# Paradigmatic Influences on Metadiscourse Features in Medical Research Articles

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## Abstract

For the recent decades, scholars have examined the use of metadiscourse markers (MDMs) paradigmatically through several comparative studies across varying languages and cultures. No study to date, however, has investigated a comprehensive, full-fledged comparison of the possible disparities among the native English writers (NEW), Iranian English writers (IEW), and Iranian Persian writers (IPW) in crafting disciplinary research articles (RAs) in the academic field of medicine. By drawing on Hyland's (2005) metadiscourse taxonomy, the present research thus embarked on this comparison through the random selection of 240 medical research articles (RAs), 120 quantitative and 120 qualitative ones. The results could espouse the perspective that medical RA genre is less impacted by the inevitable language differences thereby giving rise to the greater importance of consensually-acknowledged disciplinary epistemology underlying medical sciences. It is thensuggested that ESP classes as well as the article writing workshops held in L2 make every effort to include the interactional phase of the discourse as well.

## 1. Introduction

In an attempt to put forth a somehow generally-agreed-upon configuration of metadiscourse, researchers inform us by the contention that a good piece of writing has to be reader-friendly through taking account of logical togetherness of its components, orienting its readers by proper signposting,and consideringreaders' processing problems and their possible reactions (Adel, 2006; Hyland, 1998).

Metadiscourse,developed by the pioneers of the field such as Crismore (1989), Vande Kopple (1985), and Williams (1981),and predicated on a view

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ofwriter's awareness of discourse and writing capacity to socially engage the audience,is evidenced in literature to be in close association with Systemic Functional Linguistics (SFL) developed by Hallidayan school (Hyland, 2005). In Hyland's words, "because metadiscourse analysis involves taking a functional approach to texts, writers in this area have tended to look to the Systemic Functional Theory of language for insights and theoretical support" (P. 26; see also Adel, 2006). Hyland (2005) refers to *ideational*, *interpersonal*, and *textual* functions of language well-expounded by Halliday so as to conceptualize the multifunctionality of natural languages. The ideational function represents experience and ideas roughly relating to the concept of 'propositional content'. The Interpersonal function corresponds roughly to metadiscourse as a way to epitomize our interactions and engagement with others, considering the roles we take on for the expression of our feelings, personalities and evaluations. The Textual function relates to the mere organization of the text ruling in cohesion and coherence to delineate how a text is processed to be understandable to readers. Lyons (1977) has referred to this as text *reflexivity* or "the capacity of natural language to refer to or describe itself, calling attention to the idea that parts of a text can function to organize the discourse and help make the message comprehensible rather than refer to the world (p. 5)." Moreover, to Halliday, there exists no independent and discrete operation of these metafunctions as their representation is simultaneous in a piece of discourse. In other words, the integration of all these functions, each of which is apprehended in relation to others, assists in understanding the meaning of a text (Hyland, 2005).

This study on research article (RA) writers' use of metadiscourse emerged out of our experience as to the ways medical texts across paradigmatic modes of quantitative and qualitative can magnify the argumentative couching in academic texts. It is motivated by the need to appreciate more the differences that exist between Anglophone and non-Anglophone (here Iranian) RA writers in couching such texts most likely arising from language and other cultural influences. As a determinant of rhetorical configuration, Burgess (2002) sees the role of audience even more critical than the writers' L1, their specialty, as well as the language they want to publish.This is somehow in line with what Scollon (1993) asserts as to the stability and instability of the relationship between writer and audience which can determine the way a certain genre is formulated, i.e., being, for example, the established member of a community, the writer can sense such a stable position that s/he would dispense with some rhetorical norms needed in couching a particular text; here no cultural constants are involved.However, while Scollon and Scollon (1995) argue, for example, in favor of no 'inherent' difference between Asians and

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Westerners in drawing on inductive and deductive strategies for shaping the introductions in texts, they believe in the Asians' disposition "to be concerned with showing deference or respect in interactions with non-intimates, in contrast to the westerners who tend to emphasize egalitarian relationships" (p. 36). These researchers further discuss the notion of 'corporate discourse' so as to project factors such as ideology, socialization, forms of discourse and face systems (social organization) which can impact the rhetorical identity in 'interdiscourse communication'. The appreciation of these elementscan surely be beneficial in two important ways. First, in academic writing courses more often than not offered to graduate and post-graduate cohort of university students, teachers seem to be highly in need of well-delineating how the people communicate in different languages and hence contribute to learners' amelioration of their argumentative writing genre. Second, research in the realm of metadiscourse across varying languages and paradigmatic representations can surely give rise to distinguishing the commonalities and demarked aspects of rhetoric virtually extant in this area and thus facilitating communication among different cultural identities.

Our study conspicuously adopts the approach delineated by Hyland's (2005) interpersonal model of metadiscourse for the simple reason that viewing just the textual functions of language can be devoid of the identification that "all metadiscourse is interpersonal in that it takes account of the reader's knowledge, textual experience, and processing needs" (Hyland &Tse, 2004, p.141). Moreover, adoption of Hyland's metadiscourse configuration can provide us the possibility of comparing our findings with those of others as the model has been extensively used by the researchers working within the field (see for example Abdi, 2011; Cao & Hu, 2014;Heng& Tan, 2010; Hu & Cao, 2015; Khedri, Ebrahimi, &Heng, 2013).

