversative — *however, that being said, nevertheless*
(d) temporal — *first, second, next, then, finally*

Interactional Metadiscourse
There are five interactional features too.
Attitude markers indicate the writer‘s opinion or assessment of a proposition. Examples: *I agree, I am amazed, appropriate, correctly, dramatic, hopefully, unfortunately*

Self-mention refers to explicit authorial presence in the text and gives information about his/her character and stance. Examples: *I, we, the author*

Engagement markers explicitly address readers to draw them into the discourse. Examples: *we, our (inclusive), imperative mood*

Hedges indicate the writer‘s decision to recognize other voices, viewpoints or possibilities and be (ostensibly) open to negotiation with the reader. Examples: *apparently, assume, doubt, estimate, from my perspective, in most cases, in my opinion, probably, suggests*

Boosters allow the writer to anticipate and preclude alternative, conflicting arguments by expressing certainty instead of doubt. Examples: *beyond doubt, clearly, definitely, we found, we proved, it is an established fact*

Objectives of the Study
The main objective of this study is to compare and contrast the metadiscourse markers in English medical texts and their Persian translation based on Hyland’s model to investigate whether these markers function identically in English and Persian within the same genre. A minor objective of this study is to find out if there are any significant differences between English medical texts and their Persian translation in terms of the number and types of metadiscourse markers.

Questions of the Study

In keeping with the aim of the study the following research questions are addressed:

1. Is there any difference in the amount of metadiscourse markers used in English medical texts and their Persian translation?
2. Is there any difference between the types of metadiscourse markers used in English medical texts and those in their Persian translation?
3. How are different types of metadiscourse markers distributed in English medical texts and their Persian translation?

Research Hypotheses

1) There is no significant difference in the number of metadiscourse markers used in English medical texts and their Persian translation.
2) There is no significant difference between the types of metadiscourse markers used in English medical texts and those in their Persian translation.
3) Distribution of different types of metadiscourse markers in English medical texts is the same as their distribution in their Persian translation.

Significance of the Study

Metadiscourse is quite a new concept in the area of text analysis. Despite the importance of metadiscourse in composition, reading, rhetoric and text structure and being investigated from different angles recently, it is still unknown to many of those who are involved in the field of linguistics and translation and surprisingly little is known about the ways metadiscourse markers are realized in English medical texts and their translation into Persian. Thus, it deserves more investigation and warrants comprehensive research. In this perspective, therefore, the present study sheds more light on the subject and seeks to address this gap. The findings of this study will give an insight to the translators and writers of English or Persian medical articles, professional translators, undergraduate and graduate students of English translation and teaching who are interested in metadiscourse markers, teachers who teach discourse and different types of translation, teachers of English as a second language, and educational institutes like universities and institutes for higher education, which are involved in the field of linguistics and translation, regarding the types of metadiscourse markers which enhance the quality of writing and translation.

LITERATURE REVIEW

Metadiscourse is a universal aspect of our everyday language, and a major feature of the way we communicate in a range of genres and settings. Fairclough (1992) sees metadiscourse as a kind of 'manifest intertextuality' where the writer interacts with his or her own text. The peer-reviewed research on metadiscourse details that discourse markers are an important means to shaping effective communication, supporting a position, facilitating readability, and creating a relationship with the reader. The aim of this chapter is to present briefly the previous studies carried out in the area of metadiscourse.

Metadiscourse Models

Metadiscourse is a kind of category which can be debated in various ways. Over the past several decades, several metadiscourse taxonomies have been proposed in the literature so as to classify metatextual elements according to their form, meaning, or function since the initial interest in this topic (Hyland, 2005; Vande Kopple, 1985, 1997; Crismore, 1984; Hernandez

Guerra & Hernandez Guerra, 2008: 100). Most of the classifications suggested for metadiscourse are based on the functions of language as follows.

Earlier models have divided metadiscoursal markers into "textual" and "interpersonal" (Vande Kopple, 1985). In this vein, textual metadiscourse constituted of four strategies: text connectives, code glosses, illocution markers and narrators, and the interpersonal metadiscourse consists of three strategies: validity markers, attitude markers and commentaries. Vande Kopple's model was specifically prominent due to the fact that it was the first organized and systematic attempt for introducing a taxonomy that led to a great deal of studies and new taxonomies. However, the categories are vague and overlap functionally with each other. As a case in point, not only do citations enhance a position by claiming the support of a credible other (validity markers) but also, they show the source of the information (narrators) (Hyland, 2005).

Crismore et al. (1993) introduced the revised model. In this model, two major categories of textual and interpersonal remained the same, but the subcategories were broken down, separated, and reorganized. Furthermore, they divided the textual metadiscourse into two categories of "textual" and "interpretive" markers in order to separate organizational and evaluative functions. Textual markers consist of features which can help the discourse to be organized, and interpretive markers facilitate readers' interpretation and understanding of the writer's intension and writing strategies (Crismore et al., 1993).

Later classifications have distinguished between categories such as "interactional" and "interactive" (Hyland & Tse, 2004 cited in Dafouz-Milne, 2008). The model introduced by Hyland (2005), divides into two major categories of "interactive" and "interactional". Thompson and Thetela's conception (1995) is of great worth in construction of this model, however; it has a vast breadth of focus by including stance and engagement markers. The interactive part of metadiscourse is preoccupied with the writer's recognition of his reader, and his attempts to accommodate the readers' interests and needs, and to make the argument acceptable and reasonable for him. On the other hand, the interactional part is concerned with the writer's efforts to make his ideas transparent, and to involve the reader by expecting his problems and responses to the text (Hyland, 2005). Following Thompson and Thetela (1995) and Thompson (2001), Hyland and Tse (2004) make a worthwhile distinction between interactive and interactional metadiscourse. Although both have an interpersonal function, the former helps the reader through the text to have better understanding with the help of signposts like transition markers, sequencers, code glosses, frame markers etc. These interactive resources are on par with Halliday's (1994) textual metafunction. Interactional metadiscourse, on the other hand, expresses the opinion of the writers, and their association and interaction with their readers. Hence, interactional resources are more related to Halliday's interpersonal metafunction (Hyland, 2005). While interactive metadiscourse primarily involves the management of information flow, interactional metadiscourse is more personal and engages the reader more explicitly in the text by noticing and evaluating the text material (Hyland, 2005). Consequently, this new model proposes that metadiscourse is engrossed in the socio-rhetorical context in which it occurs, and with regard to this fact, variation in the use of metadiscoursal features has been demonstrated to be strongly dependent on the intentions of writers, the audience or community, as well as socio-cultural contexts.

Metadiscursive Elements in the Translation of Scientific Texts

Translation Method and Metadiscourse

According to Newmark (1988), translation is rendering the meaning of a text into another language in the way that the author intended the text (p. 5). The translator tries to closely interact with both source and target texts of all kinds for the particular purposes and particular recipients, usually in response to a translation job commissioned by a client (Hatim & Mason, 1997). Williams (2005) stated that a translator requires knowledge of literary and non-literary textual criticism, since he has to assess the quality of a text before he decides how to interpret and translate it. A translator translates a source text into a target text, thereby implicitly or explicitly taking into account the form and genre of the text and the fact that the whole process of translation is embedded in a cultural and political context (Vermeer, 2007, p.174). Translation of scientific texts, as happens with other texts of specialization, can be approached from different perspectives: discourse, register, genre, terminology, etc., as several authors have suggested (Gamero, 2001; Montalt, 2005). One successful approach is the pragmatic perspective that applies genre and register to translation (Suau-Jiménez, 2001). This allows us to identify all communicative functions and translate them into the target text. In the same vein, register analysis permits us to identify the field and thus the whole lexical and semantic sphere of the text; the tenor tells us who the reader is and so how to address him/her in a meaningful and persuasive way; and, finally, the mode leads us to recognize and recreate syntax and lexical levels of specialization. This translating method has yielded very good results: after a training period following a series of steps that lead translators to analyze genre and register, they automatise the process and identify generic structure and register characteristics in a short time. In this way translation is done in a faster and more secure way, since genre and register guarantee that structural, grammatical and lexical equivalences can be found easily.

Metadiscourse, a recent applied linguistics concept coming from the development of the tenor of register and from the meaning of *hedging* (Lakoff, 1972), has become an extremely useful new tool in specialized translation. It is described as the linguistic material that oral and written texts possess, not adding any propositional contents but meant to help the reader in the interpretation and evaluation of the message (Crismore *et al.*, 1993). Metadiscursive elements such as hedges principally have been the object of analysis in scientific English (Salager-Meyer, 1994) and thus the notion of metadiscourse has become a new concept itself, highlighting a pattern with a variety of linguistic resources within academic and scientific English (Hyland, 1998, 2000; Hyland & Tse, 2004). However, there are few contrastive works comparing metadiscursive elements in English and Spanish designed to be applied to specialized translation (Suau-Jiménez, 2005a, 2005b; Suau-Jiménez & Dolón, 2007).

Both hedges in research articles and phatic elements in popular science are two examples of metadiscourse. They also constitute what Halliday (1978) calls *tenor* within the category of register, being a token of Halliday's *interpersonal function*. The implications for translation are important since metadiscourse assists in the accomplishment of some important prescriptive functions in scientific genres: politeness and/or reader persuasion, both in research and popular science articles. If these texts are translated without considering metadiscourse of the target language and genre, one might unwittingly flout texts' communicative goal since persuasion would not be expressed as native speakers of the target language do and therefore, the result would be a deficient translation.

Pisanski Peterlin (2008) examines the translation of textual metadiscourse in academic writing, using the example of translating Slovene research articles into English. The results showed that

not all metadiscourse items found in the original texts were translated, while, at the same time, a significant number of items were inserted in the translation. For those metadiscourse items which were translated, literal translation was chosen in over half of the cases. The results for the comparable target language corpus revealed that metadiscourse is used more frequently in English originals than in translations from Slovene.

Parvaresh and Nemati (2008) investigated the effects of metadiscourse markers on the comprehension of English and Persian texts. They also measured the participants' awareness of those markers and their interaction with those texts in both languages by using a follow-up questionnaire. The texts and questions were also translated into Persian and used for a Persian reading comprehension test. The analyses showed that the participants performed significantly better on the undoctored texts although they had read them first, regardless of whether the texts were in their L1 or in their L2. The results revealed that for L2 it was the lower proficiency learners who benefited more from the presence of metadiscourse markers.

Skrandies (2007) studied metadiscourse in German history writing and its translation into English. The analysis of the translation side of the parallel corpus described typical translation patterns, identified shifts in translation and evaluated these shifts with regard to their effect on writer-reader interaction. This study showed that although translators generally respect the rhetorical functions of historiographic metadiscourse, they use a variety of linguistic means in their transfer of metadiscursive patterns and structures. It can be demonstrated that translators frequently change the presentation of metadiscursive acts from the point of view of the ST writer to the perspective of the TT reader and that they opt for syntactic reorganization to ensure a coherent flow of information.

