

Metadiscourse Features in Medical Research Articles: Subdisciplinary and Paradigmatic Influences in English and Persian¹

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Abstract

Disciplinary studies on metadiscourse in academic texts have come a rather long way (since the 1980s) to afford an awareness of the ways authors strive to signal their insights into their materials as well as their audience. However, few comprehensive corpus-based studies to date have provided a starting point for shaping our understanding of subdisciplinary and paradigmatic diversities within medical contexts in different cultures/languages. For this purpose, 160 research articles (RAs) were picked out from certain databases on medical physics (80) and nursing (80), each group of which was, then, stratified into quantitative (40) and qualitative papers (40) written in English and Persian, and their metadiscourse tokens were compared in terms of type and frequency on the basis of Hyland's (2005) taxonomy. Results indicated a rather cogent homogeneity between the native English writers (NEWs) and Iranian Persian writers (IPWs) in crafting nursing quantitative and qualitative RAs.

Keywords: Medical Physics; Nursing; Quantitative Research; Qualitative Research; English Natives; Persian Natives

1. Introduction

A long time has elapsed since L2 instructors around the globe could readily grapple with the rather not-easy-to-handle teaching courses devoid of any grounding

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knowledge in their work. Familiar concepts such as ESP, EAP, genre, discourse, and the rather new concept of metadiscourse are so investigated and so intertwined in diverse and numerous ways that solely bearing the awareness of the concepts at large makes scanty help on the way to some promising pedagogical achievements. To put the perspective in the words of Basturkmen (2006), “[I]t is time to stand back from practice and make explicit the thinking behind” (p. 9). The thinking behind metadiscourse use, being the conspicuous concern of this paper, is sensed to be deeply rooted in and frequently ascribed to the work of Swales (1990) who, through developing EAP, viewed language as having been composed of genres characterized by their communicative purposes and hence demarcated patterns of obligatory or optional moves. And it is really these distinct features of genres that configure metadiscourse distribution in varying forms.

For metadiscourse, two critical functions have been enumerated by the scholars of the field (Ädel, 2006) the basic one being “to guide the reader through the text and to comment on the use of language in the text” (p. 20). Also deployed by the writers to interact with and impinge on their readers so as to maintain varying rhetorical relationships, metadiscourse has established its second vital role. “Fuzzy,” however, as the term *metadiscourse* might be defined, the consensually admitted functionality of it is one of its prominent properties to make it telling and revealing mostly in the context of use (Hyland, 2005).

Notwithstanding these facts, some researchers have also capitalized on the multifunctionality of metadiscourse tokens (Markkanen, & Steffensen, 1993). It follows from all the viewpoints referred to that the context in which metadiscourse elements is used can have a determining role in materializing metadiscursive and expressive/propositional functions. This perspective likely originates from the more recent approaches to the genre in which the dynamic, as opposed to originally-static, analysis of text types, entails underscoring contexts of use by moving beyond descriptions of genre which are purely linguistic and hence subject to change. There are, nevertheless, other scholars who have marched beyond the perspectives addressed and have assigned a bilateral interplay between context and genre to suggest that genre can also help in constituting and shaping the contexts of use in order to secure rhetorical purposes (Freedman, 1999).

By admitting a critical role in establishing a connection between reader, writer, and the text, metadiscourse markers known as self-reflexive expressions have been proven to be diversely dispersed through varying languages, disciplines, and paradigms (Ädel, 2010; Ädel & Mauranen, 2010; Hyland, 2010; Mauranen, 2010; Toumi, 2009). This study was triggered by the lack of any comprehensive comparison existing between metadiscourse frequency and distribution in terms of subdiscipline and paradigm across English and Persian medical RAs through a thick

approach by first retrieving and establishing the basic pertinent instances of metadiscourse and, then, examining the structural patterns of the discourse as the functional units in order to gain access to some predetermined goals.