## 2. Background

To academic community, the significance of metadiscourse as a quintessential component of texts assisting in fundamental understanding of discourse has gained increasing attention over the few decades (Adel, 2006; Hyland, 1998; Mauranen, 1993; VandeKopple 1985), and a host of studies have explored the use of metadiscourse in various types of the prestigious genre of RAs (e.g., Abdi, 2011; Blagojevic, 2004: Cao & Hu, 2014; Hu & Cao, 2015; Kawase, 2015; Khedri et al, 2013; Kuteeva&Negretti, 2016; Toumi, 2009) particularly in the field of medicine (see for example Mahzari, 2008; Validi, Jalilifar, Shooshtari&Hayati, 2016). Metadiscourse has been viewed as the explicit commentary of the writer on the text

he/she is writing. In other words, it comprises reflexive linguistic items referring to the text viewed as text or as language. In a wider sense, it signifies the writer's presence in a text so as to comment and thus guide his/her reader how to react to the content. As Adel (2006, p. 2) furthers, "Metadiscourse can take many different forms, ranging from morphemes, single word forms, phrases, clauses, to strings of sentences. Morphosyntactically, it can be represented by a range of different structures". One of the most typical categories identified are adverbials: *first, second, third, then, finally*, and *in conclusion* are the examples of the adverbials used to express logical binding in a text; metadiscourse verbs, for example, are also used to represent showing, explaining, describing, claiming, arguing, adding, suggesting, contrasting, denying, summarizing and the like; authors hedge their perspectives to show how uncertain they are by using *possibly, presumably, I believe, probably* and so on; they use words and phrases such as *surprisingly, amazingly,* or *unusual* to add voice to their writing as well. Nonetheless, Hyland (2005) asserts that metadiscourse can be viewed as an open category; there is always the possibility of adding new items as the writers see their needs in a certain context.

According to Hyland (2005), whether metadiscourse is a *syntactic* or *functional* category is, furthermore, another critical issue and often a source of confusion in the metadiscourse literature. Hyland further adds that researchers such as Crismore, Markkanen and Steffensen (1993) have adopted a dual position thereby concentrating simultaneously on both elements. Most scholars though have assumed a functional approach and attempted to categorize the linguistic tokens or metadiscourse markers, in terms of the functions they fulfill in a text to achieve certain *communicative purposes* for speakers or readers (e.g. Lautamatti, 1978; Meyer, 1975; Williams, 1981). Assertion of a claim, readers' direction toward an action, elaboration on meaning, suggestion of a new subjective idea and the like are some of the examples concerned. The emphasis is therefore on meanings in context or how language is used rather than a dictionary meaning. So, what counts is not the general function of a metadiscourse element but what it does in a certain context.

Furthermore, paradigmatic investigations the two major representatives of which are quantitative and qualitativeresearch can also determine the way a certain type of genre can be shaped. According to Cao and Hu (2014, p. 14), "[t]he epistemological assumptions associated with quantitative and qualitative paradigms are believed to not only govern the conduct of empirical research in each tradition (Carter and Little, 2007) but also shape the discourse and rhetorical conventions in which empirical research is presented (Holliday, 2007; Madigan et al., 1995)". And

telling as the relation between research paradigms and academic discourse would be, work in this area appears to be scanty and the relationship is under-researched (see for example, Firestone, 1987; Hansen, 1988; Sallinen and Braidwood, 2009).

Exploring the currently-practiced formulation of metadiscourse in the post-method sub-sections of medical RAs can, admittedly, shed light onto rhetorical norms of these texts and, accordingly, provide insight into how they might be used in academic writing classes.This study aims to explore how native English and Iranian academic writers in medicine use interactive and interactional metadiscourse features in the post-method sections of both quantitative and qualitative RAs in English and Persian. Our study was specifically triggered by the following questions:

1.  Are there any significant differences in terms of type and frequency between native English writers (NEW) and Iranian Persian writers (IPW) in the use of metadiscourse markers in post-method section of medical quantitative RAs?

2.  Are there any significant differences in terms of type and frequency between native English writers (NEW) and Iranian Persian writers (IPW)in the use of metadiscourse markers in post-method section of medical qualitative RAs?

3.  Are there any significant differences in terms of type and frequency between native English writers (NEW) and Iranian English writers (IEW) in the use of metadiscourse markers in post-method section of medical quantitative RAs?

4.  Are there any significant differences in terms of type and frequency between native English writers (NEW) and Iranian English writers (IEW) in the use of metadiscourse markers in post-method section of medical qualitative RAs?

## 3. Methodology

### 3.1 Corpus and procedures

This is a comparative, corpus-based study designed not only to evidence discrepancies, if any, between native speakers of English and Persian in the use of metadiscourse in RAs, but also to locate any differences likely existing paradigmatically between quantitative and qualitative types of RAs formulated by these writers. For corpus selection, as Moreno (2008) maintains, two basic steps need to be taken into account: one is drawing on comparable or equivalent data and second identifying concepts which are parallel in the discourse. To take the initiative, we first saw a need to discern which medical journals to rule in and the final decision was accordingly made.Having been published between 2010 and 2015, the corpus of

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the study was opted such that it primarily comprised around twice as many as the number of the articles that were needed out of which 240 full-length RAs were selected. Of the whole corpus, 80 RAs were in English written by native speakers of English (evidence was afforded by the names and affiliations of the authors), 80 others were also in English written by Persian speakers and the last 80 were written in Farsi all chosen from the wealth of renowned peer-reviewed journals. The reason behind ruling out certain databases such as ISI/SSCI/WoS or Pubmed/Medline databases from the study was that following examining the identified journals we noticed we could readily fall short of our expectations as to find adequate number of pertinent articles written by the Iranian authors. We were then intent on picking out the articles indexed inScopus, Embase, CINAHL, Biological Abstract, PsychoInfo databases and the like so as to have adequate access to the articles needed and address the critical element of homogeneity as well. Moreover, each category of the 80 RAs were then stratified paradigmatically into quantitative and qualitative ones (20 each) (interestingly, the two disciplines selected provide researchers with some adequate number of qualitative articlessome even subtitled as "…: a qualitative study") as the assertion by some scholars reveals that researchers' paradigmatic orientation can determine the type of formulation of their claims and argumentations (Hewings, 2006).