Metadiscourse Variation Following Language and Genre

Bearing in mind the different metadiscourse patterns is essential when translating performative and/or persuasive texts, not only in research articles but also in popular science. Translation is a process that cannot only depend on the finding of equivalences in communicative functions and terminology. It is also necessary to take into account the interpersonal function, i.e. metadiscourse or the way in which the author addresses the reader. This is what varies from one language to another, from one genre to another and, possibly, from one area of specialization to another. What Hyland and Tse (2004) describe is the English metadiscourse of scientific and academic texts, i.e. the formal register of science, which is very useful when teaching English academic writing. However, if one needs to translate those texts, either from English into another language or the other way round, it will be necessary to know in detail both types of metadiscourse: that of the text of origin and that of the target text, in order to adjust our translation. Otherwise we risk making deficient translations and obtaining a final product that 'creaks' to our ears because the metadiscourse elements are those of the text of origin instead of those of the target text, genre and field of specialization.

Orna-Montesinos (2010) investigated metadiscourse elements in the translation of scientific texts in English and Spanish and concluded that the main differences between English and Spanish metadiscourse in research articles and popular science are cross-generic more than intra-generic. In other words, metadiscourse proved to be very similar in English and Spanish within the same genre.

Related Empirical Studies

Studies about Different Aspects of Metadiscourse

Metadiscourse has been investigated from a descriptive standpoint and has been shown to be a prominent feature of various types of academic discourse. Some studies have focused on the role of metadiscourse in pedagogy. These include the effect of students' awareness of metadiscourse on their writing abilities (Steffensen & Cheng, 1996 cited in Camiciottoli, 2003), listening comprehension (Sa, 2008), and reading comprehension (Camiciottoli, 2003). It is said that metadiscourse contributes to effective comprehension (Camiciottoli, 2003) and is a feature of good English as a second language (ESL) and native-speaker student writing (Intaraprawat and Steffensen, 1995; Steffensen & Cheng, 1996). Intaraprawat and Steffensen (1995) analyzed ESL university students' essays and concluded that good writers used a greater variety of metadiscourse than poor writers. Steffensen and Cheng (1996) conducted an experiment to investigate the effect of targeted instruction on metadiscourse on the writing abilities of native-speaker university students. An experimental group that had been taught the form, function and purpose of metadiscourse learned to use it effectively and produce compositions that earned significantly higher scores than those of a control group, which had received no instruction on metadiscourse. Dastjerdi and Shirzad (2010) investigated the impact of explicit instruction of metadiscourse markers on advanced, intermediate, and elementary English as a foreign language (EFL) learners' writing performance. The participants of their study were undergraduate students majoring in English Literature at the University of Isfahan. Their findings indicated generally that explicit instruction of metadiscourse markers significantly improves EFL learners' writing ability, however, in their study the learners at the intermediate level improved significantly greater than those at the advanced and elementary levels that shows that the practitioners should pay more serious attention to metadiscourse markers in making EFL curricula.

A considerable number of text analysis studies have been conducted during recent years. Among them, some studies have attempted to clarify characteristics of different genres or text types in terms of structural, discoursal, and metadiscoursal properties. Metadiscursive practices have recently become an area of great interest to applied studies of academic discourse (e.g. Mauranen, 1993, 2001; Hyland, 1998a, 1999). Academic discourse, both written and spoken, is highly patterned, interactive and socially constrained. It displays to a high degree such features as politeness, hedging, and metadiscourse. Since the emergence of metadiscourse, it has been investigated from different aspects. In this line of research, metadiscourse has been examined in various genres, e.g., academic research articles (Mostafavi & Tajalli, 2012), Persian news reports (Hashemi & Golparvar, 2012), oral narratives (Norrick, 2001), post-graduate dissertations (Bunton, 1999), science popularizations (Crismore & Farnsworth, 1990), casual conversation (Schiffrin, 1980), school textbooks (Crismore, 1989; Crismore & Farnsworth, 1990), university textbooks (Hyland, 2000; Bondi, 1999), doctoral dissertations (Bunton, 1999), Darwin's *Origin of Species* (Crismore and Farnsworth, 1990), advertising slogans (Fuertes-Olivera *et al.*, 2001), company annual reports (Hyland, 1998a), written economics lectures (Samson, 2002), editors' letters in academic journals (Chu & Yu, 2002), parliamentary debates (Ilie, 2003), and commercial websites (González, 2005). Some works have focused on metadiscourse in student writing. It has also been shown to be present in medieval medical writing (Taavitsainen, 1999) and in scientific discourse from the late seventeenth century (Atkinson, 1999). Overall results indicate that successful academic writing involves using metadiscourse to present an argument that is understood and accepted by its audience.

The introduction of *metadiscourse* into the applied linguistics vocabulary in the 1980s, building on sociolinguistic conceptions of planes of discourse, frames, alignment and meta-talk, was largely a reaction to this overemphasis on the propositional aspects of language and an attempt to establish the important principle that language use always draws on, and creates for itself, a social and communicative dimensions. Ragan and Hopper's (1981) discussion of 'alignment' similarly helped to bring interactional aspects of discourse into focus, showing how language allows users to promote a positive impression of themselves and to negotiate participant roles with the hearer. But it was another sociolinguist working on casual conversation, Schiffrin (1980), who perhaps struck the biggest blow for metadiscourse in these early days. She helped move the notion of metadiscourse forward by showing how 'meta-talk' such as '*I am telling you that*' and '*let me give you an example*' allows speakers to change their role in the discourse by projecting themselves as an *animator*. Metadiscourse thus offers a framework for understanding communication as social engagement. It illuminates some aspects of how we project ourselves into our discourse by signaling our attitude towards both the content and the audience of the text. Writing is a social and communicative interaction between reader and writer whereas metadiscourse is the tool that writers use to influence their audience. Hyland (1998) states that "based on a view of writing as a social and communicative engagement between writer and reader, metadiscourse focuses our attention on the ways writers project themselves into their work to signal their communicative intentions. It is a central pragmatic construct which allows us to see how writers seek to influence readers' understandings of both the text and their attitude towards its content and the audience" (437).

Metadiscourse contributes to the art of persuasion or rhetoric by the following: it promotes logical appeals when it explicitly links ideas and arguments; it implies credibility of the writer's authority and competence; and it signals respect by acknowledging the reader's viewpoint (Hyland, 2005, 1998a; Dafouz-Milne, 2008). Researchers who analyze research articles for applied linguistics purposes attend to a wide variety of focuses from moves and strategies (Bhatia, 1999) to rhetorical features (Hyland, 2005). Persuasion, as an important objective in authoring research articles, is arguably partly achieved by employing metadiscourse. Examining the research and applications of metadiscourse leads to deeper understanding of the means to creating coherence in texts. Hyland demonstrates that metadiscourse, a system of linguistic and rhetorical devices which enables a writer "not only to transform what might otherwise be a dry or difficult text into coherent, reader-friendly prose, but also to relate it to a given context and convey his or her personality, credibility, audience-sensitivity and relationship to message," is an essential attribute of academic interaction (Hyland, 2000). Researchers (Hoey, 2001; Hyland, 2005) claim that interaction in written texts can be managed in the same way as the spoken text. Little by little this view has manifested academic writing as social engagement, comprising interaction between writers and readers. A study by Jalilifar and Alipour (2007) attempted to determine the effect of explicit instruction of metadiscourse markers on preintermediate Iranian EFL learners' reading comprehension skill and revealed that metadiscourse markers are primarily responsible for cohesion rather than coherence. Hyland (1997) examined how the appropriate use of metadiscourse plays a significant role in rhetorical context by analyzing the textual markers in 28 research articles across four academic disciplines: Microbiology, Marketing, Astrophysics, and Applied Linguistics. The use of metadiscourse in persuasion demonstrates the importance of using the microstructure tool in an effective manner to create credibility, and to influence the audience. Metadiscourse markers can link positions and arguments, creating logical explanations when there is no absolute proof. The writer must demonstrate respect to the reader by using the appropriate type and amount of

metadiscourse as demonstrated in the presented research. This is a skill required by students entering the upper grades as they begin to write persuasive essays.

Hyland (2004) demonstrated how metadiscourse was used to facilitate effective persuasive interaction in writing by examining graduate research writing in ESL writers. The researcher examined the overall number of metadiscourse markers in 240 Masters and Doctoral dissertations written by ESL students in Hong Kong. Hyland developed a modified model of metadiscourse to focus attention on how writers project themselves in their writing as a way to signal their intentions. Through this investigation, the author determined that variations occurred when comparing the two levels of advance degree writing. The Master's level students used slightly more interactional metadiscourse (Hedges, Boosters, Attitude Markers, Self Mention, Engagement Markers) while the Doctoral students used significantly more interactive forms (Transitional, Frame, Endorphic, Evidentials, Code Glosses). Hyland explained these differences by stating the Doctoral dissertation is usually twice as long as a Master's final written project, therefore requiring more organizational structures. Also, the more advanced students' use of metadiscourse may represent a higher-level language approach to create forthcoming relationships with their reader. Moreover, Hyland (1998) contended that metadiscourse markers are integral to the text. In other words, they cannot be removed or changed at will. In a quantitative study, Hyland (1998) examined metadiscourse markers in 28 research articles and found 373 instances of metadiscourse in each research article. In another textual analysis, Hyland (1999) explored metadiscourse markers in 21 textbooks and found 405 instances of metadiscourse markers in each text, around one per 15 words. Hyland has concluded that metadiscourse plays an important part in communication. Guillem (2009) also offered a multidisciplinary approach for communication phenomena that emphasizes the interplay among cognition, discourse and society. His findings demonstrated how different levels of metadiscourse-intra-textual, inter-textual and contextual-are equally relevant for argumentative communication.

It has also been studied comparatively in order to understand differences in usage across cultures (Mauranen, 1993). Other researchers have investigated the comparisons between writers of different cultures (Crismore, Markkanen, & Steffenen, 1993). These investigations have pointed to the possibility that metadiscourse is a universal language component and applied differently, depending on the communicative values of the particular culture. With a growing cultural emphasis on the importance of communication in modern societies, explicit talk about talk seems to have become increasingly prevalent. A "communication culture" has evolved that "generates large quantities of metadiscourse" (Cameron 2000, p. viii). Hyland (1998) claimed that the use of metadiscourse elements is closely related to the conventions and norms of cultures in general and discourse communities in particular. Although there are functional similarities in metadiscourse across languages (Verschueren, 1989), metadiscourse also reflects communicative forms and *speech codes* specific to particular cultures (Ethnography of Communication; Speech Codes Theory). Speech codes comprise systems of concepts, beliefs and rules of conduct pertaining to communicative practices, personhood, and social relationships. Cultural groups develop *metacommunicative vocabularies* (Philipsen, 1992) that express their speech codes. Although a speech code may not be followed consistently in practice, the metacommunicative vocabulary is used rhetorically in metadiscourse to interpret, evaluate, or justify communicative acts. For example, the declaration that "we need to sit down and talk" about a problem may have a certain rhetorical power for the participants that depends on a specific meaning of "*sit down and talk*" in a cultural speech code.