2. Literature Review

As a corrective to previous voices of language seeing it as fundamentally an ideational or propositional mode of representation, that is, communication of information, metadiscourse emerged to draw in and engage the interlocutors as well (Hyland, 2010). A background to this perspective is what Sinclair (1981; cited in Hyland, 2005) captured by differentiating between autonomous and interactive planes of discourse, the latter of which was somewhat ahead of its time to be acknowledged generally. Moreover, for projecting the functional mode which is closely associated with metadiscourse, as well as looking for a theoretical support, researchers have mostly resorted to systemic functional linguistics (SFL). VandeKopple (1985), for example, has used referential meaning as a term equivalent to ideational meaning labeled by Halliday. Adel (2006) stands out among those who oppose the Hallidayan model or SFG-inspired model, hence discussing in favor of Jakobson's functional model of language in which metalinguistic, expressive and directive functions of language are drawn on to revise the older customary model. The pivotal part of Adel's opposition lies in capitalizing primarily on reflexivity under which metadiscourse is mapped out. "The reflexive model [...] approaches metadiscourse from a functional perspective, acknowledging that textual material that functions as metadiscourse can take a wide range of linguistic forms, including 'propositional' ones" (Adel, 2006, p. 212). The perspective is virtually consonant with what Mauranen (1993, 2010) also persists in thereby referring to the text or the writing process as the overriding feature of metadiscourse. She would like to view reflexivity and metadiscourse as roughly synonymous to each other. However, the visibility of the reader and the writer in the text is more zeroed in on in the eyes of Adel (2006). Such metadiscoursal definitions presented by Adel (2006) and Mauranen (1993, 2010), among others, are referred to in literature as the narrow or reflexive model, whereas the perspectives such as those of VandeKopple (1985) and Crismore et al. (1993) in which the interaction between the writer and audience is underscored projects the broad or interactive model. Hyland figures "a more recent and prominent representative of this tradition" (Adel & Mauranen, 2010, p. 4). Furthermore, to bear "implications not only for the method of identifying metadiscourse, but arguably also for how the category is understood" (Adel & Mauranen, 2010, p. 2), it is also possible to draw a rather dividing line between the thick and thin approaches to metadiscourse and place the former mostly at the qualitative end of the continuum while taking the second remarkably more quantitatively oriented. Through the thin approach, first the retrieval of a

preidentified list of the subcategories occurred in the discourse is accomplished which thereby gives rise to the possibility of automatized comparison of the distribution and frequency of metadiscourse elements in a relatively large corpus in decontextualized contexts. Here only are the lemma examined, not the emic occurrences. In contrast, being fundamentally a data-oriented mode and applied in contextualized units, “the thick approach operates by first retrieving possible candidates, then excluding irrelevant ones, and finally analyzing extended units of metadiscursive meaning” (Adel & Mauranen, 2010, p. 3).

In a corpus-based study conducted by Cao and Hu (2014), 120 RAs across the fields of education, psychology and applied linguistics were compared for their interactive metadiscourse features the results of which revealed clear paradigmatic differences in the use of transitions and evidences by the writers. The authors, then, attributed the differences to the contrasting epistemological underpinnings differentiating between “qualitative and quantitative paradigms and the different knowledge-knower structure prevailing in the discipline under investigation” (p. 15). In another closely similar study on interactional metadiscourse elements of the disciplines mentioned, Hu and Cao (2015) identified the same cross-paradigmatic and subdisciplinary variations and made the same conclusions as a result.

Kutteeva and Negretti (2016) examined the genre knowledge as well as the perceived disciplinary practices of some graduate students and finally came to recognize that these two factors are connected to each other. Put it differently, the discrepancies in the writing conventions of the learners can be accounted for not only by language differences but mostly by their knowledge construction; this is well-recognized in natural sciences. In line with the cited inquiries, Kwase (2015) examined metadiscourse in the introductions of Ph.D. dissertations and RAs and discussed that variations result mostly from genre-specific features of the texts.

Other investigations have also been conducted to explore varying identities in the field of medicine across English and Persian (Mahzari, 2008; Validi, Jalilifar, Shoostari, & Hayati, 2016). However, the problem with these and many other inquiries performed in the field is that none of them clearly explain the reason why a particular metadiscourse token is used by a certain group of writers differently. Moreover, no study has yet examined MDMs to demystify the rhetorical subdisciplinary and paradigmatic norms of writing in the postmethod (excluding Introduction/Background and Method) section of medical RAs across English and Persian so as to shed more light on the discrepancies of RA writers in the realm of medicine and to provide evidence for relevant academic writing classes. Embracing both quantitative and qualitative paradigms, medical physics and nursing disciplines were selected for their underrepresentation in the existing discourse literature. This

study was, thus, designed to attain the mentioned goal by answering the following research questions:

1. Are there any significant differences in terms of type and frequency between native English writers (NEWs) and Iranian Persian writers (IPWs) in the use of metadiscourse markers (MDMs) in the postmethod section of quantitative research articles in the field of medical physics?
2. Are there any significant differences in terms of type and frequency between native English writers (NEWs) and Iranian Persian writers (IPWs) in the use of metadiscourse markers (MDMs) in the postmethod section of quantitative research articles in the field of nursing?
3. Are there any significant differences in terms of type and frequency between native English writers (NEWs) and Iranian Persian writers (IPWs) in the use of metadiscourse markers (MDMs) in the postmethod section of qualitative research articles in the field of medical physics?
4. Are there any significant differences in terms of type and frequency between native English writers (NEWs) and Iranian Persian writers (IPWs) in the use of metadiscourse markers (MDMs) in the postmethod section of qualitative research articles in the field of nursing?

3. Methodology

3.1. Corpus

This comparative, corpus-based study was designed to explore the subdisciplinary and paradigmatic discrepancies, if any, between native speakers of English and Persian in crafting the prestigious genre of academic research papers. The inspiration came from the previous research on disciplinary paradigms (e.g., Alise & Teddlie, 2010; Kidd, 2002; Richards, 2009) as well as the studies of Harwood (2006) and Ozturk (2007) who found considerable discursal and rhetorical variation across subdisciplines in their inquiries. With regard to the need for metadiscourse studies in the area of subfields, Harwood (2006) has rightly stipulated that “distinguishing between writing practices only at the disciplinary level is an oversimplification” (p. 443).

