International Journal of English Language and Literature Studies

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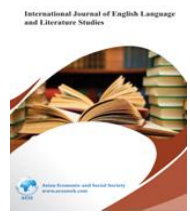

"THIS STUDY TESTS ….." FUNCTIONAL ANALYSIS OF THE GRAMMATICAL SUBJECTS IN RESEARCH ARTICLE ABSTRACTS: A CROSS DISCIPLINARY STUDY

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ABSTRACT

The aim of this study is to trace the realizations and discourse functions of grammatical subjects in the RA abstracts from two disciplines of Economics and Biology. To this end, fifty research article abstracts from the two disciplines published in journals of Biologica and Economic Modelling were selected. Both of these journals are published by Elsevier and indexed in Thompson and Reuters. The results of the data analysis indicated that there were disciplinary differences concerning the realization of the research related entity, research related event, self-mention and introducing part of study grammatical subjects. The results also indicated that in most of the cases the grammatical subjects were used to serve similar discourse functions in both sets of research article abstracts. The results of this study could in particular help research article abstract writers and readers from the disciplines of Economics and Biology with the knowledge of how GS is applied to serve different discourse functions.

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Keywords: Research article abstract, Genre, Grammatical subject, Discourse functions.

Received: 23 September 2014 / **Revised:** 12 November 2014 / **Accepted:** 17 November 2014 / **Published:** 21 November 2014

1. INTRODUCTION

The genre of research article (RA) abstract continues to grow in importance in exchanging knowledge between the disciplinary community members. Abstracts serve the function of time-saving as they inform the reader about the exact content of the article (Salager-Meyer, 1992; Martín, 2003). Abstracts are the first part of call in search for relevant literature and readers' first encounter with a text, indicating whether the corresponding article merit further attention

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(Golebiowski, 2009). RA abstracts help scholars and practitioners, especially in science, to be updated with the current scientific discoveries and contributions, including sharing and disseminating new achievements (Kanoksilapatham, 2013). RA abstracts are used as "previews" and "aids to indexing". As to the "preview" function, they form an interpretive scheme on which the reading process is directed. As to the "aid to indexing" function, they help in the indexing process for large database services (Huckin, 2006).

In the past two decades, the genre of RA abstract has become the object of extensive research. A number of research studies have primarily focused on identifying the overall organization of RA abstract (Santos, 1996; Martín, 2003; Hyland, 2004; Samraj, 2005; Cross and Oppenheim, 2006; Pho, 2008; Swales and Feak, 2009). A number of researchers have focused on the linguistic features of the RA abstracts (Hyland and Tse, 2005; Pho, 2008; Golebiowski, 2009; Gillaerts and Van de Velde, 2010; Hu and Cao, 2011; Chan and Ebrahimi, 2012). Literature reviews have indicated that the research on linguistic features received less attention compared with the organization of the RA abstract. Thus, this study intends to focus on the realizations and discourse functions of grammatical subjects (GS) in the RA abstracts from two disciplines of Economic and Biology.

2. METHODOLOGY

2.1. Corpus

Disciplines selection: Two disciplines of Economics and Biology were selected to meet the cross disciplinary nature of the study. The researchers have selected these two disciplines to have a corpus which could represent the spread of disciplines across the academic context. They built their disciplines selections on Becher (1989) taxonomy. Becher (1989) groups academic disciplines into soft and hard sciences. Hard science includes science disciplines while soft science includes the disciplines in the humanities and social sciences. Thus, based on Becher (1989) categorization of disciplines, two disciplines of Economics (soft) and Biology (hard) were selected for this study. In this study, the following abbreviations were used to refer to the disciplines: Eco (Economics) and Bio (Biology).

Journals selection: Two journals of Biologicals and Economic Modelling were selected to represent the two disciplines of Biology and Economics. Both of these journals are published by Elsevier. These two journals are indexed in Thompson and Reuters. The rationale behind selecting these journals was to have a corpus which is representative of RA abstracts produced by successful writers or what Mauranen (1996) called "good text". She states that:

> "We here take the typical native speaker user in edited and published texts as a criterion for acceptable use, and regard any text that meets this criterion as ''good''. In this way, all L1 texts in the material are good texts by definition. Even though they cannot be held up as ideal models, their typical features can be used as a guide to the working of text in that language" (p. 213).