Hyland (1996), in *Talking to the Academy* identified the major forms, functions, and distribution of hedges in a corpus of 26 molecular biology research articles and described the importance of hedging in this genre. Fuertes-Olivera, et al. (2001) studied the metadiscourse devices typically used by copywriters to construct their slogans and headlines. In their study, examples selected from a typical women's magazine showed that both textual and interpersonal metadiscourse help copywriters to convey a persuasive message under an informative mask.

Gillaerts & Van de Velde (2010) analyzed research article abstracts in terms of interactional metadiscourse in Journal of Pragmatics in the course of the past 30 years. They found interesting increasing and diminishing use of some metadiscursive patterns throughout this period among these abstracts published in the field of applied linguistics.

Comparative Studies of Metadiscourse

Most of the comparative studies have compared the use of metadiscourse in a specific area in two or more different languages. Fewer works have been devoted to the comparison of metadiscourse markers in different genres of a specific language. Metadiscourse in academic genre has received considerable attention as a major rhetorical aspect which can influence the communicative ability of those concerned. Owing to the idiosyncrasy of the metadiscursive elements, some studies have examined it in different disciplines and languages, e.g., Finish–English economic texts (Mauranan, 1993), Spanish English economic texts (Valero, 1996), a comparison of linguistics and medicine abstracts (Melander et al., 1997) and medicine, economics and linguistics in English, French and Norwegian (Breivega et al, 2002). Some of these studies on metadiscourse in different disciplines and languages are presented below.

As a case in point, Hyland (1999) examined the use of metadiscourse in two corpora–textbooks and research articles in three disciplines–Biology, Applied Linguistics and Marketing. Analysis of data revealed that more evidences and relational markers were employed in applied linguistics texts; the biology writers preferred hedges; and marketing textbooks comprised fewer evidences and endophorics. Hyland indicated that the greatest diversity in most types of metadiscourse both across genres and disciplines, is found in biology. His research also revealed consistency over genres in marketing and applied linguistics texts and both texts involved significant differences in hedges and connectives. He also realized considerable genre disparities in the use of evidences and person markers in marketing, and endophorics and relation markers in applied linguistics. As a whole, genre differences were more than disciplinary ones, and the textbooks showed greater disciplinary diversity than the research articles.

Similarly, Dahl (2004) explored two kinds of metadiscourse (locational and rhetorical metatext) in three fields (Linguistics, Economics and Medicine) within three languages (English, Norwegian and French). She maintained that ‘economics displayed a somewhat higher frequency of the two types than did linguistics for both English and Norwegian, while for French there was hardly any difference within these two disciplines; for all three languages medicine used far less metatext than the other two disciplines.’ (p. 1818). Moreover, medicine had the least degree of metatext and its texts were organized in an extremely structured format: Introduction-Methodology–Results–Discussion (Swales, 1990). She determined that economics and linguistics in English and Norwegian used much more metatext than French and they were very similar in patterns, while all three languages made little use of metatext regarding medicine.

Faghih and Rahimpour (2009) analyzed metadiscourse devices in three types of texts: English texts written by native speakers of English, English texts written by Iranians as non-natives of English, and Persian texts written by Iranians. To investigate different aspects of academic written texts, the researchers followed metadiscourse taxonomy developed by Hyland (2004 cited in Faghih & Rahimpour, 2009), which consists of two main groups: "interactive" and "interactional". The analysis revealed that interactive factors (those markers which help to guide the reader through the text) were used significantly more than interactional factors (those markers which involve the reader in the argument) by all groups. Although all groups used all sub-types of metadiscourse, they employed some subcategories differently.

Ädel (2006) investigated the use of metadiscoursal markers in English essays written by university students who were native English speakers and Swedish speakers. Besides analyzing the differences between the corpora of English and Swedish speakers, Ädel tried to find the possible differences between the American and British speakers' texts. Applying a new model of metadiscourse based on Jackobson's (1998 cited in Ädel, 2006) functional model of language, the researcher analyzed "personal" and "impersonal" metadiscourse in the corpora. She found that the use of metadiscourse differed considerably in the three groups under study, both quantitatively and qualitatively. Moreover, she found that Swedish speakers overused metadiscoursal markers in their corpus.

In an early study in 1983, Crismore compared school social science texts with nonschool social science texts based on their amount and types of metadiscourse. She distinguished two types of metadiscourse: "informational" and "attitudinal". By "informational metadiscourse", she meant those metadiscourse markers which direct readers how to understand the primary message by referring to its content and structure or the author's purpose or goals. She used "attitudinal metadiscourse" to refer to those markers which direct readers how to understand the author's perspective or stance toward the content or structure of the primary discourse. She concluded that nontextbooks used more informational metadiscourse than did textbooks, but without any large differences. However, nontextbooks used almost twice as much attitudinal metadiscourse as did textbooks.

In a study by Abdi (2002), two academic fields – the social sciences and natural sciences – were compared in terms of the use of interpersonal metadiscourse (signs of the author's personality and presence in a text (Hui & Na, 2008)). The results of the analysis revealed that SS writers employed interpersonal metadiscourse more frequently than NS writers. The types of metadiscourse were also different in the two disciplines. In another study by Abdi (2011), the distribution of interactive and interactional metadiscourse strategies was analyzed in the socio-genreic structure of research articles from social and natural sciences and the results showed that though globally similar in many ways, different sections of research articles (i.e. Introduction, Method, Results and Discussion) which follow different cognitive genre types (i.e. conviction, description, argumentation, etc.) use interactive and interactional strategies differently. From among several genres, research article is a widely practiced genre of communication among members of academic discourse community for the introduction of new findings and claims (Koutsantoni, 2006) and for receiving peer feedback.

In a research conducted by Dafouz-Milne (2003), two important newspapers in English and Spanish were compared with each other as models of persuasive texts. Contrasting these newspaper texts in terms of textual and interpersonal metadiscourse suggested that there

existed considerable variation in the frequency of textual metadiscourse categories used in the two languages which can be attributed to the culture variation. On the other hand, the study showed that the texts in the respective languages were almost similar in the use of metadiscoursal markers. According to the researcher, this result can stem from certain genre conventions. Dafouz-Milne (2008) explored the role of metadiscourse markers in the construction and attainment of persuasion. 40 opinion columns, 20 in English and 20 in Spanish extracted from two elite newspapers, the British The Times and the Spanish El Paıs. Findings suggested that both textual and interpersonal metadiscourse markers are present in English and Spanish newspaper columns, but that there are variations as to the distribution and composition of such markers, specifically in the case of certain textual categories (i.e. logical markers and code glosses).

Blagojevic (2004) compared academic articles written in English by English and Norwegian native speakers in terms of similarities and differences between items found in the two corpora. Applying an integrated type of classification system, the researcher concluded that although some traces of culture and language can be found in articles written by Norwegian speakers, the similarities between the two corpora which are caused by the same scientific discipline are more noticeable. According to Blagojevic, Norwegian writers should not fear that their English writings differ greatly from the English academic norms.

Martinez (2004) investigated the use of discourse markers in expository composition of Spanish undergraduates. The main findings were that students employed a variety of discourse markers with some types used more frequently than others. Elaborative markers were the most frequently used, followed by contrastive markers. There was a significant relationship between the number of discourse markers and the students' scores. There was also a significant relationship between highly rated essays and poorly rated ones in the frequency use of elaborative, contrastive and topic relating discourse markers.

Firoozian Pooresfahani, Khajavy & Vahidnia (2012) conducted a contrastive study to investigate the use of interactive and interactional metadiscourse elements in research articles written by Iranian applied linguistics and engineering writers in English. Results of their study showed that both disciplines used interactive and interactional features in their research articles. In both groups, writers used an interactive metadiscourse more than an interactional one. Also, there were significant differences on the overall frequency of metadiscourse features as well as on the particular occurrence of some categories in interactive and interactional features.

Correspondingly, Zarei and Mansoori (2007) explored the metadiscursive patterns within Persian and English languages in computer engineering and applied linguistics. Their findings indicated that both English and Persian languages underscored text coherence over interpersonal functions of language. Likewise, the results exhibited more presuppositions in Persian texts and as a consequence much of the meaning left to be uncovered by the reader.

In another study, Zarei and Mansoori (2011) investigated the use of metadiscourse in two disciplines (applied linguistics vs. computer engineering) within two languages (Persian and English). Analysis of data showed that the metadiscursive resources were used differently both within and between the two languages. The analysis proved that humanities focused on the textuality to the detriment of reader involvement.

In a study by C. Hernández Guerra and J. M. Hernández Guerra (2008), discourse and metadiscourse analysis of economics genre have been taken into consideration. In this study, unlike other related researches which focus on the differences between various genres, different sub-areas within a genre, namely Applied Economy, Quantitative Economy, Financial Economy, and Management and Business have been analyzed. Applying Hyland's (1998 cited in Hernández Guerra & Hernández Guerra, 2008) functional classification, researchers of this study indicate that all the sub-areas studied prefer the use of interpersonal rather than textual metadiscourse and Management uses metatextual words more frequently than the others.

Burneikaitė (2008) contrasted Master theses in the discipline of linguistics written in English by L1 and L2 writers. In her study, Burneikaitė compared metadiscourse strategies used in the corpora by L1 and L2 (Lithuanian) writers using a new taxonomy created by herself which consisted of three main categories: "text-organizing", "participant-oriented", and "evaluative" markers. She concluded that the extensive use of text-organizing markers, the limited use of participant-oriented markers, and the spare use of evaluative markers can be seen in the theses by both L1 and L2 writers. She indicated that while the overall frequency of metadiscourse was similar in L1 and L2 English texts, the use of specific metadiscoursal categories differed significantly in the texts written by L1 and L2 writers. According to Burneikaitė, this variability was not just a matter of mother tongue/culture; rather, it could be attributed to the conventional practices typical of an educational institution or individual writer style.

Parvaresh (2007) investigated the impact of proficiency level and metadiscourse markers presence in comprehending English and Persian texts in high and low-level learners and showed that lower-proficiency groups benefited more from the metadiscourse markers presence in Persian/English texts.

Jones (2011) compared the use of metadiscourse to create coherence in academic writing between a native English speaking university student and a non-native counterpart. This paper confronted a common and very significant challenge that such students faced: difficulty with constructing a coherent argument.

Tavakoli, Amirian & Moslemi (2012) analyzed variation and distribution of interactional metadiscourse markers across applied linguistics sub-disciplines of English language teaching, English literature and English translation and their results revealed that the frequency of metadiscourse markers was different across the articles of English translation, English literature and English language teaching.