Therefore, the *sine qua non* for the inquiry was to consider first the content validity of the research and, thus, call for the expertise of the faculty members in Shahid Sadougi University of Medical Sciences and Health Services in Yazd, Iran (a Rank 1 university with 17 different faculties) in a strive for their guidance and recommendation in terms of specifying the subdisciplines and the journals we needed to accommodate in our study. And the resolution was finally made. Arguably “blurred” as the boundary between hard and soft sciences might be discerned

(Kutteva & Negretti, 2016), it was felt that, for practical reasons, a distinction is needed to be made between the subdisciplines. After hours of discussion, we finally reached the consensus that from among a host of medical subfields extant and offering courses to the students, medical physics and nursing may, however arguably, be compared and contrasted more logically as it stands to reason to believe that the former treating with, for example, image quality or dose of drugs and the like and, thus, its indirect concern with human body issues comes closer to hard sciences whereas the latter being concerned more with the patient's convalescence periods, sentiment and affection, better epitomizes a paragon of soft sciences (see Becher & Trowler, 2001).

Moreover, to materialize the research steps, it was primarily required to pick out the journals needed for the study. The publication time was first set, that is, the identified journals published between 2010 and 2015 were selected out of which 160 full-length RAs were opted. Of the whole corpus, 80 RAs were in English written by native speakers of English, and 80 others were written in Farsi all selected from a slew of renowned peer-reviewed journals (For selecting the required journals we asked for the opinion of our experienced colleagues in the two subfields in Yazd Medical Sciences University). Moreover, the 80 RAs of each category were, then, stratified into medical physics and nursing subdisciplines (40 each). Each group was, then, divided into quantitative and qualitative articles (20 each) in line with a view that particular disciplinary and paradigmatic discursal norms can diversely impinge on the type of configuration of the researchers' claims and argumentations (Hewings, 2006). It should be pointed out that in medical sciences, particularly in the field of nursing, the qualitative papers can generally be identified even by their titles as the researchers usually include the phrase a qualitative article in the heading of such papers (for more information, see also Goodman & Vassar, 2011).

Furthermore, for the lack of homogeneity that examining all the canonical sections of the articles might have at large as well as the motivation triggered by the works of Cao and Hu (2014), Fang and Hu (2014), Hu and Cao (2015), Khedri, Ebrahimi, and Heng (2013), as well as Lin and Evans (2012), the postmethod sections of the articles, comprising around 250000 words, were investigated. Fang and Hu (2014), for example, assert the perspective in this way:

Given the complexities of presenting intricate findings, explicating the reasoning behind knowledge claims, and making compelling connections between findings and conclusions, there is good reason to expect the postmethod section to be an ideal site for exploring discipline- and paradigmatic-specific patterns of metadiscourse. (p. 18)

3.2. Procedure

For the simple reason that emic property or contextualization is of vital significance in issues pertinent to metadiscourse analysis, decision was made to collect data through manual frequency count rather than computer-mediated techniques so as to address the functionality of MDMs. Moreover, for boosting the reliability of the research, it was needed to seek for two groups of students to participate and work separately on the articles and, then, return them back to the researchers for final rectification. For this purpose, the issue was primarily introduced to the students of medicine, dentistry, and pharmacy as these students greatly enjoy a higher level of English proficiency compared with other learners in the related fields. Eight workshops on how to identify the markers was first held for all the volunteer and interested students of medicine and they started work on the project. The collected data were, then, reviewed and corrected by the MSc medical students of the two subdisciplines as part of their term project the results of which were ultimately revised once more by the researchers. Needless to say that the sufficiency of instances was ensured by other similar investigations performed in the field (e.g., Cao & Hu, 2014; Hu & Cao, 2015, each having examined a corpus of 120 RAs). Moreover, to specify the type and frequency of the tokens, Hyland's (2005) popular taxonomy of metadiscourse was applied for its simplicity, clarity and comprehensiveness (Abdi, 2011; Cao & Hu, 2014; Heng & Tan, 2010; Hu & Cao, 2015).

3.2. Data Analysis

To capture any possible subdisciplinary and paradigmatic disparities in the deployment of metadiscourse tokens in the academic genre of RAs couched by the NEWs and IPWs across English and Persian, a descriptive analysis method was applied. Moreover, the chi-square test was employed to compare the data obtained from the research. In the process of analyzing the results, statistical significance was set at $p < 0.05$. The degree of freedom for all comparisons was considered 1. Should the chi-square observed value exceed the critical value of 3.84 at one degree of freedom, a significant difference between the MDMs could be confirmed.