2.2. Selecting the RA Abstracts

50 RA abstracts (25 RA abstracts from each journal) were selected to represent each discipline. All the RA abstracts were taken from the RAs published in the 2012 to 2013 volumes as regular RAs and they implied the Swales (1990) IMRD (Introduction, Method, Result, Discussion) structure. The particulars of the corpus are as below:

Table-1. Particulars of the RA abstract corpus

	Economics	**Biology**
Number of the RA abstracts	25	25
Number of journals from which the RA abstracts were extracted	1	1
Length of the RA abstracts (range)	101-292	163-216
Total number of words of RA abstracts	5124	6146
Total number of the GS	169	212

2.3. Unit of Analysis

In the current research, only main clauses were analyzed for their GSs. This enables a clear display of the GSs used in the RA abstracts without having to focus on the secondary organization of text (Gosden, 1993). In this concern, It has been argued that main clause's GS makes the major contribution in the method of development of the text. Fries and Francis (1992) and Berry (1989) also indicated that due to the significant role of the main clause in text organization and genre awareness, text analyst primarily focus on the linguistic elements (GS in the current study) of the main clause.

2.4. Analytical Framework

In this study Gosden (1993) and Davies (1988) analytical frameworks were adopted to analyze the types of the GS. The GS types are described and illustrated below:

1. *Real World Entity*: The GSs are typically material entities and objects concerned with the physical world.
2. *Real World Process*: The GSs are actions and procedures executed in or resulting from scientific research activities.
3. Self-mention: The GSs clearly present the author(s) and mostly recognized through the use of 'we', even in the case where there is a single named author.
4. Introducing part of study: The GSs refer to integral, parts or internal entities of a discourse.
5. Citation: The GSs refer to earlier researches by citing the authors' names or community-validated studies.
6. This: The GS is clearly recognized through the use of "this".
7. Empty theme: The GSs postpone research-related entities and events characterized by seemingly formulaic patterns.

2.5. Procedure

First, the selected RA abstracts were traversed to Rich Text format for computer storage. Then, a word count was run on the whole data to determine the corpus size. Next, the gained data were analyzed for the GS types. Then, the frequency and percentage of the GS types were counted and compared across the two sets of RA abstracts. Finally, findings were discussed in the context of the functions embodied in their use. In the discussion section, those theme types which occurred for more than five percent in at least one discipline were discussed for their discourse functions.

3. RESULTS AND DISCUSSION

The data was analyzed for the manifestation of the four grammatical subject domains and the result is presented in Table 2.

Table-2. Frequency and Percentage of the GS types

		Fre. (Per.)	**Fre.(Per.)**
1	Research Related Entity	123 (58%)	55 (33%)
2	Research Related Process	42 (20%)	20 (12%)
3	Self-mention	22 (10%)	32 (19%)
4	Introducing part of study	12 (6%)	46 (27%)
5	Citation	5 (2%)	2 (1%)
6	This	2 (1%)	6 (4%)
7	Empty Theme	6 (3%)	8 (4%)
	Total	212 (100%)	169 (100%)

3.1. Research Related Entity

As it is evident in Table 2, the research related entity GS was the predominant GS in the two sets of the RA abstracts. This predominancy could indicate that the two groups of writers felt the need to introduce and refer to the objects and material entities used in their studies. The results in Table 2 also illustrate that Bio writers dedicated a greater portion of the GSs to realize this GS compared with the Eco writers suggesting that Bio writers favored more to thematize the objects and material entities to describe them more to provide the readers with clearer information in this regards.

The research related entity GS was used to serve different discourse functions in the two sets of RA abstracts. First discourse function was to define the research related entities and objects in the introduction section (example 1). Second discourse function was to elaborate on the features of data, materials and objects (example 2). Third discourse function was state the result related to the research related entities and objects (example 3).