Several studies have discussed the positive effects of the presence of metadiscourse in texts. With reference to Halliday's metafunctional theory of language (1985), on the *interpersonal* level, Schiffrin (1980: 231, as cited in Hyland, 2000: 109) and Crismore (1989) both point out that metadiscourse allows written texts to take on some features of spoken language (e.g., personal pronouns to establish an "I-you" relationship), and thus become more "reader friendly". Researchers have identified a wide array of linguistic devices used in metadiscourse. Discourse markers are used to indicate relations between segments of discourse ("*and*," "*because*," "*on the other hand*"), interpersonal relations ("*sorry, but*," "*you know*," "*as a friend*"), and cognitive attitudes toward what is being said ("*I mean*," "*in a sense*," "*certainly*"). Linguistic action verbs are used to describe the social actions performed in discourse ("she *asked*," "don't *threaten* me"), and, in some cases, simultaneously to carry out those actions in 'performative utterances' ("I *promise*," "I *tell* you"). 'Reported speech' (direct or indirect

quotation) purports to represent for some present purpose something that was said previously (Lucy, 1993). 'Indirect reported speech' highlights the effective content of what was said ("*Margaret told me that you would be late*"), whereas 'direct reported speech' highlights the precise way in which something was said ("*Margaret told me* '*Of course, he will be late, as always*!'").

Xu (2001) reports interesting findings in a study of metadiscourse use by 200 students across four years of an undergraduate course in English at a Chinese university. He found that students in the final two years employed more formally complex and precise interactive metadiscourse (*consequently, therefore, as a result*) than those in the first two years, who preferred forms such as *but, then* and *and.* In addition, they used fewer attitude markers, less self mention and fewer 'validity markers' (hedges and boosters). The reason for these changes is complex but Xu attributes them to the weakening intrusion of Chinese criteria of good writing as the students gained greater awareness of English academic norms.

A rather similar study was carried out in the use of hedgings and boostings in the abstracts of applied linguistics between Chinese and English academic articles by Hu & Cao (2011). They found significantly more hedges used in the English-medium abstracts and more boosters in the Chinese counterparts. The reason was attributed to the culturally preferred rhetorical strategies of English and Chinese.

An intercultural analysis of metadiscourse features in research articles was carried out by Mur-Duen˜as (2011). Here the comparison was between Spanish and English articles and based on the interpersonally driven features. The particular linguistic/cultural contexts of publication were found to influence scholars' rhetorical choices when writing their research articles.

Shokouhi and Talati Baghsiahi (2009) studied the metadiscourse functions in English and Persian sociology articles. Their results have revealed a higher number of metadiscourse elements in the English texts. Among the different metadiscourse elements used, text connectors were the most frequently employed in both languages. Modality markers were the second most frequent in both languages although the English writers used nearly twice the number of these markers. Overall, they reported that the frequency of textual metadiscourse markers was greater than the interpersonal markers in both language samples. It was further revealed that the Persian writers of sociology texts were less interested in explicitly orienting the readers and some of the main points in an article, especially in the concluding section, were left for the readers to infer.

Marandi (2003) has embarked on contrastive analysis of Persian and English texts and has shown the differences between Iranian and English writers. Yazdanmehr (2013) compared interpersonal metadiscourse in English and Persian abstracts of Iranian applied linguistics journals using Hyland's (2005) typology. Frequency and percentage of occurrence of all the categories were calculated and used to make comparisons between English and Persian abstracts. The overall finding was that the Persian abstracts were in all cases lengthier than their English versions, but in both the interactive metadiscursive resources were more prevalent than the interactional ones.

Azizi (2001 cited in Crismore & Abdollehzadeh, n.d.: 198) evaluated the appropriate use of interpersonal and textual metadiscourse markers in university student writing (24 papers in English and 24 in Persian on a single topic) and reported that there were more textual

metadiscourse markers in Persian and more interpersonal metadiscourse markers in English. Azizi (2001) showed that attitude markers were used more in English, while hedges and emphatics were more common in writing in Persian.

Abdollahzadeh (2001) studied textual metadiscourse markers (text connectives, code glosses, illocution markers) in the introduction sections of 73 applied linguistics papers written by Iranian and English academic writers and concluded that Anglo-Americans used significantly more illocution markers and code glosses than Iranians. In 2003, Abdollahzadeh (2003) investigated 65 discussion and conclusion sections of the research articles written by Iranian and Anglo-American applied linguistics writers regarding the interpersonal metadiscourse markers and showed that Anglo-Americans used significantly more certainty and attitude markers than Iranians. Abdollahzadeh (2007) also studied the metadiscourse markers subtypes (hedges, assertions, attitudinals, person markers, transitions and code glosses) in 53 newspaper editorials published in 2003 in English and Persian and reported that Anglo-American editorials used more hedges and code glosses and Persian editorials used more emphatics.

METHODOLOGY

The Corpus

To carry out this corpus-based study, 35 medical articles out of a total of 99 articles, which were originally written in English, were randomly chosen from *Sina* Journal (2011–2013), which is a Quarterly Publication by Research Center for Traditional Medicine and History of Medicine, affiliated to Shiraz University of Medical Sciences. It is worth mentioning that the probable differences between British and American English were not considered in choosing these articles and no particular dialect of English was in focus. Then 4 consecutive paragraphs were extracted randomly from each of the selected articles (n=140) and then the translation of the same paragraphs into Persian was identified in *Sina* Journal (2011–2013) (n=140). In order for the selection to be random, each paragraph of each article –excluding ones in the abstract– was given a number and for each article one number was chosen by chance. The paragraph relevant to that number and the three paragraphs following it in the English medical articles along with their Persian translation formed the corpus for this study. Consequently, the corpus for this research consists of 280 paragraphs extracted from these articles both in English and Persian.

All these 35 English medical articles and their Persian translation were taken from *PubMed* and *Sina* Journal (2011–2013), respectively. The procedure of publication of the articles in this journal is that at first the editorial board of the Research Center for Traditional Medicine and History of Medicine search at *PubMed*, a database for medical articles (www.pubmed.com), to download the full text of the most recently published English articles on the grounds of Complementary and Alternative Medicine which contain worthy scientific content for public and medical society, including medical students and scholars. Most of these articles are selected from among the articles published in the beginning of the 21st century to be up to date. Then the selected articles are given to the professional translators to be translated from English into Persian to be published in *Sina* (2011–2013). At present, this journal has published the translation of a total of 99 articles from English into Persian in 10 issues. The language of *Sina* Journal (2011–2013) is Persian, but for each translated article the journal provides the title of each article in English. Having collected the papers in English, we searched the English title of all these 99 articles at *PubMed* to get their full texts, of which we selected 35 medical articles

for the present research. All the English medical articles were taken from the following sources preceded by the name of the authors. (For full information see the References).

1) Aciduman, A., Er, U., & Belen, D., Neurosurgery
2) Afshar, A., Arch Iran Med
3) Agha-Hosseini, M. et al., BJOG
4) Akhondzadeh, S. et al., J Clin Pharm Ther
5) Amirghofran, Z., Iran J Immunol
6) Ani, V., & Naidu, K. A., BMC Complement Altern Med
7) Asadi-Pooya, A. A., Nikseresht, A. R., & Yaghoubi, E., Iran Red Crescent Med J
8) Azizi, M. H., Arch Iran Med
9) Azizi, M. H., & Nayernouri, T., Arch Iran Med
10) Bakri, I. M., & Douglas, C. W., Arch Oral Biol
11) Basha, D. P. et al., Drug Invehntion Today
12) Dunn, P. M., Arch Dis Child
13) Emtiazy, M. et al., Iran Red Crescent Med J
14) Gorji, A., Trends Pharmacol Sci
15) Gorji, A., & Khaleghi Ghadiri, M., Lancet Neurol
16) Huseini, H. F. et al., Phytother Res
17) Javidnia, K. et al., Phytomedicine
18) Lee, F. H., & Raja, S. N., Pain
19) Lin, D., UWOMJ
20) Lökk, J., & Nilsson, M., Parkinsonism and Related Disorders
21) Madineh, S. M., Urol J
22) Moher, D. et al., BMC Pediatr
23) Naghibi, F. et al., Iranian Journal of Pharmaceutical Research
24) Noorbala, A. A. et al., J Ethnopharmacol
25) Porzsolt, F., Eisemann, M., & Habs, M., European Journal of Integrative Medicine
26) Pourahmad, J., Iranian Journal of Pharmaceutical Research
27) Rahimi, R., Shams-Ardekani, M. R., & Abdollahi, M., World J Gastroenterol
28) Richmond, J. A. et al., Complement Ther Clin Pract
29) Sajadi, M. M., Sajadi, M. R., & Tabatabaie, S. M., Neurology
30) Shorofi, S. A., & Arbon, P., Complement Ther Clin Pract
31) Sewitch, M. J., & Rajput, Y., Complement Ther Clin Pract
32) Shoja, M. M., & Tubbs, R. S., J Anat
33) Tafreshi, A. P. et al., Phytother Res
34) Tibi, S., J R Soc Med
35) Zal, F. et al., Arch Irn Med

Data Collection Procedure

The following steps were taken to collect the data.

First, as mentioned before, the abstract and the references in each 35 selected articles were ignored, due to the fact that the sentences in the abstract or the phrases in the list of references might contain the same markers existing in the body of the article. From the remaining parts, 4 consecutive paragraphs were randomly chosen. Random sampling helped us overcome the problem of particularity of writers' styles. Therefore, 140 paragraphs in English (ST) and 140 paragraphs in Persian (TT) were culled to be compared and contrasted regarding the metadiscourse markers in both versions.

Second, the metadiscourse markers, in accordance with Hyland's (2005) taxonomy, were identified, categorized, and analyzed in the 280 selected paragraphs. It should be noted that Hyland's model was preferred for being recent, simple, clear and comprehensive (Abdi, Tavangar & Tavakkoli, 2010). In order to examine metadiscourse markers in Persian texts, the Persian equivalents of these markers were considered using *the living English-Persian dictionary* (Bateni, 2006). According to this model, we classified the metadiscourse elements in the English medical texts and their Persian translation into two classes: interactive metadiscourse markers and interactional metadiscourse markers as follows:

Interactive Resources

Interactive Resources help guide the reader through the text (5 types: Transitional Markers, Frame Markers, Endophoric Markers, Evidentials, and Code Glosses). These markers are features that consider the relationship between the reader and the writer in that they organize propositional information in ways that the audience is likely to find coherent and convincing. They are a consequence of the writer's assessment of the reader's comprehension capacities, understanding of related texts and the need for interpretive guidance. Interactive metadiscourse markers depend on what the writer knows of his or her reader and not simply text organizing devices.

Transitional Markers express relations between clauses:

- Mainly conjunctions and adverbial phrases which help readers interpret pragmatic connections between steps in an argument
- Signal additive, causative and contrastive relationships in the writer's thinking
- Express relationships between stretches of discourse
- Perform role internal to discourse rather than external i.e. help reader interpret links between ideas.