Moreover, while several studies, mostly inspired by Swales' CARS (Create a Research Space) model, have addressed the *introduction* section of the articles as a suitable place for their rhetorical research, many others have focused on other sections specially *results* and*discussions*. Moreno (2012), for example, "identifiedthediscussion section as the most implicated in the increased difficulty perceivedby Spanish researchers writing RAs in English (as L2) as opposed to Spanish (as L1) across all knowledge areas" (p. 176). Our experience also confirms the post-method section of the RAs as the most challenging for the writers.

Moreover, decision was made to collect the data through manual frequency count rather than using computer-assisted techniques for the simple reason that emic (functional) property or contextualization is of crucial significance in issues germane to metadiscourse analysis. As Hyland himself holds, "[i]t is based on *functional* [emphasis added] approach which regards metadiscourse as the ways writers refer to the text, the writer or the reader" (2005, p. 48). It is indeed this important principle of the functionality of metadiscourse characterization that runs the threat of misinterpretation of its features unless researchers in the field resort to individual exploration and identification of metadiscourse features manually.

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### 3.2 Data analysis

To spell out any possible disparities in the use of metadiscourse features in the prestigious genre of RAs written by the native English writers (NEW), Iranian Persian writers (IPW), and Iranian English writers (IEW),a descriptive analysis method predicated on Hyland's (2005) metadiscourse taxonomy(Table 1) was employed. And to compare the data garnered from these two groups, the non-parametric test of Chi-square was applied. For analyzing the results by Chi-square test, the Alpha level for statistical significance was set at 0.05. Moreover, the degree of freedom for all comparisons was 1 due to the fact that the two corpora were compared in every step. In the case of Chi-square observed value exceeding the critical value of 3.84 at one degree of freedom, the conclusion would be drawn as to the existence of significant difference between the metadiscoursal elements in the analyzed corpora.

Table 1.Metadiscourse analytical framework

| Tokens | Function | Examples |
|---|---|---|
| **Transitions**indicate intersentential connections | | *also; but; hence* |
| **Evidentials**indicate sources of information | *according to X; In line withZ'sstudy; "…" (2016)* | |
| **Frame markers** represent sequencing | *first; then; finally* | |
| lable stages | *thus far; to sum up* | |
| announce goals | *aim; goal; purpose* | |
| shift between topics | *in regard with; shift to; back to* | |
| **Code glosses**explain, rephrase and elaborate discourse | *e.g.; described as; viz* | |
| **Endophoric markers**refer to other parts of a text | *this section; as noted above* | |
| **Hedges**express author's uncertainty | *might; probably; perhaps* | |
| **Boosters**show certainty | *actually; never; proves* | |
| **Self mentions**signal writer's presence in a text | *me; I; we; our, the authors* | |
| **Attitude markers**magnify the writer's voice | *striking; hopefully; usual* | |
| **Engagement markers**engage readers in a text | *see; imagine; we (inclusive)* | |

## 4. Results and Discussions

The following table displays the frequency of metadiscourse markers in quantitative papers by native English writers (NEW) and Iranian Persian writers (IPW) so as to address the research question one. As can be seen in the last column, NEW had a higher frequency per 10000 than IPW in terms of using metadiscourse markers (Mean difference= 149.5).

Table 2.Frequency of metadiscourse markers (MDMs) in quantitative RAs by NEW and IPW in general

| Type of context | Total words | Raw Frequency of MDMs | Frequency per 10000 |
|---|---|---|---|
| **Quantitative papers by NEW** | 57796 | 5176 | 895.56 |
| **Quantitative papers by IPW** | 54882 | 4094 | 745.96 |

A chi-square test was conducted to explore the likelihood of any significant difference between the two groups; and the difference was identified, $\aleph^2$ (1)= 13.703, $p$=0.001.

Table 3 shows the distribution of metadiscourse categories by both groups. As can be observed, boosters and transition markers have been deployed to a high extent by both groups.

Table 3.Frequency of MDMs in quantitative RAs by NEW and IPW in details

| MDM categories | NEW | | | | IPW | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Raw | F per 10000 W | % | Raw | F per 10000 W | % | Chi-square value | p-value |
| **Code glosses** | 620 | 107.27 | 12.2 | 422 | 76.89 | 10.7 | 4.89 | **0.027** |
| **Evidentials** | 420 | 72.67 | 7.8 | 742 | 135.20 | 18.7 | 18.48 | **0.001** |
| **Endophoric markers** | 232 | 40.14 | 4.4 | 140 | 25.51 | 4 | 2.97 | 0.085 |
| **Frame markers** | 286 | 49.48 | 5.6 | 240 | 43.73 | 5.3 | 0.27 | 0.604 |
| **Transition markers** | 994 | 171.98 | 18.9 | 760 | 138.48 | 18.7 | 3.73 | **0.053** |
| **Attitude markers** | 150 | 25.95 | 3.3 | 112 | 20.41 | 2.7 | 0.78 | 0.376 |
| **Boosters** | 1474 | 255.03 | 28.9 | 1274 | 232.13 | 30.7 | 1.65 | 0.297 |
| **Self mention** | 340 | 58.83 | 6.7 | 58 | 10.57 | 1.3 | 32.91 | **0.001** |
| **Engagement markers** | 20 | 3.46 | 0 | 20 | 3.64 | 0 | 0.143 | 0.705 |
| **Hedges** | 640 | 110.73 | 12.2 | 326 | 59.40 | 8 | 15.91 | **0.001** |
| **Total** | 5176 | 895.56 | 100 | 4094 | 745.96 | 100 | 13.70 | **0.001** |

To examine the likelihood of any association between each individual subcategory across the two groups of NEW and IPW, a chi-square test was conducted. The results revealed a significant difference between the metadiscourse markers in code glosses, evidentials, transition markers, self-mention and hedges as their chi-square values exceeded 3.84 which is a minimum chi-square value with a df value of 1. The differences among the rest of the subcategories did not turn out to be significant. Being at variance, the frequencies and patterns of the subcategories drawn on across the groups have moreover made them open to argument. For the sake of clarity, these differences along with their possible epistemological underlying identities will be discussed as follows.

