

The Interpersonal Function of Metatextual Elements in Scientific Writing

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Abstract

The paper is based on the widely accepted idea that the scientific discourse is not merely an exposition of scientific statements by means of a specific genre, but a social activity by which the author builds his/her relationship with the intended audience. Thus, every scientific text contains the elements which go beyond the propositional content comprising the metatextual level.

Adopting Vande Kopple's (1985) functional classification of metatextual elements around two functions - textual and interpersonal, we have examined the metatextual elements of the latter function analysing ten research articles from two different sciences - medicine and geology. The examined elements are sub-classified (modality markers, attitudinal markers and commentaries), and systematized according to their formal realization, such as modal auxiliaries, related nouns, adjectives, adverbs, noun phrases etc.

1. Introduction

In recent years numerous studies on scientific discourse oppose the popular belief that scientific writing, particularly in natural sciences, is "a series of impersonal statements of facts which add up to the truth" (Hyland, 1994:239). The new approach to scientific writing emphasizes the social component involved in the process of creating the scientific discourse and explores the interaction between the writer of a specific scientific genre and the expected audience. Thus, a new perspective in analyzing scientific writing, commonly known as "*sociology of scientific knowledge*", has been established. (cf. G. Myer, 1992). The advocates of this concept assert that the study of scientific discourse from this point of view becomes "central to understanding the creation of knowledge. Knowledge is influenced by the basic elements of the communication process: writer, audience, language and reality. This is because transforming claims into knowledge requires reader's acceptance and therefore linguistic and rhetoric means of persuasion." (Hyland, 1996:435).

Two types of scientific writing have been specially examined in the light of the new perspective - academic textbooks and scientific research articles. These two types can be also viewed as two specific genres of scientific writing, according to Swales' (1990:58) definition of a genre:

"a genre comprises a class of communicative events, the members of which share some sets of communicative purpose. These purposes are recognized by the expert members of the parent discourse community, and thereby constitute the rationale for the genre....In addition to purpose, exemplars of a genre exhibit various patterns of similarity in terms of structure, style, content and intended audience".

This study limits its scope to examining the scientific research article, which "can be said to constitute a genre within the specific world with different conventions across different disciplines". (Valero-Garces,1996:279)

However, my idea here is to analyze scientific research articles which belong to different scientific disciplines and, neglecting their specific disciplinary conventions, to concentrate on the presence of the social component in them. Thus, my choice of medical and geological research articles was based primarily on certain common features imposed on them by the same genre affiliation. Although these two, apparently remote disciplines deal with two completely different realities, the articles which present the researches on these fields, display two characteristics which could be applied to both disciplines.

The first one is a genre-bound feature and concerns the rhetorical sections any scientific research article, specially in natural science, is comprised of. Namely, as any research article is considered to be "a communicative event" (Gosden,1995: 40), then the researcher's task is to "linguistically convert real-world entities and processes into non-real world concepts" (Mc Kenna,1997:189), in the best communicative way possible, which means - in a logically sequenced order. The aim of the rhetorical sections of an article is to fulfill that task. More or less identical rhetorical sections were identified in the examined medical and geological research articles: *Introduction, Materials and Methods / Methods, Results, Discussion / Comments and Conclusion.*

The second common characteristic of writing in both disciplines appears to be a great deal of description on procedures or phenomena under consideration.

The cross-disciplinary study employed here seems to be justifiable, providing the assumption on the presence of the social component in the examined corpus is proved. Also, on the basis of the obtained results of my study, I expect to discern some generalization concerning scientific writing and to detect some linguistic forms preferential for each discipline.

2. The objectives of the study

The subject of this study is to identify certain elements which mark the social component involved in research articles writing. By "social component" I assume the author's presence in the text and the relationship he builds with the reader of the text. As the analysis of scientific discourse

has identified various categories which carry out this component, I limited my examination to one textlinguistic variable - metatext in scientific research articles.

The Finnish linguist, Anna Mauranen (1993: 8) noted:

"Metatext is essentially text about the text itself. It comprises those elements in text which at least in their primary function go beyond the propositional content, like for example..... " The paper concludes by explaining why the results of empirical work done by Chang (1983) do not correspond to the expected results... Metatext thus serves to organize the propositional content of the text and to comment on it."