Includes:

Additions: Adds elements to argument

Examples: and (و), furthermore (علاوه بر این), moreover (از این گذشته، علاوه بر این), by the way (ضمنا"، راستی)

Comparisons: Marks arguments as either similar or different

Examples: Similarly (به همین شکل، به همین ترتیب), likewise (همچنین، همان طور، علاوه بر این), equally (همچنین، به طور مساوی), in the same way (به همان ترتیب که، همان طور که), correspondingly (به همین نسبت، متناسبا"), in contrast (برعکس), however (با این همه، با این وجود), but (اما، بجز، مگر), on the contrary (برعکس), on the other hand (از طرف دیگر)

Consequences: Relations either tell readers that a conclusion is being drawn or justified or that an argument is being countered

Examples: thus (بنابراین), consequently (بنابراین، در نتیجه), in conclusion (خلاصه کلام این که), admittedly (در واقع، در حقیقت), nevertheless (با این همه، با وجود این), anyway (به هر حال), in any case (به هر حال، در هر صورت), of course (البته، مسلما")

Words to look for:

Accordingly (مطابق با آن، بنابراین), additionally (علاوه بر این), again (دوباره، علاوه بر این), also (نیز، همچنین), alternatively (به جای آن), although (اگرچه، با وجود این که), and (و), as a consequence (به زیرا، به این دلیل), because (در عین حال), at the same time (در نتیجه), as a result (عنوان یک نتیجه یا پیامد), but (اما، بجز), by contrast (بر اساس مقایسه), consequence (نتیجه، پیامد), by the same token (به همین قیاس، به همین ترتیب), consequently (بنابراین، در نتیجه), conversely (برعکس), equally (به طور مساوی، همچنین), even though (گرچه، با وجود این که), further (همچنین، علاوه بر این), besides (علاوه بر این), but (اما، بجز), by contrast (بر اساس مقایسه), consequence (نتیجه، پیامد), by the same token (به همین قیاس، به همین ترتیب), consequently (بنابراین، در نتیجه), conversely (برعکس), equally (به طور مساوی، همچنین), even though (گرچه، با وجود این که), further (همچنین، علاوه بر این),

furthermore (علاوه بر این), hence (بنابراین، به این دلیل), however (با وجود این، هرچند), in addition (علاوه بر این), in the same (همین، یکسان), leads to (منجر شدن به), likewise (همان گونه، همچنین، علاوه بر این), moreover (از این گذشته، علاوه بر این), nevertheless (با این همه، با وجود این), nonetheless (با این همه، با وجود این), on the contrary (برعکس), rather (نسبتا"، تقریبا"، بیشتر), results in (منجر شدن به), similarly (همین طور، به همین شکل، به همین ترتیب), since (از، زیرا), still (هنوز), thereby (بدین وسیله), though (اما، در حالی), while (در حالی که، در صورتی که), whereas (بنابراین، بدین ترتیب), thus (گرچه، با وجود این که), yet (اما، هنوز) (که، اما

Frame Markers refer to discourse acts, sequences and stages:

- Signal text boundaries or elements of schematic text structure.
- Must identify features which order arguments in the text rather than events in time
  i.e. function of sequence, label, predict, and shift arguments; making the discourse clear to readers or listeners.
- Provide framing information about the elements of the discourse
  Includes:
  Sequencing: Frame markers that are used to sequence parts of the text or to internally order an argument such as explicit additive relations.
  Words to look for:
  (in) chapter x (در فصل...), (in) part x (در بخش...), (in) section x (در قسمت...), (in) this section (در این قسمت), finally (در پایان), first (اول این که، در ابتدا), first of all (قبل از هر چیز، اول از همه), firstly (نخست، در وهلهٔ اول), last (آخر، در پایان), lastly (سرانجام، در پایان), listing (a, b, c) (فهرست), next (بعد), numbering (شماره گذاری), second ("دوم، ثانیا"), subsequently ("متعاقبا"), then (بعد، پس از آن), third ("سوم، ثالثا"), to begin (آغاز کردن، شروع کردن), to start with (اول این که)
  Label: Frame makers that explicitly label text stages.
  Words to look for**:**
  All in all (روی هم رفته), at this point (در این زمان، در این لحظه), at this stage (در این مرحله), by far (به خلاصهٔ کلام این), in brief (خلاصه این که، خلاصهٔ کلام این که), in conclusion (خلاصه این که، در یک جمله این), in short (به طور خلاصه، خلاصه), in sum (خلاصه این که، در پایان، حرف آخر این که), overall (روی هم رفته، کلّی، در مجموع), so far (تاکنون، تا به حال), thus far (تاکنون، تا به حال، تا حالا), to conclude (نتیجه گرفتن), to repeat (تکرار کردن), to sum up (جمع بندی کردن، خلاصه کردن), on the whole (روی هم رفته، به طور کلی), now (اکنون، حالا)
  Announce goals: Frame makers that announce discourse goals.
  Words to look for:
  In this chapter (در این فصل), in this part (در این بخش), in this section (در این قسمت), aim (هدف، در نظر داشتن), desire (خواستن), focus (پرداختن به), goal (هدف), intend to (تصمیم داشتن), intention (هدف، منظور، تصمیم), objective (هدف), purpose (هدف), seek to (سعی کردن، جست و جو کردن), want to (خواستن), wish to (خواستن), would like to (خواستن), I argue here (به بحث پرداختن، نشان دادن), my purpose (هدف من)
  Topic Shifts: Frame markers that indicate shifts in topic.
  Words to look for:
  Well (درست، به خوبی، در واقع), right ("درست، کاملا"، دقیقا), ok (درست، صحیح، خوب), now (اکنون، در آن وقت، در این وقت), let us return to (اجازه دهید برگردیم به موضوع قبلی), back to (برگشتن), digress (از موضوع خارج شدن، از موضوع منحرف شدن), in regard to (در مورد، دربارهٔ، راجع به), move on (به کار دیگری پرداختن، از موضوع، مطلب یا غیره رد شدن), resume (دوباره شروع کردن، از سر گرفتن), return to (برگشت به), revisit (دوباره بازگشتن), shift to so (جابجایی), to look more closely (به دقت نگاه کردن), turn to (برگشتن), with regards to (دربارهٔ، راجع به، در خصوص)

Endophoric Markers refer to information in other parts of text:

- Expressions that refer to other parts of the text
- Goal is to make additional content material salient and therefore available to the reader in aiding the recovery of the writer's meaning.
- Assist with comprehension and supporting arguments by referring to earlier or anticipating something yet to come.
- Guide to reader through the discussion and help direct the reader to the writer's preferred interpretation of the discourse.

Words to look for:
In Chapters x (...در فصل های), in part s (...در بخش), in section x (...در قسمت), in the x chapter (در فصل ...ام), in x part (در بخش ...ام), in x section (در قسمت ...ام), in this part (در این بخش), in this section (در این قسمت), example x (... مثال شماره), fig x (... شکل شماره), p, x, x above (پاراگرافی که در بالا به آن اشاره شد), x earlier (مطلبی که قبلا" به آن اشاره شد)

Evidentials refer to information in other texts:

- Metalinguistic representations of an idea from another source.
- Guide the reader's interpretation.
- Establish an authorial command of the subject.
- Can involve hearsay, or attribution to a reliable source.
- Refer to a community based literature and provides important support for arguments.
- Distinguish who is responsible for a position and while this may contribute to a persuasive goal it needs to be distinguished from the writer's stance toward the view.

Words to look for:
Date (تاریخ تعیین کردن), name (نام بردن، ذکر کردن), cite (ذکر کردن، نقل کردن), quote (ذکر کردن، نقل قول), reference number (منبع شماره...), according to (طبق، بنابه گفتهٔ),

Code Glosses elaborate propositional meaning:

- Supply additional information by rephrasing explaining or elaborating what has been said
- Goal is to ensure the reader is able to recover the writer's intended meaning
- Reflect the writers prediction about the reader's knowledge-base
- Introduced by the following phrases, parentheses can be used here

Words to look for:
(mm) (میلی متر), as a matter of fact (در واقع، در حقیقت), called (به نام، معروف به), defined as (توصیف کردن), e.g. (به عنوان مثال), for example (به عنوان مثال), for instance (به عنوان مثال، برای مثال), I mean (منظورم این است که), in fact (در حقیقت), in other words (به عبارت دیگر، به بیان دیگر، یعنی), indeed (در واقع), known as (کسی یا چیزی را به اسم ... شناختن), namely (یعنی، بدین معنی که), or (یا، یا این که), put another way (به بیان دیگر), say (مثلا")، specifically (به بیان دقیق به طور دقیق تر، مخصوصا")، such as (مانند، از قبیل، مثل), that is to say (یعنی، به عبارت دیگر، به بیان دیگر), that means (بدین معنی که), via (از طریق، از راه، به وسیلهٔ، با), which means (به معنی چیزی بودن)

Interactional Resources

Interactional Resources involve the reader in the text (5 types: Hedges, Boosters, Attitude Markers, Self Mention, and Engagement Markers). These types of markers alert the reader to the writer's perspectives for both information and the readers themselves. They are the means that readers become involved and are drawn into engaging opportunities of the discourse. Interactional markers control the level of personality in the text. They help to focus the reader's attention, acknowledge uncertainties, and guide interpretations. They also help explain the positions of others, anticipate, acknowledge and challenge alternative or divergent information.

Hedges withhold comment and open dialogue:

- Indicate the author's decision to recognize alternative viewpoints and voices
- Withhold complete commitment to a proposition
- Emphasize subjectivity of a position through opinion
- Create positions of negotiation
- Imply statements are passed on writer's reasoning
- Indicate writer's degree of confidence in position

Words to look for:
about (درباره، در مورد), almost ("تقریبا"), apparently ("ظاهرا"), appear (به نظر رسیدن), approximately ("تقریبا"، حدودا"), argue (بحث کردن، نشان دادن), around ("در حدود، تقریبا"), assume (فرض کردن), broadly ("تقریبا"، به طور کلی، عمدتا"), certain amount (میزان مشخص), certain extent (حد مشخص), certain level (سطح مشخص), claim (ادعا کردن), could (توانستن), couldn't (نتوانستن), doubt (شک داشتن), essentially ("اساسا"، در اصل), estimate (تخمین زدن), fairly ("کاملا"، نسبتا"، تا اندازه ای), feel (احساس کردن), felt (احساس کردن), frequently (اغلب، مکرر، به دفعات), from my perspective (از دیدگاه من، از نظر من), generally ("عموما"، به طور کلی), guess (حدس زدن), indicate (نشان دادن), in general ("معمولا"، قاعدتا"), in most cases (در اغلب موارد), in my opinion (به عقیده من، به نظر من), in my view (به نظر من، به عقیدهٔ من، به گمان من), likely ("احتمالا"), mainly ("عمدتا"، اساسا"، بیشتر), may (ممکن بودن), maybe (شاید), might ("احتمالا"), often (اغلب), on the whole ("روی هم رفته، به طور کلی، کلا"), ought (باید), perhaps (شاید), plausible (پذیرفتنی، قابل قبول), possible (ممکن), probably ("احتمالا"), quite ("کاملا"), rather ("تقریبا"، نسبتا"), relatively (نسبتا"، به نسبت), roughly ("تقریبا"), seems (به نظر رسیدن), should (باید), sometimes (گاه گاهی، بعضی اوقات), tend to (معمولا"، گرایش داشتن به), typical (عادی، خاص), uncertain (نامعلوم، مبهم), unclear (نامعلوم، مبهم، نامشخص), unusual (غیرعادی), would (انجام کاری), wouldn't (انجام ندادن کاری)