4. Results

Results for question # 1: Table 1 illustrates the frequency of MDMs in quantitative papers by NEW and IPW in the field of medical physics. As can be seen in the last column, NEW had a higher frequency per 10000 than Persian writers in terms of using metadiscourse markers (mean difference = 153.28):

Table 1. *Frequency Results of MDMs in Medical Physics Quantitative Papers by NEWs and IPWs, in General*

Type of Context	Total Words	Raw Frequency	Frequency per 10,000
Quantitative Papers by NEWs	21,754	2,620	1204.38
Quantitative Papers by IPWs	26,068	2,740	1051.10

A chi-square test was run to find out the probability of any significant difference between the two groups. The results turned out to be positive by $\chi^2 (1) = 10.381, p = 0.001$.

Table 2 delineates the distribution of metadiscourse features by both groups. As can be identified, code glosses, attitude markers, self-mentions, and hedges were applied by the NEWs more than the IPWs, whereas the IPWs employed evidentials more frequently than the NEWs:

Table 2. *Frequency Results of MDMs in Medical Physics Quantitative Papers by NEWs and IPWs, in Details*

MDMs	NEWs			IPWs			Chi-Square Value	p value
	Raw	F per 10,000 Words	%	Raw	F per 10,000 Words	%		
Code Glosses	286	131.47	11.1	244	93.60	9.2	6.08	0.014
Evidentials	194	89.18	7.5	392	150.38	14.7	15.569	0.001
Endophoric Markers	108	49.65	4.2	100	38.36	3.7	1.636	0.201
Frame Markers	142	65.28	5.5	178	68.28	6.7	0.068	0.795
Transition Markers	398	182.95	15.5	476	182.60	18	0.000	1.000
Attitude Markers	112	51.48	4.3	74	28.39	2.7	6.696	0.010
Boosters	824	378.78	32.1	914	350.62	34.4	1.074	0.300
Self-Mentions	188	86.42	7.3	48	18.41	1.8	44.462	0.001
Engagement Markers	12	5.52	0.5	20	7.67	0.8	0.286	0.593
Hedges	308	141.58	12	212	81.33	7.9	16.686	0.001
Total	2,620	1204.4	100	2,740	1051.1	100	10.381	0.001

The results of the chi-square test conducted to find out any possible association between each individual subcategory across the two groups in the field of medical physics indicated a significant difference between the MDMs in code glosses ($p = 0.014$), evidentials ($p = 0.001$), attitude markers ($p = 0.010$), self-mentions ($p = 0.001$) and hedges ($p = 0.001$). The remaining subcategories compared, however, did not turn out to be significant.

Results for question # 2: Table 3 displays the frequency results of the quantitative papers by NEWs and IPWs in the field of nursing. The frequency per 10,000 for the native English group was virtually similar to that of their Persian counterparts (mean difference = 5.67):

Table 3. *Frequency Results of MDMs in Nursing Quantitative Papers by NEWs and IPWs, in General*

Type of Context	Total Words	Raw Frequency	Frequency per 10,000
Quantitative Papers by NEWs	36,015	2,560	710.81
Quantitative Papers by IPWs	18,898	1,354	716.48

For identifying the likelihood of any significant difference between the groups, a chi-square test was run, the results of which indicated no significant difference between the groups: $\chi^2(1) = 0.018$, $p = 0.895$.

The varying subcategories of MDMs were separately analyzed to explore the possibility of any difference. Table 4 below maps out the results across the metadiscourse tokens revealing that in quantitative papers Iranians deployed evidentials ($p = 0.001$) more noticeably than the English natives, whereas for self-mentions ($p = 0.001$) and hedges ($p = 0.009$), it was the reverse. The endophoric markers, however, approached a significant value ($p = 0.08$). As to the remaining features, the two groups did not differ, however:

Table 4. *Frequency Results of MDMs in Nursing Quantitative Papers by NEWs and IPWs, in Details*

MDMs	NEWs			IPWs			Chi-Square Value	p Value
	Raw	F per 10,000 Words	%	Raw	F per 10,000 Words	%		
Code Glosses	334	92.74	12.9	178	94.19	12.5	0.005	0.94
Evidentials	226	62.75	8.7	343	181.50	24.1	57.8	0.001
Endophoric Markers	124	34.43	4.7	40	21.17	2.8	3.07	0.08
Frame Markers	144	39.98	5.5	62	32.81	4.4	0.67	0.41

Transition Markers	596	165.49	22.9	284	150.28	19.9	0.71	0.40
Attitude Markers	38	10.55	1.5	38	20.11	2.6	2.61	0.11
Boosters	650	180.48	24.9	360	190.50	25.2	0.33	0.57
Self-Mentions	152	42.20	5.8	10	5.29	0.7	29.13	0.001
Engagement Markers	8	2.22	0.3	0	.00	0.0	----	----
Hedges	332	92.18	12.7	114	60.32	7.9	6.74	0.009
Total	2560	710.81	100	1354	716.48	100	0.18	0.895

Results for question # 3: Table 5 below compares the frequency of MDMs in qualitative articles of medical physics between the NEWs and IPWs. The table sets out that the NEWs applied MDMs remarkably higher than the other group (mean difference = 411.67):

Table 5. *Frequency Results of MDMs in Medical Physics Qualitative Papers by NEWs and IPWs, in General*

Type of Context	Total Words	Raw Frequency	Frequency per 10,000
Qualitative Papers by NEWs	16676	1930	1157.35
Qualitative Papers by IPWs	14698	1096	745.68

The results of chi-square test revealed a significant difference between the two groups: $\chi^2(1) = 87.86$, $p = 0.001$. The NEWs outweighed the Iranian Persian group in terms of the frequency of MDMs in qualitative papers of medical physics texts.