As Table 3 spotlights the findings on quantitative RAs, the frequency of boosters and transition markers projects over the others respectively in both groups (255.03 & 171.98 per 10000 w respectively).

One reason behind using boosters at a stark level of discrepancy with others can be ascribed to medicine being a discipline which is mostly concerned with the findings generally arising from experimental investigations. It follows that by permitting the researchers to mitigate alternatives and hence capture certainty in medicine, boosting tokens such as *surely, reveals, it is clear that*, and the like can lend themselves well to give an authoritative stance to writers for asserting and making claims. Moreover, compared with other disciplines such as linguistics and economics (Dahl, 2004), medicine has proven to enjoy a fairly fixed and uniform organization of discourse thereby displaying a similar pattern of metadiscourse distribution across the languages.

As to transitions, although occupying the second rank across the English and Persian RAs and highly approaching significance across the two languages ($p$=0.053), the frequency per 10000 turned out to be higher in English (171.98 *vs.* 138.48) thereby representing the nature of the Persian language which can likely bear the potential to attain adequate and felicitous homogeneity through a fewer number of this element. Also in Hyland's (2005) study over 184000 cases of metadiscourse markers in the MA and Ph. D dissertation of EFL students in Hong Kong, transitions ranked second to signify the importance of this token in projecting internal connections in the discourse. Cao and Hu (2014) identified a unique deployment of cross-disciplinary transition markers in the quantitative RAs as well.

As to evidentials, bearing a significant difference across the two languages ($p$=001), the frequency of occurrence of this metadiscourse subcategory in RAs

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couched by IPW is approximately twice as that of the English writers (135.20 *vs.* 72.67 per 10000 w). One explanation over the virtually doubled use of evidentials by the Iranian group is that these researchers more possibly bear the propensity to make their findings justified and better adopted by the readers through richer citations, that is, by way of referring to most of the pertinent works done in the field. Moreover, one conspicuous difference was identification of the use of more and more recent citations by the native writers (see Hyland, 2005, for example); this was not however the case for Iranians. The reason can likely be attributed to some strategic political issues and challenges resulting from disparate cultural identities among the nations thereby giving rise to lower accessibility of the Iranians to newly published texts via internet and other media. This can more basically be understood as a result of the international sanctions imposed on Iran since the 1979 revolution thereby constraining Iranian authors as to accessing up-to-date scientific resources in time (see for example, Katzman, 2016).It is also possible that on occasions such situation somehow restricts them in their efforts to line up with the prestigious high-rank journals and marginalize them in the academic world.The consequences of this, however, can better be understood fromCanagarajah'(1996) words, "[t]he exclusion of Third World scholars impoverishes the production of knowledge not only in the Third World, but internationally" (P.435).

Regarding the hedges, being also statistically significant across the two languages (p=001), we observed approximately twice as much employment of this token by the English than the Persian writers (110.73 *vs.*59.40 per 10000 w). Conditioned arguably by the impact of language or/and culture andconsonant with the perspective that Iranians appear to capture their propositions with some degree of confidence (Hofstede, 1977), we also expected to see a lower application of hedges by the Persian writers. Keshavarz and Kheirieh (2011), however, found the opposite to this in their study that, as they state, countered their expectations. In their own words, "[i]t was unexpected because being decisive and firm in stating one's opinion is an aspect of Iranian culture" (p. 12).

For code glosses also being statistically significant between the two groups (*p*=0.027) as well as displaying a preponderance of use by the NEW vis-à-vis the IPW (107.27 *vs.* 76.89 per 10000 w), we identified the higher simplicity and far more fluency of the Iranians' style of writing in medical texts so that authors most often discount this category as a need for more explanation and exposition of their writing. Although Code glosses have the potential to highlight the researcher's appraisal of shared subject matter, they also "imply an authoritative position vis-à-vis the reader"

(Hyland, 2005, p. 59); and this authoritative position can less be discerned in Persian medical texts. And the Persian authors' evaluation of their audience can generally be seen as if sharing with them a greater level of shared knowledge on a subject thereby constraining them to use many code glosses in their works. To put in another way, because IPW publish their articles in the Iranian setting which are expected to be read by virtually the Persian researchers, the commonalities are presumed to be greater among them which would restrict the frequency of the code glosses.

The most intriguing part of the findings, however, relates to self-mentions their use of which being overwhelmingly greater in the native English RAs (58.83 *vs.* 10.57 per 10000 w); they turned out to be around 5 times as much as the Iranian group and thus significant. Keshavarz and Kheirieh (2011) came to the same result by identifying a higher application of self mentions in the Persian articles holding that shunning self-mentions assists Iranians to disguise and not directly involve themselves in the text; this is part of the Iranian cultural identity. As they further add, "[s]tudents are sometimes instructed by teachers in Persian essay classes to be more formal and polite by avoiding self-mention in their written texts" (p. 12). Ohta (1991) and Scollon (1994) bear the same voice in this regard capitalizing especially on the disposition of the Asian students to project themselves collectively in their writings so as to observe the conventions of politeness and formality.

For other subcategories of metadiscourse no significant difference was found. Moreover, engagement markers stood at the bottom of the table in terms of frequency (F=20) which is in line with what Abdi (2011) explored across varying subsections of RAs. However, the identification of exactly equal number of engagement markers in both types of texts (English & Persian) can once more reveal the uniqueness of the medical texts in propositional representations. By echoing his sentiment, Dahl (2004) concurs that within the medical discipline enjoying a rather uniform pattern of epistemological exposition, metatexts appear to be invariably distributed and text format highly structured.

