

A Study of the Rhetorical Organization of Medical Research Papers



Applied Linguistics

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ABSTRACT

Globalization of academic discourse in recent decades has contributed to the dramatic increase of the number of scientific journals published in English. In order to gain professional and academic promotion, researchers working in different areas of knowledge of the Health Sciences need to publish their results internationally. However, the writing up of a research article may represent a hurdle, especially for inexperienced writers and non-native English speaking researchers, since they need to manage the rhetorical conventions established by the international scientific community. With the aim of facilitating publication to these scholars, I analyzed the rhetorical structure of 60 research papers published in high-impact international journal in various subdisciplines of Medicine. In this study, the prevalent functional units in each of the sections of the research articles are described, and a model of rhetorical strategies available to writers to express communicative intentions is proposed.

INTRODUCTION

In today's context of scientific dissemination, the need to publish research articles (RAs) in high-impact English language journals has become almost an imperative for those multilingual scholars who seek academic and professional promotion (Lillis & Curry, 2010). Despite the difficulties involved in the production of an effective RA, the fact is that in order to get their papers accepted, researchers have to manage the discourse conventions expected by the members of the international scientific community, including the rhetorical organization of RAs (Martín & León, 2014).

Within the framework of genre analysis (Swales, 1991, 2004), many studies have examined the rhetorical structure of the different sections of RAs across various disciplines, such as Posteguillo (1999) in Computer Science, and Yang & Allison (2004) in Applied Linguistics.

In this study, I attempt to expand this area of research by analyzing the functional units that scholars most frequently use in order to express a communicative intention in each section that conforms a RA in Medicine. I propose a model of rhetorical strategies that may have pedagogical implications for novice writers in this discipline.

METHODS

A total of 60 RAs were selected at random from high-impact journals, over a period of six years (2010-2015), in the subdisciplines of Cardiology, Immunology, Neurology, Gynecology, Ophthalmology and Oncology.

Following Swales' (1991, 2004) genre-analytic approach, I identified the functional units prevalent in each of the macrostructural sections of the RA (Introduction, Methods, Results and Discussion), and the various subunits that can be used to express these functional units. For the identification of these rhetorical strategies I was primarily based on semantic criteria, although lexical items were also useful on those occasions in which there was ambiguity.

RESULTS

The analysis revealed that the prototypical RA in Medicine is divided into seven basic functional units and that researchers have at their disposal a series of rhetorical strategies (subunits) to express the communicative functions. This structural model is presented as follows:

Introduction section

Unit 1. Creation of a research context

1.A – Claiming the importance of the research topic (with or without citations)

1.B – Expressing what is known about the topic (with or without citations)

1.C – Reviewing previous literature

Unit 2. Justification of research

2.A – Indicating a knowledge gap

2.B – Criticizing previous research

2.C – Expanding research

Unit 3. Announcement of present research

3.A – Describing main features or aims of the study

3.B – Stating hypothesis or research questions

3.C – Summarizing main findings

3.D – Highlighting the main contribution of the study

Methods section

Unit 4. Description of methodology

4.A – Describing data collection and materials

4.B – Describing experimental procedure

4.C – Describing statistical analysis

Results section

Unit 5. Statement of findings

5.A – Announcing where the results or data are located (in graphs, figures)

5.B – Making observations on the results

6.C – Comparing results with previous research

Discussion section

Unit 6. Explanation on the meaning of findings

6.A – Interpreting findings

6.B – Drawing conclusions

Unit 7. Evaluation of the significance of findings

7.A – Highlighting the implications of findings

7.B – Stating the limitation of findings

7.C – Recommending future research or practice

According to this model, in order to create a research context (Unit 1) in the Introduction, the writer can use three main rhetorical strategies, as illustrated in the following examples:

1. A - Catheter ablation is an important therapeutic option for controlling recurrent ventricular tachycardia (VT) late after acute myocardial infarction. (Card. 2)
1. B - Recently, methods have been developed to characterize the VT substrate that are based on bipolar electrogram characteristics during sinus or paced rhythm. (Card. 2)
1. C - A broad spectrum of mutations has been identified in human PIDcausing genes, and this genotypic heterogeneity is often associated with phenotypic diversity that cannot

be easily recapitulated in animal models.^{8,9} (Imm. 1) Similarly, writers can justify their research (Unit 2) by means of any of the communicative strategies exemplified below:

2. A - Although the effect of PCO on the straylight (large angle) domain of VF has been assessed,^{3,14} clinical studies of the effect of PCO morphology on straylight **are lacking**. (Oph. 7)
2. B - However, **recent studies have forced us to rethink these paradigms because they have been unable to demonstrate** a survival benefit from the use of either lymphadenectomy^{10,11} or adjuvant pelvic radiation (Gyn. 5)
2. C - Here, **we update previously published meta-analyses of community risk^{27,28} by adding more studies and accounting for** the length of follow-up. (Card. 9)

It is in the last part of the Introduction where researchers announce their work (Unit 3) through the rhetorical options illustrated as follows:

3. A - **The aim of this study was to estimate prospectively the risk of** adverse pregnancy outcomes in asymptomatic carriers of inherited thrombophilia polymorphisms. (Gyn. 8)
3. B - **In the current study we hypothesized that** imatinib reduces edema formation via direct preservation of endothelial barrier integrity. (Card. 4)
3. C - **Herein, significant** corneal nerve diminishment is demonstrated, not only in the clinically affected eyes in patients with unilateral HZO, but also in their unaffected contralateral eyes. (Oph. 7)
3. D - **Our findings indicate a previously unrecognized mechanism for** the induction of IL-9 from ILC. (Imm. 5)

In the Methods section, the writers describe the methodological procedures (Unit 4) as illustrated in the following examples:

4. A - **Analysis was limited to** singleton live births **between 37 and 41** completed weeks of gestation. (Gyn. 10)
4. B - **Bivariate and multivariate linear regression was used to characterize** the relationship between RV parameters and demographics. (Card. 3)
4. C - Results **were analyzed with Student t test**, the analysis of variance, Pearson's correlation coefficient, and multivariate linear regression analysis. (Oph. 7)

In order to describe the results obtained in their study (Unit 5), writers typically use the rhetorical strategies exemplified below:

5. A - **Figure 1 shows** the random-effects meta-analysis of the resulting values adjusted to 12 months. (Card. 6)
5. B - **No significant differences were found** between the responses achieved in the two groups. (Onc. 2)
5. C - These findings are **consistent with** results from other studies. (Onc. 9)

In the final Discussion section, researchers explain the meaning of findings (Unit 6) and evaluate their significance (Unit 7). The most frequently used strategies to achieve these communicative intentions are illustrated as follows:

6. A - **These findings indicate** that prothrombin gene mutation confers an increased risk for the development of adverse pregnancy outcomes. (Gyn. 8)
6. B - Therefore, **it may be concluded that** although survival is the only currency of natural selection, the exchange rate with truth is likely to be fair in most circumstances. (Neu. 9)
7. A - These results **further emphasize the functional importance** of the distinct responses of the RV to cardiopulmonary disease. (Card. 3)
7. B - However, **with a small sample size, caution must be applied** as the findings might not be extrapolated to all patients. (Imm. 5)
7. C - **Further research should be undertaken** to investigate the potential of this tumor-specific synthetic lethal strategy against cancers with similar molecular effects but diverse anatomical origins. (Onc. 8)

DISCUSSION

This study has revealed the prevalent rhetorical structure of RAs in the field of Medicine. By becoming aware of the main rhetorical options used by the members of the international disciplinary community, novice writers and non-English background scholars may be in a better position to make informed rhetorical choices when seeking to publish in English-language journals, since they would be more likely to meet the expectations of editors and reviewers of these international journals. The reported findings can also contribute to the preparation of instructional programs specially designed to deal with the needs of medical researchers.

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