Although there are some negative attitudes in some cultures, (including my own) towards using metatext in scientific writing where it is considered to be unnecessary and superfluous, there are much more positive ones, such as Crismore and Farnsworth's (1990:121):

"Metadiscourse can guide and direct readers through a text by helping them understand the text and the author's perspective....thereby making the text more friendly and considerate"

Among the linguists who support the positive attitude towards the use of metatext in scientific writing, there is, however, no agreement on the scope of metatext : some of the linguists (such as Enkvist, 1985) limit the notion of metatext to its text-organizing role, while others take a comprehensive view of metatext, and include in it the interactive elements such as expressions of the author's attitudes and certainty. (Vande Koopple 1985, Crismore & Farnsworth 1990; Markkanen at al. 1990) etc. Thus, Vande Koopple (1985) has classified all metatextual elements according the functions they accomplished into metatextual elements with:

- 1/ Textual Function
- 2/ Interpersonal function

The textual function is, according to the same author, realized by means of : text connectives, such as: *first, next*; code glosses, such as: *x means y*; action markers (*to sum up* , and narrators (*according to, as*). As this function is explicitly realized in the texts of research articles, it has been often discussed and examined in applied linguistics. Some of the linguists (Clyne, Mauranen, Valero-Garces) point out that the attitude and the usage of textual metadiscourse varies among cultures and is often connected to the educational and cultural background of the writers. Thus, textual metadiscourse has become the subject of numerous studies on contrastive rhetoric.

The interpersonal function is realized by means of validity markers, attitudinal markers and commentaries, and as they are the subject of this study they will be commented later on.

This very classification has been adopted in this study and metatextual elements with the interpersonal function were extracted from the corpus of 26 research articles, among which medical and geological articles were equally represented.

During the analysis answers to several questions were sought for:

1. Are metatextual elements with the interpersonal function possible to identify in the discourse of medical and geological research articles?
2. What are the linguistic forms by which these elements are realized?
3. Is there any linguistic form which can be considered preferential for the medical or geological discourse, respectively?
4. Is it possible to make any generalization about the presence of metatextual elements with the interpersonal function in scientific articles?

Before I present the results of this study, it will be convenient to discuss briefly the notion of "the author's presence" in research articles writing, since both types of metatextual elements demonstrate it either in an explicit or implicit way.

3. The author's presence in scientific discourse

The author's presence in the scientific research articles can be both evidenced through the author's either explicit or implicit reference to the reader.

The choice of the first person pronoun (singular, or when it is the case of multi-authored research articles - plural form) in contrast to the impersonal mode, either in conveying the propositional content or in offering the reader the guidelines through the text (e.g., *first we shall, ...we want to sum up*, etc.) is one of the explicit marks of author's presence, besides the author's addressing the reader directly, as it can be seen from the following two examples:

Can the sex effect be accounted for by differences in phenomenologic variables such as length of illness or exposure to medication? (M-1/II, pp.1652)¹

Note that the interaction parameters of the same change have roughly the same value. (G-6/II, pp.1454)

Sometimes these questions are modulated by the use of modal auxiliaries, suggesting lesser degree of certainty on the assumption:

¹ The notation: "M" stands for medical discourse; the Arabic numerals stand for the particular article; the Roman numerals stand for the journal (the order and the titles are given in the Appendix)

Could the outcome of ECT-treated psychotic patients have been improved with a different approach to continuation or maintenance treatment or both? (M-13/IV, pp.182)

All these examples reveal the author's wish either to draw the reader into a dialogue or to attract his attention to a specific piece of information, often visually represented.

Besides the explicit marks of the author's presence in the text, (specially evident in the metatextual elements with the text-organizing function), implicit marks of the author's presence in the texts of scientific research articles can be evidenced as well, all of them witnessing the author's "awareness of anticipated feedback from the academic community". (Gosden, 1995:43).

Thus, aware of the possible validation and assessment, the author rarely makes his assertions and claims categorical; by modulating them he leaves the door open to his colleagues who might have a different opinion. In this way the author is demonstrating his respect and tolerance to the discourse community he belongs to. At the same time, the author may express his attitude towards the subject under discussion. Such modulated statements are often referred to as the "author-marked statements".

Since many metatextual elements serve to modulate or to comment on the statement which follows, they are often examined under the common label of hedges. If the notion of hedging is taken in its widest sense and any author-marked statement is considered a hedged statement, then the metatextual elements with the interpersonal function might be regarded as one of numerous textlinguistic variables which carry out the same purpose: building the author-reader relationship.