Table 4 shows the frequency results of the qualitative papers by native English writers (NEW) and Iranian Persian writers (IPW). The frequency per 10000 for the native English group was much greater than that of the Persian group counterpart (Mean difference = 238.29)

Table 4.Frequency of MDMs in qualitative RAs by NEW and IPW in general

| Type of context | Total words | Raw Frequency of MDMs | Frequency per 10000 |
|---|---|---|---|
| **Qualitative papers by NEW** | 58024 | 4876 | 840.34 |
| **Qualitative papers by IPW** | 52720 | 3174 | 602.05 |

A chi-square test was conducted to find out whether there was any significant difference between the two groups. And the results revealed a statisticaldifference between NEW and IPW in terms of using metadiscourse features in qualitative RAs at large, $\aleph^2$ (1)= 39.282, $p$=0.001.

The different subcategories of metadiscourse markers were separately analyzed to explore which of the subcategories significantly differed between the two groups of writers. Table 5 below depicts the results across the metadiscourse type. As set out in the table, NEW used transition markers, boosters, self-mention and hedges in qualitative papers more noticeably than the IPW ($p$<0.05). Additionally, the code glosses and endophoric markers approached significant values ($p$=0.07 & 0.06 respectively). The two groups of writers did not differ as to the remaining tokens.

Table 5.*Frequency of MDMs in qualitative RAs by NEW and IPW in details*

| MDM categories | NEW | | | IPW | | | Chi-square value | p-value |
|---|---|---|---|---|---|---|---|---|
| | Raw | F per 10000 W | % | Raw | F per 10000 W | % | | |
| **Code glosses** | 494 | 85.14 | 10.7 | 330 | 62.59 | 10 | 3.27 | 0.07 |
| **Evidentials** | 694 | 119.61 | 14.3 | 554 | 105.08 | 18.3 | 1.00 | 0.32 |
| **Endophoric markers** | 74 | 12.75 | 1.2 | 24 | 4.55 | 0 | 3.56 | **0.06** |
| **Frame markers** | 264 | 45.50 | 6 | 232 | 44.01 | 6.7 | 0.44 | 0.83 |
| **Transition markers** | 1230 | 211.98 | 25 | 780 | 147.95 | 25 | 11.38 | **0.001** |
| **Attitude markers** | 298 | 51.36 | 6 | 208 | 39.45 | 6.7 | 1.60 | 0.21 |
| **Boosters** | 756 | 130.29 | 15.5 | 464 | 88.01 | 15 | 8.09 | **0.004** |
| **Self mention** | 296 | 51.01 | 6 | 58 | 11.00 | 1.7 | 25.81 | **0.001** |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Engagement markers** | 48 | 8.27 | 1.2 | 22 | 4.17 | 0 | 1.33 | 0.25 |
| **Hedges** | 722 | 124.43 | 14.3 | 502 | 95.22 | 16.7 | 3.84 | **0.05** |
| **Total** | 4876 | 840.34 | 100 | 3174 | 602.05 | 100 | 39.28 | **0.001** |

As the table vividly pigeon-holes the results of the MDMs in this study, transitions markedly grasp the first rank across the two languages; for quantitative RAs, this position belonged to the boosters though. This high frequency of transitions extant in the qualitative papers can be attributed to the argumentative-type conventions of these articles. Naturally all persuasive discourse genres across languages meet such properties and need this metadiscursive feature so as to suitably project their identity and hence well-produce coherence in the texts (see Heng& Tan, 2010; Simin, 2004; Williams, 1981). However, the disparity between the groups in this probe emerging as highly significant ($p$=0.001) and the low occurrence of the token among the Persian texts (147.95 *vs.* 211.98 per 10000 w) can be assigned to Iranian medical discourse simplicity of style arising from capitalizing more on content and hence less hinging on transition markers.

As regards boosters, the most common function of which is to augment authorial commitment to knowledge claims paradigmatically, they, however, ranked second in English and fourth in Persian RAs occupying anyway a lower position compared with transitions. Denoted from the previous section and expounded by some researchers, boosters are particularly the critical, well-identified, overarching feature of the quantitative-type articles which lend themselves much better to organization and orchestration of the experimental findings.

With a borderline statistical difference between the groups ($p$=0.06), endophoric markers per frequency with NEW amounted to around triple as many as the Persian writers (12.75 *vs.* 4.55). It stands to reason here to ascribe this discrepancy to the rather inadequate application of the diagrams, figures, tables and specially photos by the Persian group thereby giving rise to mitigation of the token applied by IPW; NEW's use of photos pertinent to structural organs of the body conspicuously outnumbered that of the Persian texts. Also compared with the quantitative texts, these markers in the qualitative RAs amply reduced. We reason that the argumentative nature of the qualitative texts, for some of which we failed to see even one photo, table, or diagram (for example in nursing), would highly contribute to the results obtained.

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Notwithstanding all the intriguing results to date identified and discussed, once more we came across the fact of self-mentions deployment by the English writers 5 times higher than the Persian ones (51.01 *vs.* 11; $p$=0.001). This is due, as we have noted, to the nature of Iranian cultural instantiation and part of the identity of Asian communication which appears not to prioritize 'self' as appropriate; indirectness israther the more acknowledged mode of interaction.