Example 1: *SOEs* are modeled as controlled by the members of the enterprise who determine output and effort levels, while facing output prices and wage rates set by government. (Eco 4)

Example 2: *The newly suggested IV threshold cointegration tests* have standard distributions that do not depend on any stationary covariates. (Eco 12)

Example 3: *Potencies* expressed relative to the candidate standard are therefore affected by the strain of virus used in assays and the use of a standard would therefore not facilitate direct comparison of data from laboratories that have used different challenge strains. (Bio 5)

3.2. Research Related Process

A marked disciplinary difference was noted through the analysis of the two sets of RA abstracts concerning the employment of the research-related process GS. The greater employment of this GS by the Bio writers could be attributed to the experimental nature of this discipline which requires writers to refer to the processes used in carrying out the experiment. It seems that explicit presentation of these processes could explicitly contributes to better interpretation of the experiment.

The result of the data analysis indicated that this GS was used to serve three discourse functions. The first discourse function was indicating the importance of study (example 4). This discourse function was found in both sets of RA abstracts. This employment could suggest that both groups of writers need to ensure the readers among which the journals' editors about the importance of the study to increase the chance of publication.

Example 4: *Modelling of conditional volatilities and correlations across asset returns* is an integral part of portfolio decision making and risk management. (Eco 14)

The second discourse function was to identify, explain, and define the processes adopted in data collection, analysis and measurements (example 5). This discourse function was reported to be found in Eco RA abstracts. According to Lim (2006), writers felt the need to state the processes used to carry out the study. This discourse function could help the readers who want to conduct similar experiment in regards to adopted processes. It seems that such information could directly contribute to the better interpretation of the experiment that helps interpretation of the gained findings and claims.

Example 5: *Three alternative formulations of equilibria in SOE economies* are explored. (Eco 4)

The third discourse function was presenting the research's process from which the findings were emerged (example 6). This discourse function was found in both sets of RA abstracts. This discourse function facilitates the tie between the process and findings which could increase the validity of findings and convince the readers among which are the journal editors about the validity and significance of the emerged findings.

Example 6: *Enumeration of TT-specific IgG antibody-secreting cells by ELISPOT* displayed a significant increase in the magnitude of this population after vaccination. (Bio 10)

3.3. Self-Mention

The difference between the two sets of RA abstracts concerning the use of the self-mention GS is highlighted in Table 2. The greater tendency of the Eco RA abstract writers towards the application of this GS could suggest that they favor to explicitly present themselves in the research. This result might also reveal that Eco writers, at least in this study, prefer to be seen at the "cutting

edge" of their field using self mentions (Berkenkotter and Huckin, 1995). It seems that Eco writers prefer to have a more interactional RA abstracts compared to their counterparts in Bio. The less attention of the Bio writers to include this GS could suggest the objective nature of the Bio RA abstracts and also that the Bio writers preference to force the readers to infer the authority behind the presented arguments and claims.

Data analysis illustrates that the self-mention GS was used to serve different discourse functions in the different rhetorical sections of the analyzed RA abstract. In the introduction section, both groups of writers used this GS to state the goal of their study (example 7). This employment, besides clarifying the goal of study explicitly, could "align writers with their main position, giving a strong indication of where they stand in relation to the issue under discussion" (Hyland, 2003). In addition, this GS was used to highlight the contribution of the study to the existing literature in the Eco RA abstracts (example 8).

Example 7: *We* present the results of a collaborative study for the characterization of a preparation of diphtheria toxoid adsorbed, and its calibration in terms of the 3rd International Standard (IS) for Diphtheria Toxoid Adsorbed. (Bio 11)

Example 8: In this paper, *we* propose new threshold co integration tests based on instrumental variables estimation. (Eco 4)

In the method section, this GS was used to describe the processes and procedures of the study by both groups of writers (example 9). This employment could be discussed on the ground that both groups of writers felt the need to explicitly describe the process or the procedures of the study in an explicit way. Lim (2006) indicated that the use of self-mention in such a way could "further the objective of vigorous, direct, clear and concise communication". The use of the self-mention to serve this discourse function was common in both sets of RA abstracts.