Table 6 depicts the frequency of different subcategories of MDMs by the two groups. The NEWs used code glosses, evidential, endophoric markers, attitude markers, boosters and self-mentions at a higher level compared to the IPW ($p < 0.05$). The use of transition markers approximated the significance value ($p = 0.08$). Furthermore, no significant differences were found for frame markers, engagement markers and hedges between the two groups:

Table 6. *Frequency Results of MDMs in Medical Physics Qualitative Papers by NEWs and IPWs, in Details*

MDMs	NEWs			IPWs			Chi-Square Value	P Value
	Raw	F per 10,000 Words	%	Raw	F per 10,000 Words	%		
Code Glosses	166	99.54	8.7	92	62.59	8.5	8.40	0.004
Evidentials	292	175.10	15.3	126	85.73	11.6	30.35	0.001

Endophoric Markers	40	23.99	2.1	14	9.53	1.3	5.76	0.016
Frame Markers	122	73.16	6.4	110	74.84	10.1	0.27	0.87
Transition Markers	332	199.09	17.4	244	166.01	22.3	2.98	0.08
Attitude Markers	164	98.34	8.6	90	61.23	8.2	8.61	0.003
Boosters	464	278.24	24.3	192	130.63	17.6	52.83	0.001
Self-Mentions	80	47.97	4.2	6	4.08	0.5	37.23	0.001
Engagement Markers	24	14.39	1.2	16	10.89	1.5	0.36	0.55
Hedges	224	134.32	11.7	202	137.43	18.4	0.33	0.85
Total	1930	1157.35	100	1096	745.68	100	87.86	0.001

Results for question # 4: Table 7 below compares the frequency of MDMs in qualitative papers of nursing between NEWs and IPWs. Similar to the frequency of medical physics, the NEWs had a higher frequency of MDMs compared to the Iranian Persian group (mean difference = 166.42):

Table 7. *Frequency Results of MDMs in Nursing Qualitative Papers by NEWs and IPWs, in General*

Type of Context	Total Words	Raw Frequency	Frequency per 10,000
Qualitative Papers by NEWs	41321	2946	712.95
Qualitative Papers by IPWs	38022	2078	546.53

The inferential results of the chi-square test revealed a significant difference across the two groups: $\chi^2(1) = 21.87, p = 0.001$.

Table 8 below displays the frequency of the various subcategories of MDMs in nursing qualitative papers by the two groups. As can be seen from the table, the NEWs significantly outperformed their Persian counterparts in using transition markers, self-mention and hedges ($p < 0.05$). The two groups did not significantly differ in the remaining subcategories:

Table 8. *Frequency Results of MDMs in Nursing Qualitative Papers of by NEWs and IPWs in Details*

MDMs	NEWs			IPWs			Chi-Square Value	P Value
	Raw	F per 10,000 W	%	Raw	F per 10,000 W	%		
Code	328	79.38	11.1	238	62.60	11.5	1.80	0.18

Glosses								
Evidentials	402	97.29	13.7	428	112.57	20.5	1.21	0.27
Endophoric Markers	2	.48	0.0	10	2.63	0.5	—	—
Frame Markers	142	34.37	4.8	122	32.09	5.8	0.06	0.81
Transition Markers	898	217.32	30.6	536	140.97	25.6	16.13	0.001
Attitude Markers	134	32.43	4.5	118	31.03	5.6	0.02	0.90
Boosters	292	70.67	10	272	71.54	13.1	0.007	0.93
Self-Mentions	216	52.27	7.3	52	13.68	2.5	21.88	0.001
Engagement Markers	24	5.81	0.8	6	1.58	0.4	2.0	0.16
Hedges	500	121.00	17.1	300	78.90	14.4	8.82	0.003
Total	2,946	712.95	100	2,078	546.53	100	21.87	0.001

5. Discussion and Conclusion

Drawing on the model instantiated by Hyland (2005), this study sought to capture the frequency and distribution of MDMs by English and Persian RA writers subdisciplinarily and paradigmatically in medicine. By addressing research question # 1, a significant difference could be identified between the NEWs and IPWs in using MDMs at large (Table 1). Furthermore, given the subcategorical variation set out in Table 2, code glosses first were found to project higher among the NEWs ($p = 0.014$) to confirm that English is a “writer responsible culture” (Dahl, 2004, p. 1807). In her study, Dahl (2004), however, investigated textual metadiscourse in RAs and by comparing English, French, and Norwegian texts, she could ultimately discern English and Norwegian as the languages in which the writer’s presence is more felt to orient of the reader through the text; for French, however, it was contrary to the case. In the same vein, Hinds (1987) compared English and Japanese texts and finally found English as a fairly higher reader-invested-in language vis-a-vis Japanese. The same relationship, that is, the higher significant frequency of attitude markers ($p = 0.010$) by the English natives also exists which can be ascribed to the intuition of the Iranian culture-oriented writers who, especially in the less-argumentative quantitative-type texts, most often fail to take sides as they might do in the qualitative writing modes.