In regard with the hedges, as we also found in the previous RQ, IPW used them lower in frequency compared with the NEW (95.22 *vs*. 124.43; $p$=0.05). This is in line with what Scollon and Scollon (1995) suggest as to theindirect rhetorical property of the Asian culture which in this way tends to value the audience (see also Keshavarz and Kheirieh, 2011). Be that as it may, variety of hedging tokens identified in English is another intriguing part of the issue which needs to be addressed as well. The following comprises groups of hedging items for which we have solely one equivalent in the Persian language. They are as follows:

- likely, possibly, probably

- may, might

- rather, fairly

- should, ought to

Even the word 'indicate' which is instantiated by Hyland (2005) as a hedging token and thus is differentiated from other boosting items such as the words 'show', 'demonstrate', 'exhibit', 'display', 'reveal' and the like, appear to bear the potential to be problematic for Persian analysts as there is just one Persian equivalent for them. Moreover, for the word 'would', which to Hyland represents a hedging feature, rarely can a proper equivalent in Persian discourse be found and hence very rarely structures the Persian RAs. In addition, due to the fact that the tokens referred to above are generally among the most frequently-used hedging elements in English, it stands to reason to suggest that English discourse can infuse a better variety and thereby a higher deployment of hedging features compared with the Persian language.

Also comparing the frequency of hedges applied in qualitative and quantitative RAs can underscore the higher employment of this metadiscourse feature in the former in both English and Persian languages (124.43 & 95.22 *vs*.

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110.73 & 59.40) thereby delineating a virtually all-encompassing argumentative identity of these texts in their post method sections and hence the need for more tokens.

Regarding the remaining tokens, albeit no statistical difference was found between the RAs under the study, comparing the frequency of the engagement markers applied by the NEW (F=8.27) with that of the IPW (F= 4.17) in the qualitative RAs demonstrated a double increase. This distribution triggers arguably the perspective that Persian writers' monotony of style likely preempted them to bring about a higher diversity and hence to create crafting of this type. Hyland's (2005, p. 132) sentiment is that "a heterogeneous groups of devices are used to address the reader" in couching texts one of which is the deployment of engagement markers. However, it should be noted that in academic writing, researchers are mostly urged to shun such structuring so that not to make their writing sound "inappropriately informal and conversational" (p. 133). Discourse conventions of this type in RAs might have well contributed in positioning the engagement markers at the lower end of our tables in all of the research questions.

Table 6 compares the frequency of metadiscourse markers by NEW and IEW. Both group had a similar frequency of metadiscourse markers. Compared to the Iranian Persian writers, the Iranian English writers used a higher frequency of metadiscourse markers in quantitative papers.

Table 6.*Frequency of MDMs in quantitative papers by NEW and IEW in general*

| Type of context | Total words | Raw Frequency of MDMs | Frequency per 10000 |
|---|---|---|---|
| **Quantitative papers by NEW** | 57796 | 5180 | 895.56 |
| **Quantitative papers by IEW** | 54882 | 4988 | 908.86 |

A chi-square test was conducted to explore the presence of any significant difference between the two groups. The results identified insignificant difference between the groups, $\aleph^2$ (1)= 0.094, $p$=0.76.

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Table 7.*Frequency of MDMs in quantitative papers by NEW and IEW in details*

| MDM categories | NEW | | | IEW | | | Chi-square value | p-value |
|---|---|---|---|---|---|---|---|---|
| | Raw | F per 10000 W | % | Raw | F per 10000 W | % | | |
| Code glosses | 620 | 105.54 | 12.2 | 598 | 108.96 | 12.2 | .042 | 0.84 |
| Evidentials | 420 | 72.67 | 7.8 | 600 | 109.33 | 12.2 | 7.12 | 0.08 |
| Endophoric markers | 232 | 40.14 | 4.4 | 278 | 50.65 | 5.6 | 1.33 | 0.25 |
| Frame markers | 286 | 49.48 | 5.6 | 226 | 41.18 | 4.4 | 0.071 | 0.40 |
| Transition markers | 994 | 171.98 | 18.9 | 904 | 164.72 | 17.8 | 0.045 | 0.70 |
| Attitude markers | 150 | 25.95 | 3.3 | 168 | 30.61 | 3.3 | 0.44 | 0.51 |
| Boosters | 1474 | 255.03 | 28.9 | 1410 | 256.91 | 28.9 | 0.008 | 0.93 |
| Self mention | 340 | 58.83 | 6.7 | 228 | 41.54 | 4.4 | 2.86 | 0.09 |
| Engagement markers | 20 | 3.46 | 0 | 10 | 1.82 | 0 | 0.20 | 0.65 |
| Hedges | 640 | 110.73 | 12.2 | 566 | 103.13 | 11.1 | 0.30 | 0.58 |
| Total | 5176 | 895.56 | 100 | 4988 | 908.86 | 100 | 0.094 | 0.76 |

To have a more in-depth comparison, the different MDM subcategories were compared between native English writers and Iranian English writers in quantitative texts. The chi-square results showed no statistically significant difference across the groups in using metadiscourse markers ($p>0.05$). However, the evidential and self-mention metadiscourse markers approached significance ($p=0.08$ & 0.09 respectively). In fact, IEW used self-mention markers more than the native English writers while it was the reverse for the evidential markers.

Touching upon research question 3 which is followed by the illustration and comparisons of the figures in Table 7, the study clearly reveals no statistical difference in metadiscourse features between the native English writers (NEW) and Iranian English writers (IEW) in the quantitative texts. Contrasted, however, with the findings delineated previously out of which significant disparities were explored between the groups (NEW vs. IPW), the rather homogeneity between the NEW and

IEW can be accounted for by several conceptualizations. First, it can be concluded that in writing RAs, the domineering impact of experience and in-depth knowledge of the conventionalized forms of L2 appear to override the effect of the first language and culture. Put it another way, the more L2 writers have internalized discourse norms and writing conventions of a second language, the better they can infuse these identities in their texts. As Hyland (2005) also rightly asserts, "although linguistic and cultural factors may distinguish first and second language writers, we should not ignore the cross-cutting influences of individual and group experience" (p. 115). The second explanation is possibly germane to the influence of medicine, a discipline bearing a rather fixed and unique formulation of discourse and hence being less subject to other potentially overbearing effects. This is the conclusion that Dahl (2004) also reached by way of a disciplinary comparison of the medical, linguistics, and economics RAs. Nevertheless, we would rather not even discount the effect of paradigmatic norms of crafting texts by the writers as we came across the rather higher heterogeneity of the qualitative RAs couched by NEW and IPW in the findings that follow.