Boosters emphasize certainty and closes dialogue:

- Strengthen and argument by emphasizing the need for the reader to draw same conclusion as writer
- Close down possible alternative by emphasizing certainty and narrowing diverse positions
- Create rapport with reader by taking a joint position and using a confident voice

Words to look for:
have (دانستن), beyond doubt (غیرقابل شک), certain (بی شک، قطعی، مسلم), clear (واضح، مشخص), conclusively (به طور قاطع، با قاطعیت), decidedly ("بدون تردید، قاطعانه، مسلما"), definitely ("قطعا"), demonstrate (نشان دادن), doubtless ("بدون تردید، بی شک، قطعا"), established (رایج، متداول، مرسوم), evident (واضح، آشکار، معلوم), find (پیدا کردن), found (پیدا کردن), in fact (در حقیقت), incontestable (مسلّم، بی چون و چرا، غیرقابل بحث), incontrovertible (مسلّم، بی چون و چرا، غیرقابل بحث), indeed ("مسلما"،), indisputable (در واقع), know (دانستن), known (معلوم، آشکار), must (باید), never (هرگز، هیچ وقت), no doubt (به احتمال قوی), obvious (آشکار), of course ("البته، قطعا"، مسلما"), prove (اثبات کردن), realize (تشخیص دادن، درک کردن), really ("واقعا"), show (نشان دادن), sure (مسلّم، قطعی), think (فکر کردن), thought (فکر), truly ("واقعا"), indicate (نشان دادن), writer's attitude to propositions (نگرش نویسنده در مورد موضوع)

Attitude Markers express writer's attitude toward the propositional information:
Convey surprise, agreement, importance frustration versus commenting on status of information i.e. truth, relevance, undeniable, without a doubt
Words to look for:

! (تعجب), admittedly (در واقع، در حقیقت، به راستی، باید اذعان کرد که), agree (موافق بودن), amaze (متعجب ساختن), appropriate (مناسب), astonish (حیرت زده کردن، متعجب کردن), correctly (به درستی), curious (کنجکاو), fortunate (خوب، مساعد), hopeful (امیدوارکننده، امیدوارانه), important (مهم), inappropriate (نامناسب), interesting (جالب), prefer (ترجیح دادن), preferred (مقدم), remarkable (چشمگیر، قابل ملاحظه), shocking (تکان دهنده، زشت), striking (چشمگیر، درخور توجه), surprising shocked (حیرت زده، بهت زده), understandable (باورنکردنی، حیرت انگیز), unbelievable (تعجب آور، شگفت انگیز), unexpected (پیش بینی نشده، غیرمنتظره), unfortunate (بدشانس، ناموفق), unusual (غیرعادی، در خور توجه), usual (معمول، عادی، همیشگی)

Self Mention explicit reference to the writer:

- Refer to explicit writer presence in the text
- Measured by frequency of first person pronouns and possessive adjectives

Words to look for:
I (من), we (ما), me (به من), my (من ِ), our (ما ِ), mine (مال من), us (به ما), the author (نویسنده), the author's (نویسنده ِ), the writer (مؤلف), the writer's (مؤلف ِ)

Engagement Markers explicitly build relationship with reader:

- Devices that directly address the reader by focusing their attention or to include them in the context
- Create impression of authority, integrity, credibility by emphasis or dampening the reader in the text

Words to look for:
Add (اضافه کردن), allow (اجازه دادن), analyze (تجزیه و تحلیل کردن), apply (به کار بردن، اعمال کردن), arrange (مرتب کردن، منظم کردن), assess (برآورد کردن، ارزیابی کردن، تعیین کردن), assume (فرض کردن), by the way (راستی), calculate (محاسبه کردن، برآورد کردن), choose (انتخاب کردن), classify (دسته بندی کردن), compare (مقایسه کردن), connect (ارتباط داشتن), consider (در نظر بررسی کردن، مطالعه کردن، گرفتن), consult (مشورت کردن), contrast (مقایسه کردن), define (تعریف کردن), demonstrate (نشان دادن), determine (معین کردن، مشخص کردن), do not (انجام ندادن کاری), develop (توسعه دادن), employ (به کار بردن، استفاده کردن از), ensure (فراهم کردن، اطمینان حاصل کردن), estimate (تخمین زدن), evaluate (ارزیابی کردن), find (پیدا کردن), follow (دنبال کردن), go (رفتن), have to (مجبور بودن), imagine (تصور کردن), incidentally ("به طور اتفاقی، ضمنا"), increase (افزایش یافتن), input (ورودی، اطلاعات), insert (وارد کردن), integrate (یکی کردن), key (کلیدی، مهم، اصلی), let us (بگذارید), look at (نگاه کردن به), mark (علامت گذاشتن، نشان دادن، توجه کردن), measure (اندازه گرفتن), mount (افزایش یافتن، سازماندهی کردن), must (باید), need to (لازم بودن، احتیاج داشتن، باید), note (توجه کردن به، نشان دادن، خاطر نشان کردن), notice (توجه کردن، پی بردن), observe (مشاهده کردن), one's (خود، خودش), order (سفارش دادن، دستور دادن), ought (باید), our (مان ِ), pay (پرداخت کردن), picture (عکس، تصویر), prepare (آماده کردن), recall (فراخواندن، به یاد آوردن), recover (بهبود یافتن، بازیافتن), refer (اشاره کردن به، مراجعه کردن به), regard (در نظر گرفتن), remember (به یاد آوردن), remove (برطرف کردن، از بین بردن), review (بررسی کردن، ارزیابی کردن), see (دیدن، پی بردن به), select (انتخاب کردن), set (تعیین کردن، در جای خود قرار دادن), should (بایستی), show (نشان دادن), suppose (نیاز داشتن به، فرض کردن), state (بیان کردن), take (بردن), think about (فکر کردن درباره), turn (چرخاندن، تبدیل کردن), us (inclusive) (خودمان، ما را، برای ما)

The Framework for Data Analysis

For the detection of these 10 categories, the whole corpora were scrutinized word by word. Because in computer-assisted analysis, there is a risk of assuming external reference items as metadiscourse, which could damage the validity of research, in our study we used the manual frequency count in order to achieve a higher reliability. After the collection of data, the total

number of metadiscourse markers in each type of texts was determined. The total number of metadiscourse markers in English medical texts and their Persian translation was counted separately. The two acquired figures were compared with each other in order to find out if there was a significant difference between them. This provides the answer to the first research question which asks whether there is any difference in the amount of metadiscourse markers used in English medical texts and their Persian translation.

To answer the second research question which seeks to find whether there is any difference between the types of metadiscourse markers used in the ST (English medical articles) and in the TT (translation of these articles into Persian), a one-to-one comparison was carried out. SPSS software version 14 (SPSS Inc, Chicago, IL) was used for the statistical analysis of the data. The Kolmogorov-Smirnov test (KS-test) was used to report normally distributed data. The KS-test tries to determine if two datasets differ significantly. This non-parametric and distribution free test has the advantage of making no assumption about the distribution of data. According to this test, the *P*-values reported for each parameter should be more than 0.05 in both English medical texts and their Persian translation at the same time in order to be able to consider that variable as normal. The paired t-test and Wilcoxon signed-rank test were applied to the collected data with 95% CIs to compare the values of means to find out whether the number of each type of metadiscourse markers in English medical texts was significantly different from that in their equivalent Persian translation and to study whether these markers function identically in English and Persian within the same genre. The level of statistical significance was set at 0.05.

RESULTS

Table 1 shows the summary of the data gathered in the current research, that is, the type and frequency of each kind of metadiscourse markers in total and the total number of metadiscourse markers which existed in the selected English medical texts and their Persian translation. A glimpse at Table 1 reveals that translated texts into Persian have employed fewer metadiscourse markers than the English texts (1187 occurrences in the translated texts into Persian versus 1472 occurrences in the English medical texts). The English medical articles also have a higher proportion of metadiscourse markers in each category and type than their Persian translation. Comparison of the ST and the TT in our study show that not all metadiscourse markers existing in the original texts have been translated into Persian. More noticeably, transitional markers and engagement markers are the most frequently used metadiscourse elements in the two texts.

Table 1. The Type and Frequency of Metadiscourse Markers in the Selected Texts

Types of Metadiscourse Markers		**Frequency in English Medical Texts**	**Frequency in Translated Texts into Persian**
Interactive	**1) Transitional Markers**	598 (40.6%)	530 (44.6%)
	2) Frame Markers	86 (50 sequencing; 9 labels; 22 announce goals; 5 topic shifts; 5.8%)	68 (38 sequencing; 8 labels; 18 announce goals; 4 topic shifts; 5.7%)
	3) Endophoric Markers	21 (1.4%)	18 (1.5%)
	4) Evidentials	13 (0.9%)	13 (1.1%)
	5) Code Glosses	109 (7.4%)	91 (7.7%)

Interactional	**1) Hedges** **2) Boosters** **3) Attitude Markers** **4) Self Mention** **5) Engagement Markers**	151 (10.2%) 158 (10.7%) 27 (1.8%) 39 (2.6%) 270 (18.3%)	106 (8.9%) 96 (8%) 24 (2%) 26 (2.2%) 215 (18.1%)
Total		**1472**	**1187**

As mentioned earlier, the KS-test was used to report the normally distributed data. According to this test, the *P*-values >0.05 in both English medical texts and their Persian translation at the same time are considered as normal. The results of applying the KS-test to the quantitative data are shown in Table 2. As it is clear from the table, the *P*-values of transitional markers (0.773 vs. 0.497, respectively in English text and the translated text into Persian), engagement markers (0.114 vs. 0.142, respectively), total interactive resources (0.761 vs. 0.724, respectively), total interactional resources (0.211 vs. 0.315, respectively), and the total of both interactive and interactional resources (0.261 vs. 0.227, respectively) were more than 0.05 and as a result they were normal. This table also shows that the minimum, maximum, and median of the total metadiscourse markers in English medical texts are more than the minimum, maximum, and median of the total metadiscourse markers in their translation into Persian.

Table 2. The Results of Applying the Kolmogorov-Smirnov Test to the Quantitative Data

Categories and types		**English Medical Articles (n=35)**				**Their Persian Translation (n=35)**			
		Min	**Max**	**Median**	***P*-value**	**Min**	**Max**	**Median**	***P*-value**
Interactive	**Transitional Markers**	5	37	16	0.773*	4	33	15	0.497*
	Frame Markers	0	10	2	0.053	0	10	1	0.045
	Endophoric Markers	0	4	0	0.000	0	4	0	0.000
	Evidentials	0	2	0	0.000	0	2	0	0.000
	Code Glosses	0	14	2	0.108	0	12	1	0.028
	Total Interactive				0.761*				0.724*
Interactional	**Hedges**	0	18	2	0.133	0	13	2	0.015
	Boosters	0	17	3	0.386	0	10	2	0.042
	Attitude Markers	0	7	0	0.001	0	6	0	0.000
	Self Mention	0	7	0	0.003	0	6	0	0.000
	Engagement Markers	0	27	6	0.114*	0	23	5	0.142*
	Total Interactional				0.211*				0.315*
Total		11	112	35	0.261*	10	85	31	0.227*

* *P*-value in both texts is more than 0.05 so the parameter is Normal.