It could, furthermore, be noticed that Iranian writers are likely less inclined to reveal themselves in the texts through self-mentions as this disposition has been ingrained in them ever since the essay writing classes of school days during which instructors vigorously would demand them to eschew, as far as possible, using the tokens ‘I’ and ‘we’. This is in fact in concord with the results of our study in which

the NEWs applied it about five times as much as that of the Persians in their RAs (86.42 vs. 18.41, $p = 0.001$).

The results on hedges, which signify a significant relationship between the groups ($p = 0.001$) and show a better propensity of the English writers to capitalize on the subjectivity of their position and, thus, magnify the propositional content in the form of an opinion, need a slight scrutiny in the field of medical physics (NEWs, 141.58 vs. IPWs, 81.33). It can be suggested that for Iranians while inscribing quantitative papers, in particular, culturally it is less admissible to leave the issue for alternative voices; decisiveness in presenting information is the acknowledged norm. Kramsch (1993) holds the same perspective viewing it as if emanating from the inextricable amalgamation of language and culture. The viewpoint has also been entrenched by Hofstede (1977) as well as Keshavarz and Kheirieh (2011). Put by the latter researchers, “Iranians usually express their propositions with some degree of confidence” (p. 12). The part of the outcomes that rather intrigued us was that it was exclusively on evidentials that Persian writers projected higher than their English counterparts (IPWs, 150.38 vs. NEWs, 89.18, $p = 0.001$) to substantiate cross-cultural variation in writing RAs. Seemingly, the Iranian researchers show a higher tendency to resort to as many available resources as they can in order to cogently justify their arguments. Nevertheless, cross-disciplinary as the conceptualization normally appears to be, more inquiries are needed to make generalizations. For other metadiscourse subcategories, however, insignificant differences were identified between the groups.

For question # 2, as Table 3 reveals, in general, no significant discrepancy was revealed between the nursing groups ($p = 0.895$). However, for the clear reason that comparing the medical physics groups (previous research question) a significant difference was found, the extant disparity can more likely be attributed to the difference between hard and soft sciences. It was perhaps for this disparity that we could explore such a difference between the subdisciplinary groups and, thus, a better homogeneity between the nursing groups across the two languages of our concern. However, for we are no closer in acknowledging whether the interpretation is valid to make generalizations, we need to await further research.

Nevertheless, when it came to exploration of the possible disparities in terms of the tokens frequency within the nursing groups (Table 3: NEWs vs. IPWs), the outcome proved to be virtually akin to that of the medical physics. Given evidentials, for example, the IPW were again overtly projected for their higher deployment of the token (181.50 vs. 62.75; $p = 0.001$) to substantiate their higher strive for support of their arguments.

As to self-mentions and hedges, the results proved to be similar to those of the medical physics texts; Iranians were found to bear the tendency to mitigate their

use of these 2 types of features compared with their English counterparts (for the discussion germane to the reasons for this refer to the relevant interpretation addressed in question # 1).

The virtual likeness of the tokens distribution in medical physics and nursing quantitative RAs can surely give rise to the issue of the subdisciplinary homogeneity within the medical sciences arena. It seems that this homogeneity can be traced back to the culturally-ingrained specifications of the nations on the one hand and, as Dahl (2004) also asserts, to the higher maturity and hence stability of medical sciences discipline as opposed to economics and linguistics on the other. Delineated further by Dahl (2004), medicine is the field that “[I]ts research object, the human body, has general validity, and its research methods are common to the medical community, making the interpretations of research data less dependent on subjective evaluation than what is the case in the humanities and social sciences” (p. 1822). The higher variation of the features in the qualitative papers written by the two groups can endorse the claim.

With respect to the disparity distinguished between the two groups at large (question # 3), code glosses were the first MDMs to show up as significantly different (NEWs, 99.54 vs. IPWs, 62.59; $p = 004$). In several investigations, the use of code glosses was found to be superseded by the native speakers of English. In a study conducted by Abdollahzadeh (2001) through which the deployment of textual metadiscourse by Iranian and English natives was addressed, it was Anglo-American academic writers who, in using code glosses, outperformed their Iranian counterparts so as to provide more guidance to their readers. Yet in another inquiry, Abdollahzadeh (2007) compared Persian and Anglo-American editorials and attained results akin to the previous one; Iranians’ depressed employment of code glosses was once more stipulated. One explanation over such distribution, which is somehow consonant with that of our study, that is, the diminished use of this metadiscourse subcategory by the IPWs, underscores the Iranian cultural conventions which are represented in their writing, as well. It is indeed triggered by these conventional modes that the Persian authors seemingly fail to see the need to much assist their readers in the recovery of intended meaning in discourse; the onus for appreciation is more put on the shoulders of the reader hence providing partial evidence to call Persian a reader-oriented language vis-a-vis English. However, further subdisciplinary as well as cross-paradigmatic studies with Persian writers are needed to certify such important issue. Moreover, it is important to note that for quantitative RAs (question # 1) similar results were obtained on code glosses. This can give rise to the perspective of the overbearing impact of cultural aspects over paradigmatic influences.