The most evident characteristic of metatextual elements with the interpersonal function as hedging devices is that they modulate the whole statement by which the propositional truth is to be communicated and, not a specific item within the propositional truth. This can be seen by comparing these two sentences:

A. *Clearly*, the findings indicate that the cyclone separation had a positive effect to concentrate the organic matter in the overflow fraction. (G-3/III, pp. 351)

B. The engineering behaviour of the material is *clearly* important for the slope stability. (G-4/III, pp. 290)

The adverb "clearly" in the example B. is incorporated in the statement itself and according to Ken Hyland (1996: 437), it can be classified as an "accuracy-oriented hedge", by means of which the author's expresses the proposition with a greater precision is revealed.

4. The classification of metatextual elements with the interpersonal function

In the analysis of medical and geological research articles I have followed Vande Kopple's (1985) classification of metatextual elements with interpersonal function, so that all of the selected elements have been classified according to their function into three subcategories.

The first group of metatextual elements (to which the above example A. belongs), is realised by "modality markers" and reveals the author's valuation of the propositional content conveyed by the statement, while the second subcategory of metatextual elements with the interpersonal function is usually realised through the use of attitudinal markers, and reveal the author's attitude towards the propositional content. Both subcategories comprise formally and syntactically different word classes. The third subcategory of metatextual elements explicitly denote the author's presence in the text, and is realised by different linguistic forms, with the purpose of involving the reader directly in a dialogue with the author.

The analysis has demonstrated that the meaning of the adjective or adverb in a metatextual element is the crucial factor in distributing metatextual elements with the interpersonal function into the validity and attitudinal markers group. This can be illustrated by the following contrasted pairs:

It is impossible to generalize vs. It is difficult to generalize

Presumably, vs. Unfortunately.....

A. The modality markers by which the interpersonal function of metatextual elements is conveyed, are used to assess certainty or uncertainty of propositional content and the degree of commitment to that assessment. They are realised by use of three formally different categories: adverbs, adjectives and modal auxiliaries, and their syntactic constructions selected in the corpus, will be briefly discussed below:

1/ Clause - initial adverbs, which are according to their syntactic function - disjuncts related to the degree of truth, either by expressing the author's conviction as in adverbs: *arguably, evidently, clearly, certainly, obviously*, etc., or some degree of doubt, as in adverbs, such as: *probably, presumably, possibly, very likely*, etc.

(1) *Certainly*, in other groups of patients, chronic volume overload has been shown to be a powerful precipitant of regional abnormalities of ventricular function. (M- 3/IV, pp.458)

(2) *Presumably*, calcium accumulation is dependent on disease chronicity. (M-12/VII, pp.273)

(3) *Obviously*, because of Freud's stature and authority in these years, his directions and influence must have had a substantial impact on each analysand's experience. (M-10/IV, pp.170)

2/ Adjectives, which semantically belong to the group of probability adjectives such as: *possible, impossible, probable, improbable, likely/unlikely*) and emphasizees, (such as: *clear, certain, sure*), can be used according to their functions as:

a) Complements in the construction with " the dummy it":

(4) *It is impossible to assert* that the symptoms of the other subjects will never be explained by neurological diagnoses, but after 6 years of follow up this is increasingly unlikely. (M-5/VI, pp.585)

(5) *It is now abundantly clear* that the depression is associated with ischemic heart disease. (M-8,III, pp.8)

The complement of the adjective in the selected examples is either the to-infinitive phrase, (as in (4) or the that-clause, as in example (5)

The semantics of the verb in the infinitive phrase is very important: the verb should belong to one of the following groups:

- **epistemic verb** (such as : *to suggest, to indicate, to assume, to speculate, etc.*),
- **performative verb** (such as: *to note, to notice, to establish, to say, to discuss, to claim, to refer, to propose, to generalize, to assert, to explain.*)
- **cognitive verb** (such as: *to reflect, to think, to realise*).

b) Adjectives used as complement of the linking verb "seem"

(6) It almost *seems obvious* that if depression increases the risk of postinfarction mortality, then treating depression should reduce the risk. (M- 8/III, pp.9)

c) Prenominal modifiers in noun phrases of various functions (most often subjects (7) or subjective complements (8), as in the following examples:

(7) *A plausible explanation* is that the mantle has been metasomatized with fluids derived from dehydration of the subducted slab. (G-10/II,pp.1646)