As displayed in Table 8, there was not a big difference between the frequency of metadiscourse markers between NEW and IEW (Mean difference=16.23).

The results obtained from the chi-square test showed no statistically significant difference between the groups, $א^2$ (1)= 0.17, $p$=0.68.

Table 8.*Frequency of MDMs in qualitative papers by NEW and IEW in general*

| Type of context | Total words | Raw Frequency of MDMs | Frequency per 10000 |
|---|---|---|---|
| **Qualitative papers by NEW** | 58024 | 4876 | 840.34 |
| **Qualitative papers by IEW** | 47982 | 4110 | 856.57 |

Table 9 below reveals the results across the metadiscourse tokens. The transition markers were used more frequently than the other subcategories.

Table 9.*Frequency of MDMs in qualitative papers by NEW and IEW in details*

| MDM categories | NEW | | | IEW | | | | |
|---|---|---|---|---|---|---|---|---|
| | Raw | F per | % | Raw | F per | % | Chi- | p-value |

| | | 10000 W | | | 10000 W | | square value | |
|---|---|---|---|---|---|---|---|---|
| Code glosses | 494 | 85.14 | 10.7 | 424 | 88.37 | 10.3 | 0.05 | 0.82 |
| Evidentials | 694 | 119.61 | 14.3 | 616 | 128.38 | 14.9 | 0.26 | 0.61 |
| Endophoric markers | 74 | 7.41 | 1.2 | 146 | 30.43 | 3.4 | 14.30 | **0.001** |
| Frame markers | 264 | 45.50 | 6 | 278 | 57.94 | 6.9 | 1.38 | 0.24 |
| Transition markers | 1230 | 211.98 | 25 | 816 | 170.06 | 19.5 | 4.62 | **0.032** |
| Attitude markers | 298 | 51.36 | 6 | 360 | 75.03 | 9.2 | 4.57 | **0.03** |
| Boosters | 756 | 130.29 | 15.5 | 766 | 159.64 | 18.4 | 3.10 | 0.078 |
| Self mention | 296 | 51.01 | 6 | 178 | 37.10 | 4.6 | 2.23 | 0.14 |
| Engagement markers | 48 | 8.27 | 1.2 | 10 | 2.08 | 0 | 3.60 | **0.058** |
| Hedges | 722 | 121.33 | 14.3 | 516 | 107.54 | 12.6 | 0.74 | 0.39 |
| Total | 4876 | 840.34 | 100 | 4110 | 856.57 | 100 | 0.17 | 0.68 |

To identify any significant difference in the subcategories involved, the different MDM subcategories were compared between NEW and IEW. The chi-square results revealed a significant difference across the two groups in the subcategories related to endophoric markers ($p$=0.001), transition markers ($p$=0.032), attitude markers ($p$=0.03) and engagement markers ($p$ =0.058). The IEW used the endophoric markers and attitude markers more than the NEW (Mean difference=23.02 & 23.67 respectively). The NEW, however, used transition markers and engagement markers more than the IEW (Mean difference= 41.92 & 6.19 respectively). The two groups did not show any significant difference in the other metadiscourse subcategories.

Considering the research question 4 and to account for the significant differences in the qualitative RAs existing between the groups (NEW vs. IEW) that demarcated endophoric, transition, attitude, and engagement markers from other metadiscourse subcategories, we came across a rather fascinating result: the use by the NEW of endophoric markers reduced around 4 times in frequency (7.41 *vs.* 30.43). In other words, Iranian writers had deployed it with much higher frequency. This can possibly be reasoned by the Iranians' particular conceptualization in writing in L2; as English was not their first language, they had likely sensed a need to

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construct their writing salient and hence readily perceived by their interlocutors through using a higher number of endophoric markers and thus facilitating the referential material as they proceeded in the text. Moreover, as time came to a comparison of the results germane to this part with those of the qualitative RAs crafted in Persian by the Iranians (research question 2), the results emerged to skew at the other end; NEW had employed this token around 4 times as higher (12.75 vs. 4.55) to portray the findings even far more fascinating and colored. The largely-sensible lower application of endophoric markers by the Persian writers can logically be ascribed to the property of their writing in first language--Persian, as the researchers failed to see a need for further explanation and hence orientation of their readers in aiding to retrieve meaning; they had taken it for granted that readers can easily be directed through L1 texts on their own.

For transition markers with a significant difference between the groups (NEW, 211.98 *vs.* IEW, 170.06; $p=0.032$), we could rather leap to the conclusion as to the presence of a higher homogeneity here in comparison with the results of the same token in research question 2 (NEW, 211.98 *vs.* IPW, 147.95; $p= 0.01$). Note that both outcomes pertain to the qualitative papers. It conspicuously follows that Iranians while writing *English* articles come closer to the norms of writing in a certain paradigm and their writing is more comparable to the English natives than when crafting in their own language. Put another way, conventional paradigmatic writing in medicine is less affected by the disparities existing between English and Persian languages and/or cultures. This point, from among other findings, can be of crucial importance, especially for the instructors who intend to teach the norms of writing medical English RAs.

Furthermore, it is even more fascinating to tap the results of the attitude markers which exhibit a significant difference across the groups (NEW, 51.36 *vs.* IEW, 75. 03; $p= 0.03$); we failed, however, to identify such a difference between the groups with the *quantitative* papers(NEW, 25.95 *vs.* IEW, 30.61; $p= 0.51$). One reasonable sentiment can be that Iranians show normally a higher disposition toward cautiousness and circumspection in writing the qualitative RAs in which one can barely maneuver on certainty and conclusiveness.