Concerning evidentials (NEWS, 171.10 vs. IPWs, 85.73; $p = 0.001$), although for the two previous research questions germane to quantitative RAs no difference was found, the NEWS's frequency in use outnumbered the Persian group. It stands to reason to pin it down that Iranians highly possibly failed to bear adequate access to other qualitative-type RAs to address and hence invigorate their arguments. To the best of our recollection, striving at the outset of the study to garner the medical physics qualitative articles for the corpus we needed, we were also somehow troubled to have adequate number of them available whereas for the nursing corpus, this was not the case. It is because, on the one hand, qualitative papers are, as literature reveals, the newer more recent types of RAs compared to their older quantitative counterparts. On the other, seemingly the Iranian medical physics RA writers, in particular, might have had more difficulty in their accessibility to qualitative-type sources to evidence compared to the nursing group (see question # 4).

As to endophoric markers the frequency of which amounted to 23.99 for the natives of English, which was much higher than that of the Persian writers (9.53), the difference was significant ($p = 0.016$). Interestingly, in the medical physics qualitative-type rhetoric crafted by the English writers, we could observe a number of photos and diagrams their presence of which in the text could follow the need for more endophoric markers. The Persian texts had comparatively fallen short of the token resulting virtually from their lower level of the ideational material in the form of photos or the like. Accordingly, a reader-oriented as the Persian language can arguably be, we may not hesitate to see that Iranian writers would seemingly prefer to shun steering their readers through texts much more than they think is required.

Another intriguing part of the outcomes is pertinent to attitude markers being significant ($p = 0.003$) by comparison of the RA types. As it was with the quantitative papers (the previous research questions), here again the frequency was higher with the English writers (NEWS, 98.34 vs. IPWs, 61.23). It can be argued that Iranians show propensity to put things preferably fixed and immutable and formulate their ideational content with more certainty rather than being identified as indecisive when they write. This can be part of the conventionalized culturally-oriented rhetoric ingrained in the Iranians to indicate their epistemic rather than affective attitude to propositions in RAs.

One more appealing part of the results was related to the use of self-mentions being significantly higher in the English group (NEWS, 47.97 vs. IPWs, 4.08; $p = 0.001$) amounting to 12 times as much as the Persian counterpart. A glance at the relevant results on the quantitative papers (NEWS, 86.42 vs. IPWs, 18.41; $p = 0.001$) can reveal an increase in frequency by the English roughly higher than 4

times. This reality substantiates that cultural conventions in medical physics writing have an overbearing impact on paradigmatic discrepancies. In other words, avoiding deployment of self-mentions as a vehicle to project self by Persian writers is so culturally institutionalized that the differences between quantitative and qualitative papers fail to impinge on the acknowledged conventions (Keshavarz & Kheirieh, 2011).

In terms of boosters, it was found that the frequency in use by the qualitative papers (NEWs, 278.24 vs. IPWs, 130.63; $p = 0.001$) was much lower than that of the quantitative papers discussed in question # 1 (NEW, 378.78 vs. IPW, 350.62; $p = 0.300$). The reason that, in the quantitative RAs, boosters frequency stands much higher might be attributed to the nature of the experimental research through which authors' decisiveness most often emanates from the resolute outcomes. However, explanation for the significant discrepancy between the groups in the medical physics qualitative RAs ($p = 0.001$) can be assigned to the nature of this field in which far more visual signals are deployed for clarification of meaning vis-à-vis nursing. The semiotic representation which the English authors used—through which they could maneuver virtually conclusively and speak with rather firmness and hence employ a higher frequency of boosters—was, however, largely missing in the Persian texts. The results obtained in this part can also add to the previous evidence as to the reader-orientedness nature of the Persian texts.

By comparing the results of the nursing qualitative papers (Table 7), a significant difference was revealed totally between the groups ($p = 0.001$) whereas no such significance was found in the case of nursing quantitative papers ($p = 0.0895$) to bear witness for a better homogeneity across the quantitative RAs. It can be concluded that for virtually firmly-established and hence more stable epistemological conventions applied in writing quantitative papers (Miller, 1994; Swales, 1990), they savor certain entrenched moves and steps their presence of which might less be observed in other types of genres. These properties would magnify this paradigm to be accommodated as far more collective and, thus, better socially derived compared to others (Basturkmen, 2006).