(8) *One possible solution for answering this question* is to control for the phenomenologic variable that differ between the sexes, such as age at onset. (M-1/II,1652)

Often noun phrases can be followed by modal auxiliaries, so that uncertainty is emphasised :

(9) *A possible explanation might be* traced to the considerable clinical experience guided by study clinicians during our numerous treatment studies at Western Psychiatric Institute and Clinic....(M-4/I, pp.1511)

The head nouns in these phrases belong to the category of "factive" nouns, such as: interpretation, explanation, indication, evidence, fact, consensus).

d) In supplementive adjective clauses :

(10) *Most important* the prospective study design ruled out the possibility that preexisting physical illness preceded the men's visit to psychiatrists and use of mood-altering drugs before age 50. (M-10/IV, pp.191)

3/ Modal auxiliaries (may, might, could, would, must,) accompanied by the same types of verbs, as with the adjectives. They may have different sentence position, and can be either in active or passive voice, as the following examples show :

(11) Higher content of light compounds,..... *may explain* this increase in conversion.(G-3/III, pp.352).

(12) In general *it must be assumed* that apertures will be greater where the fracture lies parallel to the local principal stress...(G-2/III, pp.399)

(13) ...so, the applicability of the method to both phosphate types *may be assessed*. G-1/I, pp.1345)

(14) *It might be questioned* whether the differences in rates of nonpsychotic patients is explained by severity. (M-9/I, pp.1500)

Sometimes modal auxiliaries are followed by noun phrase which contains probability adjective :

(15) However, *it would be an unlikely explanation* for the increased rate of new infarctions seen in depressed individuals initially free of any cardiac disease. (M-8/III, pp.8)

This study has excluded the examples such as "*It should be noted*" and "*It can be seen*" for the reason that in spite of the fact that these word groups formally fit the same category, they rather belong to the genre writing conventions and are not regarded as elements which convey personal component.

B. The analysis of medical and geological research articles has shown that there are more attitudinal markers than the ones which exhibit validity. They also appear to be accomplished through a greater variety of syntactic forms, all of which are marked by, so called "emotionally-charged" features.

Attitudinal markers are realised by the following syntactic forms:

1/ Clause initial adverbials, which are, according to their function - disjuncts), as in the examples:

(16) *Unfortunately*, the composition of sediment that has been or is about to be subducted at a specific system usually is poorly known. (G-9/II, pp.1641)

(17) *Importantly*, the current study demonstrated a relation between reference segment disease and target lesion calcium. (M-12/VII, pp.272)

(18) *Surprisingly*, however, the patients with PTSD did not differ from the patients without PTSD on substance abuse measures and sociodemographic characteristics. (M-11/IV, pp.218)

The commonest adverbs which belong to this group are: *surprisingly, unfortunately, unexpectedly, apparently, interestingly, frankly, doubtfully* etc.

2/ Adjectives, with the syntactic function of :

a. Subjective complements, which can be followed by "to-infinitive phrase", as in (19), (20), (22) or the "that-clause", as in (24) the following examples: (19) *It is interesting to speculate* that the regional abnormalities of ventricular relaxation that we found may be related at least in part to these findings.(M-3/V, pp.459)

(20)....*it is suitable to refer briefly* to the broad aspects of migration through unfaulted ground, specially coal-bearing sequences.(G-2/III, pp.393)

(21).... it is difficult to generalize in any useful way about their attributes with respect to fluid migrations, and particularly coalbed methane. (G-2/III, pp.404)

(22) *It is important to emphasize* that the six effects on brain morphology, as indicated in the study, is a difference of degree rather than pattern. (M-1/II,1652)

(23) *It was readily apparent* that the MQ model consistently overpredicated the liquid-phase resistance (1/Q1) by as much as 1-2 orders of magnitude over the experimentally determined overall resistance, 1/Q1. (G-12/IV, pp.160)

The verbs of "the to-infinitive phrase" and of the "that-clause", semantically belong either to epistemic, performative or cognitive verb groups.

b. Inverted complement in noun phrases, as in the example:

(24) *Much more noticeable is* that the main cleat orientation can swing towards both smaller or larger faults,.....(G-2/III, pp.399)

c. Prenominal modifiers in noun phrases:

(25) Thus, *a reasonable interpretation* of the Eu systematics in humorole 63 is that hot acidic solutions transported Eu + preferentially over the other REF.....(G-5/II,1437)