And finally the reason for the fourfold use of engagement markers by the NEW compared with IEW (8.27 *vs.* 2.08; $p= 0.058$) can more likely be attributed to the ability of the English natives in bringing variety in form and in well-structuring their mother language.

No significant difference was recognized between the groups for other subcategories, however.

## 5. Conclusions and Implications

The findings of the present study capitalize on several intriguing factual points about metadiscourse features in RAs. First, by admitting the perspective that metadiscourse bears a universal identity, it signifies this construct as an inextricable part of language deployed by writers across languages, disciplines and genres. Metadiscourse subcategories are discussed to be rhetorical devices which aid authors to felicitously transfer the ideational or propositional content of the text, to orient themselves with their interlocutors in a certain context, and thus offer a framework for social engagement through organizing the message. Second, by aiming to explore paradigmatic, linguistic, cultural and other possible influences on the use of metadiscourse, this study particularly sets out to investigate varying subcategories of metadiscourse across English and Persian languages in the post-method sections of RAs. The following are some of the key findings of the study:

culture-bound indirectness of the Iranian authors attested by their restricted use of self mentions compared with the English natives,

- pragmatic influence of using boosters as these devices appear at a high level in medical quantitative texts across English and Persian,

- overbearing effect of paradigm in applying transitions as these tokens occupy the first rank in both English and Persian qualitative RAs,

- culture-bound effect of the mitigated deployment of hedges by the Persians across the two paradigms, and

- close association and thus insignificant difference between the NEW & IEW (RQ3) in using all metadiscourse subcategories hence signifying the disciplinary impact of medicine in creating such homogeneous English quantitative RAs.

It can be argued that globally though akin in several ways, Iranian authors prefer different strategies when crafting medical discourse in their own or English language. Predicated on the findings, in general the probe concludes that arising from the differences extant between quantitative and qualitative RAs across English and Persian, native English and Iranian Persian writers construct metadiscourse norms in their texts rather differently in an effort to accomplish the conventionally-acknowledged rhetorical functions in those languages. The reason for, however, the

higher homogeneity of these authors in writing medical English articles, especially the quantitative papers, is in agreement with what Kuteeva and Negretti (2016, p. 47) assert: "[i]n the natural sciences, language per se is less important when it comes to knowledge construction". It follows then that writers, irrespective of their native languages, either English or Persian, can develop strategic competence to successfully access metadiscourse as socio-rhetorical devices which serve disciplinary knowledge-making practices.

Here it is important to note that, as literature reveals, in academic settings, the macro-level aspects of language (structure and organization levels) have largely been tapped by metadiscourse researchers rather than the micro-level issues of discourse which encompass the interactional property of language as well (Hu & Cao, 2015) thereby requiring this to be zeroed in on in academic writing courses and material development. A pertinent implication relates to the way metadiscourse can best be taught and the impact it can have on pedagogic capacities of learners. By virtue of the fact that in Iranian L2 context, reading comprehension ability is the most crucial skill our students are concerned with, and the research conducted by Daftaryfard (2002), Dastgoshadeh (2001), jalilifar andAlipour, (2007), Khorvash (2008), and Tavakoli, Dabaghi, and Khorvash (2010) from among others, have all demonstrated the impact of metadiscourse instruction on improving reading capacity, we suggest it to be part of the academic reading as well as discipline- and paradigm-oriented writing courses so as to ameliorate learners' pedagogic accomplishments. Be that as it may, another pertinent controversy concerns which corpus and writing norms should be taken as the point of departure for instruction: native speaker professional norms, native speaker non-professional norms, learner-professional norms, or learner non-professional norms (for more discussion of the perspectives, see Adel, 2006). And granted that researchers have attempted several ways to terminate this long-abiding controversy, seemingly we still have to wait to see how they reach a consensus (for an account of the issue, see Cargill & Connor, 2006). Moreover, the matter can more likely be raised in compound and coordinate bilingualism disputes as well; do the two languages cognitively compound in the mind of the adult L2 learners or do they coexist with each other without any interference? The issue is to date unresolved but as the philosopher and prominent figure of language teaching and pedagogy, Widdowson (2003) believes, "[w]hile teachers are busy trying to focus attention on the L2 as distinct from L1, thereby striving to replicate conditions of bilingualism, the learners are busy on their own agenda of bringing the two languages together in the process of compound bilingualism" (p. 154).

Benefitting from all the issues posed in this study, we hope they will generally help in improving and rectifying the condition of our ESP classes through paradigm- and discipline-tailored courses by ruling in the interactional phase of discourse as well. Moreover, the workshops held for the academic L2 authors involved in writing RAs may take advantage of the findings and even work on appropriate strategies that student learners can tease out metadiscourse norms on their own.

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## Appendix A

It is to be noted that the ranking of the academic journals in Iran especially in Medical Sciences universities differs from non-medical universities. The ranking is as follows:

ISI

Medline/Pubmed

Scopus, Embase, CINAHL, …

Psycho info

Others

We thought, of course after consulting with our colleagues, that we may not find adequate number of English papers written by the Iranians in the journals indexed in the first two ranks, i.e., ISI and Medline/Pubmed. Therefore in order to tap the homogeneity considerations, we selected our papers from at least rank 3. The following are some of the journals used for the purpose:

Medical Physics

    2. Advances in Medical Sciences

    3. Iranian Journal of Medical Physics

    4. Iranian Journal of Biomedical engineering

    5.  Journal of Nursing care Quality

Journal of Care Management

Iranian Journal of Nursing

Iranian Journal of Nursing Research (IJNR)

The following are some of the Persian Journalsused:

فیزیک پزشکی ایران

مجله پزشکی هرمزگان

طب و تزکیه

پرستاری و مامایی جامع نگر

سلامت و بهذاشت اردبیل

فصلنامه علمی پژوهشی دانشکده پیراپزشکی کرمانشاه