Furthermore, when it came to capture the causes of discrepancy in the subcategories between the groups, first we came across the case of transitions ($p = 0.001$) in which the IPW had employed the token roughly two-thirds in frequency as much as the other group (NEWs, 217.32 vs. IPWs, 140.97) to make the difference significant. This was not however the case for the nursing quantitative writers (NEWs, 165.49 vs. IPWs, 150.28; $p = 0.40$). By comparing the Iranian writers across the groups (149.97 vs. 150.28), a virtually complete homogeneity was observed between the Persian writers across the paradigms. It could be argued once more in favor of the overriding impact of language on paradigmatically-oriented

coaching. It means that the Persian language establishes its rhetorical norms so vigorously that the effects of writing in either qualitative or quantitative mode fade away in terms of using transitions in the soft science of nursing.

As to hedges, similar to what we observed in the nursing quantitative RAs, the frequency in use remarkably depressed by the Persian writers (NEWs, 121.00 vs. IPWs, 78.90; $p = 0.003$) epitomizes the fact that the Iranian cultural conventions can be reflected in writing RAs which are associated with more assertiveness and resolution and less uncertainty.

In regard with self-mentions, the results indicate a decrease of around four times among the Iranians (NEWs, 52.27 vs. IPWs, 13.68; $p = 0.001$). Once more, the earlier relating discussions can apply as to the domineering effect of Iranian culture over subdisciplinary and paradigmatic modes of writing and hence deploying a far less number of self-mentions in writing RAs simply for the purpose of dimming subjectivity. Insignificant differences, however, were explored between the groups for other tokens.

Of the four research questions discussed, a rather robust homogeneity was found only between the nursing quantitative writers (question # 2), but not between the other groups. Therefore, it makes sense to reason in favor of the likelihood of writing with less disparity of MDMs use across English and Persian quantitative RAs within the soft subdisciplinary nursing science in medicine. One intriguing finding was the remarkably low use of self-mentions by Iranians across the two subfields and paradigms to account for the influences of culture on the variables mentioned. The application of attitude markers, evidentials, and hedges was, moreover, different in several ways.

Admittedly, although the use of MDMs is globally similar across languages in some respects, it is plausible to conclude that the writers' varying deployment of these tokens can certainly emanate from varying cultural, paradigmatic, and (sub)disciplinary influences. In this regard, Dahl (2004), for example, demonstrated that medicine, compared with linguistics and economics, enjoys almost a similar pattern of metadiscourse distribution across English, French, and Norwegian. Nevertheless, more such studies are required for making some felicitous generalizations.

Notwithstanding these facts, what research to date has mostly addressed is the structural and organizational levels of language which are explained as microlevel aspects of discourse—the rhetorical norms have less been investigated in literature (Hu & Cao, 2015) which need to be explored, as well. Another area of research pertains to the role of metadiscourse teaching in improving reading comprehension ability among the L2 learners (Daftarifard, 2002; Dastgoshadeh

2001; Jalilifar & Alipour, 2007; Khorvash, 2008; Tavakoli, Dabaghi, & Korvash, 2010). Effective as the instruction might well be, the way that metadiscourse might best be taught can be the focus of future academic writing courses. Nevertheless, another relevant unresolved controversy relates to the type of corpus and discourse norms, which are needed to be addressed in pedagogical L2 settings.

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Appendix A

The following are some of the journals used for medical physics:

1. *Medical Physics*
2. *Advances in Medical Sciences*
3. *Iranian Journal of Medical Physics*
4. *Iranian Journal of Biomedical Engineering*

and nursing:

5. *Journal of Nursing Care Quality*
6. *Journal of Care Management*
7. *Iranian Journal of Nursing*
8. *Iranian Journal of Nursing Research (IJNR)*

The following are some of the Persian journals used:

۱. فیزیک پزشکی ایران
۲. مجله پزشکی هرمزگان
۳. طب و ترکیه
۴. پرستاری و مامایی جامع نگر
۵. سلامت و بهداشت اردبیل
۶. فصلنامه علمی پژوهشی دانشکده پیراپزشکی کرمانشاه

Appendix B
Model of Metadiscourse in Academic Texts (Hyland, 2005, p. 49)

Category	Function	Example
Interactive	Help to Guide the Reader Through the Text	Resources
Transitions	express relations between main clauses	in addition; but; thus; and
Frame Markers	refer to discourse acts, sequences or stages	finally; to conclude; my purpose is
Endophoric Markers	refer to information in other parts of the text	noted above; see figure; in section 2
Evidentials	refer to information from other texts	according to X; Z states
Code Glosses	elaborate propositional meaning	namely; e.g.; such as; in other words
Interactional	Involve the Reader in the Text	Resources
Hedges	withhold commitment and open dialogue	might; perhaps; possible; about
Boosters	emphasize certainty and close dialogue	in fact; definitely; it is clear that
Attitude Markers	express writers' attitude to proposition	unfortunately; I agree; surprisingly
Self-Mentions	explicit reference to author(s)	I; we; my; me; our
Engagement Markers	explicitly build relationship with reader	consider; note; you can see that