Table 3 presents the results of the application of the paired t-test and Wilcoxon signed-rank test to the data in the English medical articles and the translation of these articles into Persian. This table shows that there is a significant difference between the total of the two dimensions of metadiscourse markers in English medical articles and their Persian translation (42.05 vs. 33.91, t=7.622, df=34; *P*<0.05). The significant level reported by the computer is 0.000 (*P*<0.001). Also there is a significant difference between the types of metadisourse markers used in the English medical texts and their Persian translation (*P*<0.05). There is a significant difference between interactive resources in English medical texts and interactive resources in the translation of the texts into Persian (23.62 vs. 20.57; t=7.080, df=34, *P*<0.001). Table 3 shows the fromer is more than the latter. There is also a significant difference between interactional resources in English medical texts and interactional resources in the translation of the texts into Persian (18.42 vs. 13.34; t=6.472, df=34, *P*<0.001). The mean of transitional markers is 17.08 in English medical texts and 15.14 in the translation of the texts into Persian which shows that there is a statistically significant difference between the two texts (t=6.576, df=34, *P*<0.05). The mean of engagement markers is 7.71 in English medical texts which has been reduced to 6.14 in the translation of the texts into Persian, but there is a statistically significant difference between the two texts (t=5.895, df=34, *P*<0.05). The results of paired *t*-test also demonstrate that there is a statistically significant difference between the frame markers, code glosses, hedges, boosters, and self mention in English medical texts and those in the translation of these articles into Persian (*P*<0.05). However, there is no significant difference between endophoric markers (*P*=0.083), evidentials (*P*=1), and attitude markers (*P*=0.083) in the selected texts.

Table 3. Results of the Paired *t*-test and Wilcoxon Signed-rank Test in the Selected Texts

Types of Metadiscourse Markers		**English Medical Texts**	**Their Translation into Persian**	***P*-value**
Interactive	**Transitional Markers**	17.08 ± 8.05	15.14 ± 7.13	<0.001*
	Frame Markers	2.45 ± 2.57	1.94 ± 2.26	0.001*
	Endophoric Markers	0.60 ± 1.11	0.51 ± 0.98	0.083
	Evidentials	0.37 ± 0.64	0.37 ± 0.64	1.000
	Code Glosses	3.11 ± 3.28	2.60 ± 2.98	0.001*
	Total Interactive	23.62 ± 11.78	20.57 ± 10.05	<0.001*
Interactional	**Hedges**	4.31 ± 4.87	3.02 ± 3.78	<0.001*
	Boosters	4.51 ± 4.26	2.74 ± 2.80	<0.001*
	Attitude Markers	0.77 ± 1.41	0.68 ± 1.25	0.083
	Self Mention	1.11 ± 1.76	0.74 ± 1.42	0.004*
	Engagement Markers	7.71 ± 6.28	6.14 ± 5.41	<0.001*
	Total Interactional	18.42 ± 14.85	13.34 ± 11.23	<0.001*
Total		42.05 ± 24.59	33.91 ± 19.15	<0.001*

* Indicates a significant difference between the two selected texts.
Values are expressed as mean ± SD.

Paired samples test shows that the mean of interactive resources in English medical texts and their Persian translation (3.05) is less than the mean of interactional resources in English medical texts and their Persian translation (5.08). Table 4 demonstrates that there is a

significant difference between the interactive resources in the whole corpus and the interactional resources (P<0.001).

Table 4. The Results of Paired Samples Test for Interactive and Interactional Resources

Categories	Paired Differences					t	df	*P*-value
	Mean	Std. Deviation	Std. Error Deviation	95% CI of the difference				
				Lower	Upper			
Interactive in English and Persian	3.05	2.55	0.43	2.17	3.93	7.08	34	<0.001
Interactional in English and Persian	5.08	4.64	0.78	3.48	6.68	6.47	34	<0.001

CI = confidence interval; df = degree of freedom

Figure 1 illustrates the outcome of comparing the total of different types of metadiscourse markers in English medical texts and their translation into Persian. Based on Figure 1, transitional markers were the most frequent metadiscourse markers in this corpus (598 in English medical texts and 530 in their translation into Persian with a percentage of 40.6% and 44.6%, respectively). Engagement markers were the second most frequent type of the metadiscourse markers (270 in English medical texts and 215 in their translation into Persian with a percentage of 18.3% and 18.1%, respectively). Other most frequent metadiscourse markers in decreasing order were boosters (n=158, 10.7%), hedges (n=151, 10.2%), code glosses (n=109, 7.4%), frame markers (n=86, 5.8%), and self mention (n=39, 2.6%) in English medical texts and hedges (n=106, 8.9%), boosters (n=96, 8%), code glosses (n=91, 7.7%), frame markers (n=68, 5.7%), and self mention (n=26, 2.2%) in their translation into Persian. The frequency of endophoric markers and attitude markers in neither of the texts is considerable. Finally, evidentials were the least frequent metadiscourse marker in this corpus (n=13).

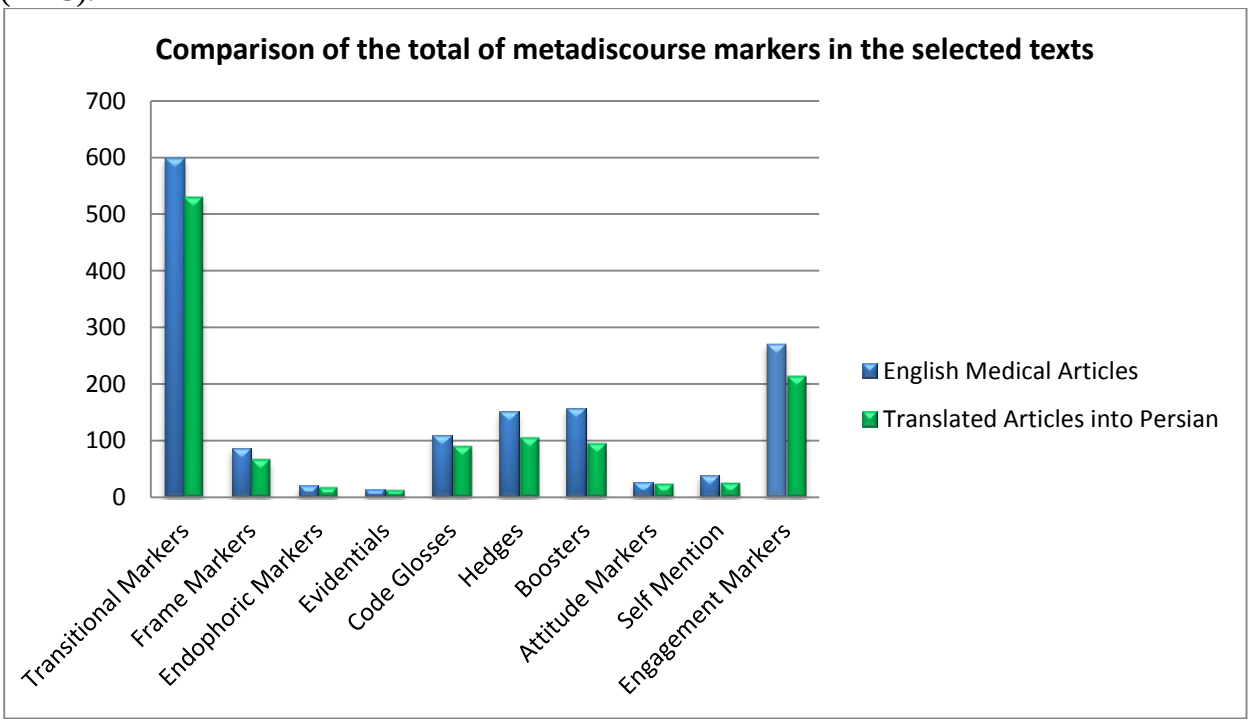

Figure 4.1. Comparison of the total of metadiscourse markers in English medical texts and their translation into Persian

Based on the results calculated by the computer, we can reject the null hypotheses. As a result, we can conclude that English medical texts and their Persian translation are different in terms of the number and types of metadiscourse markers and the distribution of different types of metadiscourse markers in English medical texts is not the same as their distribution in their Persian translation.

DISCUSSION

It is a commonly held belief that discovery of the meaning of a text is a central issue in translation process and the quality of the translated work. Metadiscourse is one aspect of discourse which is crucial in the relation that sender and receiver of a massage establish. The importance of metadiscourse markers lies in the fact that they contribute to the organization of the text and effective interaction between authors and their audience. In addition, metadiscourse markers enable writers or speakers to express their attitudes towards the information they convey and also towards their audience (Fuertes-Olivera et al., 2001). It is clear that the use of metadiscourse is important in academic writing, especially in research articles. While different cultural backgrounds of writers have been found to influence the types and number of metadiscourse used (Mauranen 1993; Valero-Garces 1996), it is also evident that metadiscourse is a universal feature of professional rhetorical writing. It can be demonstrated that Iranian translators typically reproduce some form of metadiscourse in their Persian translations. They frequently change the presentation of metadiscursive acts from the point of view of the ST writer to the perspective of the TT reader and that they opt for syntactic reorganization to ensure a coherent flow of information. The results of this study indicated that there was a significant difference between the number and types of metadiscourse markers in the English medical articles and their Persian translation, which verify that metadiscourse plays a salient role in this genre.

In our study, the findings showed that the percentile proportion of total metadiscourse markers in English medical texts was more than their Persian translation. This revealed that metadiscourse markers are used more frequently in English medical texts than in their Persian translation. Our finding is similar to the finding of a study conducted by Shokouhi and Talati Baghsiahi (2009) in which they studied the metadiscourse functions in English and Persian sociology articles and their results revealed a higher number of metadiscourse elements in the English texts. Pisanski Peterlin (2008) also reported that metadiscourse was used more frequently in English originals than in translations from Slovene. In contrast to our findings, Sultan (2011) reported that the total percentage of metadiscourse use for the English language was less than for the Arabic language. However, the similarities or differences of the findings of Pisanski Peterlin (2008) or Sultan (2011) might be because of the differences which exist in the structure and characteristics of different languages, so their findings cannot be attributed to English medical texts and their translation into Persian.