(26) *Our comprehensive reviewing of data indicates* that most data sets are consistent within an error of about 7% except for few data sets. (G-6/II, pp.1459)

(27) *A surprising finding* was the absence of a difference between the groups with or without PTSD on substance abuse measures and sociodemographic characteristics. (M-11/IV, pp.218)

However, the combination of modality and attitudinal markers is not rarely found:

(28) *It would be easy* to think that the phenomena responsible for the increased mortality seen in treatment samples would not be strong enough to manifest an effect in milder case. (M-8/III, pp.5)

(29) This *could easily* explain a good part of increased mortality associated with the depression following infraction. (M-8/III,pp.8)

C. The third group of metatextual elements which reveal the author-reader relationship according to Vande Copple's classification is labeled under the title of "**commentaries**", and is used to draw the reader in a dialogue with the author. This group of metatextual elements displays the author's explicit presence in the text, while the two previously analysed groups indicate the author's awareness of the reader in an implicit way.

However, the analysis of medical and geological discourse in scientific research articles has shown that commentaries are very rarely used in this academic genre, and are thus considered to be a rarely accepted writing convention. The only identified examples are those which are aimed at drawing the reader's attention to a specific example, or picture, as in giving the directives, usually by means of verbs such as "to consider" or "to note".

(30) *Note* that the oil figure includes the original HAO solvent. (G- 3/III, pp.342)

There is an assumption that commentaries might be more often used in less formalized types of scientific articles, such as popular scientific magazines, as well as those intended to popularize science among the young.

Conclusion

Since the aim of this study was to answer several questions, the answers obtained by analysing medical and geological scientific articles are briefly summarized here:

Medical and geological written discourse does not consist of scientific statements only but includes the social component as well. Analysing metatextual elements with interpersonal function, we have confirmed the presence of the author in the text, which appears to be mainly implicit, although some evidence of the author's explicit presence was noticed through the category of "commentaries".

The implicit presence of the author and his awareness of the intended audience is expressed by two categories which are semantically distinguished as modality and attitudinal markers. These categories are realised by different forms and syntactic constructions and what demarcates the categories is the meaning of adjectives and adverbs contained in metatextual elements.

Although the corpus of the study comprises two different disciplines, the analysis has not selected the preferential form for any of them. This indicates that these linguistic features are not disciplinary bound, but are connected with the author's personal inclination.

As far as the frequency of the metatextual elements with interpersonal function is concerned, the greater diversity was noted among the branches of one discipline (medicine) than between the two disciplines. Also, the distribution of these elements in respect to the rhetorical sections is identical both for medical and geological research articles. They are mostly selected from the introduction and the discussion or conclusion, while other rhetorical parts are almost deprived of them.

The fact that the examined corpus belongs to two remote disciplines may indicate that the same types of metatextual elements are possible to select in research articles of other scientific disciplines.

Finally, it should be noted that both metatextual functions are worth examining. In addition to some theoretical applications, the textual metadiscourse is possible to examine in order to obtain some practical results for instructing novice writers in making their writing more effective. They should be made aware of the advantages the textual metatext offers them in providing the readers with helpful guidelines through the text. In such a way the writers orientate the readers and help them comprehend their ideas much easier.

On the other hand, the presence of the interpersonal metatext in scientific research articles proves the assumption that any writing is obviously, "a social act performed in a specific context for a particular audience" (Bruffee 1986), and that the research article, as "the published paper, is a multilayered hybrid co-produced by the authors and by members of the audience to which it is directed." (Knorr-Cetina, 1981:106)

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APPENDIX

The considered geological articles are taken from the following journals and books:

1. *Geochimica et Cosmochimica Acta*, maj 1990, Pergamon Press
2. *Geochimica et Cosmochimica Acta*, april 1992, Pergamon Press
3. European Coal Geology and Technology, 1997, published by Geological Society, London

4. *Journal of Contaminant Hydrology*, November 1995, Vol.20, Nos.1-2, Elsevier

The considered medical articles are taken from the following journals :

1. *American Journal of Psychiatry*, November 1997.
2. *American Journal of Psychiatry*, December 1997.
3. *American Journal of Psychiatry*, January 1998.
4. *American Journal of Psychiatry*, February 1998.
5. *British Heart Journal*, 1991, No.66
6. *British Medical Journal*, 1998, Vo.316
7. *Journal by the American College of Cardiology*, 1997, Vol.29, No.2

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