Example 9: <u>*We*</u> use four conventionally accepted proxies for financial development, namely money supply (M2), liquid liabilities (M3), domestic bank credit to the private sector and total domestic credit provided by the banking sector (all percent of GDP). (Eco 8)

In the result and discussion sections, the self mention GS was used to serve two discourse functions, which were common in both sets of RA abstracts. The first was to show the ownership status concerning the findings and claims (example 10). The use of this GS in this manner could reflect the writers' preference to take the responsibility for the findings and claims and to convince readers, in the related disciplinary community, that they are competent members. According to Karahan (2013), this use illustrates "the highest degree of author presence" and the authors' confidence in stating the findings and making claims (P. 318). The second discourse function was used to show the writers' ability to conclude their study (example 11). This could show the writers ability to clearly present the readers with the contribution of the study.

Example 10: To validate the potential of this approach, we monitored the *in vitro*-generated tetanus (TT)-specific antibody levels in a cohort of donors before and after receiving tetanus vaccination. (Bio 10)

Example 11: We conclude that the theoretical risks arising from manufacturing seasonal influenza vaccine using MDCK-33016PF cells are reduced to levels that are effectively zero by the multiple, orthogonal processes used during production.(Bio 12)

3.4. Introducing Part of Study

A marked disciplinary difference in relation to the use of the introducing part of the study GS across the two sets of RA abstracts could be noticed from the result presented in Table 2. The greater use of this GS by the Eco RA abstract writers could imply the Eco writers' favor of being less visible. This manner of writing makes the Eco RA abstracts to have a less interactional. In addition, this result could reflect that the Eco writers prefer to focus on the research rather than the researcher.

The introducing part of study GS was used to serve four discourse functions. The first discourse function which was common in both sets of RA abstracts was introducing aim of the study (example 12). This could suggest the writers intend to take the reader's attention explicitly to the aim of the study. The second discourse function was stating the research's findings and claims (example 13). The use of this GS in this manner is not surprising as the researchers could let themselves free from taking the responsibility and leaving the responsibility for what has been found and claimed to the data analysis. Furthermore, it could increase the validity and objectivity of the reported findings and claims. The third discourse function was to state the implication of the study (example 14). This use could suggest the writers' intention to explicitly state the implication of their study to convince the journal editors to publish their RA. This discourse function was found in the Eco RA abstracts only.

Example 12: *This study* tests the Saving-Investment correlations in India using both single-equation and system estimators. (Eco 3)

Example 13: *Results* suggest that the replacement standard is suitable for use as the reference vaccine in serological assays and that the Vero cell assay may be suitable for calibration of future replacement standards. (Bio 11)

Example 14: *The implication* we draw from our analyses is that to evaluate policy initiatives, such as trade liberalization, in developing and transition economies without explicitly recognizing the role that SOEs can play may be misleading. (Eco 4)

4. CONCLUSION AND IMPLICATIONS

This research intended to find out the realization and discourse functions of the GSs in the RA abstracts from two disciplines namely Economics and Biology. It also intended to add to the earlier claims that academic writing is shaped by the disciplinary background (Lovejoy, 1991; Hyland, 1998; 2008; 2009; North, 2005).

In this research, findings illustrated disciplinary differences in the use of the GS types and their discourse functions in two sets of the RA abstracts. These differences were clear in use of research related entity, research related event, introducing part of study and self-mention GSs. This could

suggest the importance of the GS as a textual device which lies in close relation with the public aims, norms and conventions of specific discourse communities and as well the contexts in which it is realized.

This research contributes to the existing literature by increasing the knowledge of RA abstracts writers and readers in general and those from the disciplines in focus in particular concerning how GS is applied to serve different discourse functions. In addition, findings reported in this research could increase writers' awareness concerning disciplinary difference as an important aspect which helps in understanding the 'culture' of writing and getting familiar with the conventions and expectations of a particular disciplinary community.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

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