Our results showed that there was a significant difference between the total of interactive resources in English medical texts and the total of interactive resources in their translation into Persian. Also there was a significant difference between the total of interactional resources in English medical texts and the total of interactional resources in the translation of the texts into Persian. In addition, our results showed that there was a significant difference between the total of the two dimensions of metadiscourse markers in English medical articles and their Persian translation and the total number of metadiscourse markers employed in English medical texts was higher than their Persian translation. This means that the distribution of different types of

metadiscourse markers in English medical texts is not the same as their distribution in their Persian translation.

Analysis of the two dimensions of metadiscourse in the present study showed that the mean of interactive resources in English medical texts and their Persian translation was less than the mean of interactional resources in this corpus. English and Persian both relied more on interactional markers than on interactive ones. Interactional metadiscourse features pave the way for writers to interact with readers, get access to them, and signal their truth-value about current propositional information. This finding may indicate the significance of involving the readers in the text and alerting them to the writer's perspectives for information over guiding the reader through the text and enabling the writer to manage the information. On the whole, the statistical analysis shows that the differences between the two languages are statistically significant. However, Yazdanmehr, et al. (2013) studied interactive and interactional metadiscursive resources in research article abstracts in English and Persian and reported that interactive metadiscursive resources were present in all the abstracts unexceptionally, and were generally more frequent and ubiquitous than the interactional ones. Moreover, Pooresfahani, Khajavy, & Vahidnia (2012) investigated the use of interactive and interactional metadiscoursal features using the model suggested by Hyland (2005) in two disciplines, applied linguistics and engineering, and their results showed that in both groups the writers used interactive metadiscourse markers more than interactional ones.

The KS-test in this study documented that the occurrence of transitional markers and engagement markers was quite normal. These two markers are used to 'express relationships between stretches of discourse and make links between the stretches of discussion' and 'explicitly build relationship with reader', respectively (Hyland, 2005). The findings of our study showed that these markers were the first and the second most frequent metadiscourse markers in both English medical texts and their Persian translation, respectively, while evidentials were the least frequent metadiscourse marker in this corpus. Therefore, it seems that both English and Persian maximally rely on transitional and engagement markers and minimally on the evidentials. Our data conflicted with the findings of the two studies conducted by Yazdanmehr, et al. (2013) and Khedri, Ebrahimi, & Heng (n.d.), in which they reported the non-existence of engagement markers in the English and Persian abstracts and in the research articles in English language teaching, respectively.

When we compare the frequency of occurrence of frame markers, code glosses, hedges, boosters, and self mention in English medical texts to that of their Persian translation, figures clearly indicate that English medical texts tend to use these markers much more than their Persian translation. However, the findings revealed that there were worth-pointing differences, but not statistically significant differences, in terms of endophoric markers, evidentials, and attitude markers in the selected texts. Similar to our study in which there were 13 evidentials in English medical texts and 13 in their Persian translation, Yazdanmehr, et al. (2013) reported that in their study evidentials appeared to nearly the same extent in English and Persian abstracts. They also reported that attitude markers were wholly absent in research article abstracts written by Iranian applied linguists in English and were very rare in Persian abstracts.

Hyland (2001: 223) argued that the use of self-mention is important in academic writing. He pointed out that the 'points at which writers choose to announce their presences in the discourse are those where they are best able to promote themselves and their individual contributions'. In the Persian texts, besides the use of particular words or phrases to mention the author, the

verb's SHENASE is also used very commonly to serve this metadiscursive function. This structure is absent in English, i.e. nothing is attached to the verbs in English in order to indicate that they are referring to first person singular or plural subject which may be due to the fact that most of English medical articles have the natural tendency to use passive structures. However, although using SHENASE is more common in Persian to make clear who the subject is, little use was made of the pronouns "ما"or "من" serving the function of self-mention in the Persian texts and our findings showed that English medical texts employed more percentage of self mention markers (2.6%) than their Persian translation (2.2%). Yazdanmehr, et al. (2013) showed that self mentions were the most common interactional type in English and Persian abstracts in their study, but our findings showed that self mentions were the seventh frequent markers in English medical texts and their Persian translation.

CONCLUSION

The result revealed that there was a statistically significant difference in the amount and type of metadiscourse items employed in English medical texts and their Persian translation ($P<0.001$). This study demonstrated that English medical articles contain more metadiscourse markers compared to the translation of these medical articles into Persian and also English medical articles used all types of metadiscourse markers more frequently than did their Persian translation, except in three cases which were endophoric markers, evidentials, and attitude markers. Based on the computer results, this difference could not be accidental. Translated texts into Persian employed fewer metadiscourse markers than the English texts. The English medical articles also had a higher proportion of metadiscourse markers in each category and type. The findings of this study showed that not all metadiscourse items found in the original texts were translated. More noticeably, transitional markers and engagement markers were the most frequently used metadiscourse elements in the two texts. However, evidentials were the least frequent metadiscourse marker in this corpus.

Our results also showed that the total number of the two dimensions of metadiscourse markers employed in English medical texts was significantly higher than their Persian translation. This means that the distribution of different types of metadiscourse markers in English medical texts is not the same as their distribution in their Persian translation.

Paired samples test showed that the mean of interactive resources in English medical texts and their Persian translation was less than the mean of interactional resources in this corpus. English and Persian both relied more on interactional markers than on interactive ones. This finding may indicate the significance of involving the readers in the text and alerting them to the writer's perspectives for information over guiding the reader through the text and enabling the writer to manage the information.

The minimum, maximum, and median of the total metadiscourse markers in English medical texts were more than the minimum, maximum, and median of the total metadiscourse markers in their translation into Persian.

There was a significant difference between interactive resources in English medical texts and interactive resources in their Persian translation. English medical texts used a larger variety of interactive resources than the translation of the text into Persian. Also there was a significant difference between interactional resources in English medical texts and in the translation of the texts into Persian. The findings showed that English medical texts used more interactional resources than their Persian translation.

English medical articles used larger variety of metadiscourse markers compared to their Persian translation. This is more explicit when the subtypes of metadiscourse markers are also taken into consideration. The greater number of metadiscourse markers used in the English medical texts can explain why they seem to be less restricted than their Persian translation. In other words, the authors of English medical articles attempt to comment on their writing more, thereby establishing a closer relationship with their readers.

All in all, this study suggests that the distribution of different types of metadiscourse markers in English medical texts is not the same as their distribution in their Persian translation. English medical texts and their Persian translation undoubtedly differ in some points in terms of metadiscourse functions.

IMPLICATIONS OF THE STUDY

Metadiscourse is quite a new concept in the area of text analysis. Despite the importance of metadiscourse in composition, reading, rhetoric and text structure and being investigated from different angles recently, it is still unknown to many of those who are involved in the field of linguistics and translation and surprisingly little is known about the ways metadiscourse markers are realized in English medical texts and their translation into Persian. Metadiscourse markers assist in the communicative goal of texts such as medical research articles. If these texts are translated without considering metadiscourse markers of the target language and genre, then for example the reader cannot draw the same conclusion as writer does and therefore, the result would be a deficient translation. Thus, it merits more attention and the findings of the researches devoted to this area could be of great value. Metadiscourse, after all, is an area of language whose different aspects warrant serious investigation.

Translators need special practice regarding the interactive and interactional dimensions of metadiscourse markers. Awareness and use of metadiscourse markers should also be an inseparable part of each translation course. The findings in this study suggest that the teachers engaged in teaching translation and discourse to Persians at the universities should emphasize on metadiscourse markers so that the students grasp the idea that different genres require different metadiscourse markers. Translators should understand how, by the use of hedges and boosters, they can withhold commitment or emphasize certainty in a translated text. Moreover, they should understand the English writer's attitude toward the content by focusing on attitude markers existing in Persian. Persian translations should also indicate the English author's presence by self-mentions and engagement markers.

The findings of this study make it possible for the interested bodies to understand features typical of English medical articles and their Persian translation. Some such features are the various uses of metadiscourse markers by the translators who translate the English medical articles into Persian to establish a stronger interaction with their readers.

From the practical point of view, the findings of this study can help instructors to select more effective teaching methodologies which integrate specific instructions related to metadiscourse markers in order to take into consideration the better criteria for preparing appropriate materials based on their students' needs and to make new generation of teachers and translators aware of these linguistic elements. The findings of the present study also will give an insight to the translators and writers of English or Persian medical articles, professional translators, undergraduate and graduate students of English translation and teaching who are interested in

metadiscourse markers, teachers of English as a second language, and educational institutes like universities and institutes for higher education, which are involved in the field of linguistics and translation, regarding the types of metadiscourse markers which enhance the quality of writing and translation.

As metadiscourse markers can help students in comprehending and writing various texts and since, based on the findings of this research, English medical texts and their Persian translation differ in using metadiscourse markers, it is essential that teaching different metadiscourse markers be part of general English classes of medical students on the one hand, and translation courses on the other. It is not necessary to directly introduce the concept of metadiscourse to medical students or students of language. The best way is to help them to understand how native writers use metadiscourse markers to manage the information flow so as to provide their preferred interpretations by additive, contrastive, and consequential steps in the discourse, text boundaries or elements of schematic text structure, referring to information in other parts of the text and to sources of information from other texts, and restatements of ideational information, or to involve the reader in the argument by withholding writer's full commitment to proposition, emphasizing force or the writer's certainty in proposition, indicating the writer's appraisal or attitude to propositional information, referring to or building a relationship with the reader, or referring to authors' presence in terms of first person pronouns and possessives. In fact, these kinds of instructions will help pupils to become more successful translators, writers, teachers, and readers. Moreover, this awareness will help learners not to deviate from the specific norms of writing or translating in the field of medicine and other fields of study.

PROSPECTS FOR FURTHER RESEARCH

It is a fact that no research is complete in its own right. The more answers are obtained, the more questions will naturally be raised. The domain of metadiscourse is too vast to be explored in one single study. Future research is definitely needed to shed light on other aspects and effects of metadiscourse markers in the ST and TT. The differences which turned out to exist between the frequency and types of metadiscourse markers based on Hyland's model in English medical articles and their translation into Persian can be compared with probable differences of metadiscourse items in Persian medical articles and their translation into English. Further studies should also investigate the manifestation of metadiscourse markers, both interactive and interactional, in different fields of study in order to achieve more plausible and attestable insights. In addition, this research can be replicated, using texts other than medical texts along with their Persian translation. Moreover, the effect of metadiscourse awareness on the performance of students of translation can be investigated in a pedagogical context.

LIMITATIONS OF THE STUDY

As it is clear from any scientific research, nothing can be self-evident unless verified by observation or experimentation. To conduct any kind of scientific research, one may confront with problems and limitations. There are some limitations with respect to this study. First, this study just analyzed the most recently published English medical texts and their Persian translation on the grounds of Complementary and Alternative Medicine. In order to make generalizations in a more confident manner, a larger corpus of data which encompasses a wider range of various medical articles including neurosurgery, orthopaedics, cardiac surgery, radiology, etc. is needed. Second, the corpus of this study was almost limited. Other studies with larger samples could be done to ensure the external validity of these findings. In addition, the findings of this research cannot be generalized beyond English texts to equivalent texts in other languages.

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