https://doi.org/10.37708/ezs.swu.bg.v24i1.10

METAPHOR IMPACT ON RHETORICAL STRUCTURE: A COMPARATIVE STUDY OF BULGARIAN AND INTERNATIONAL RESEARCH MEDICAL ARTICLE INTRODUCTIONS IN THE ENGLISH LANGUAGE

Ivaylo Dagnev

Medical University – Plovdiv, Bulgaria
E-mail: ivaylo.dagnev@mu-plovdiv.bg

ORCID ID: 0000-0002-8287-5307

ABSTRACT: The current study aims to analyze research medical article introductions and the role metaphors play in them in a cross-cultural comparative setting. For that purpose, two corpora were selected - the first one being a selection of Bulgarian research medical article introductions and the second a respective set of international article introductions. All article were published in high impact factor journals. The study exploits Swales' model of rhetorical genre analysis to achieve its main purpose – an in-depth investigation of metaphor typology and its role in rhetorical move structure in two different discourse settings. To that end, the research is based also on Lakoff & Johnsons' division of conceptual metaphors into ontological, structural and orientational ones. The findings of the study illuminate some common traits to both sets of excerpted article introductions – Bulgarian and international. However, some notable differences were also found, mostly having its roots in the differences of the move structure in the respective article introductions, and also related to the different approaches which the specific cultural constraints have imposed. The study is all the more relevant, as it analyzes Bulgarian articles originally published in the Bulgarian language and translated into English. In this way some significant discrepancies in rhetorical structure and metaphor typology are more visible. The paper may be considered as an attempt to further develop the field of English for academic purposes.

KEYWORDS: medical research article, rhetorical moves, conceptual metaphor typology, Bulgarian, English

I. INTRODUCTION

1. Rhetorical Structure

Genre Analysis through rhetorical move analysis was first introduced by Swales (1981) to examine the organizational patterns of research articles. Its primary aim is to elucidate the communicative intent of a text by classifying various discourse units based on their rhetorical functions. Swales introduced the concept of "move", which he defined as a segment of text that serves a particular communicative role, with each move contributing to the overall purpose of the genre (Swales, 1990, p. 141). Swales' foundational work focused primarily on the academic article introductions, where he identified consistent patterns of moves

arranged in a specific sequence. This led to the development of the Creating a Research Space Model (CARS), which has significantly impacted research and instruction in English for Academic Purposes (Swales & Feak, 2004).

On the other hand, research writing aimed at international publication has emerged as a critical concern for scholars across various disciplines over the last three decades (Flowerdew, 2005; Kanoksilapatham, 2005; Swales, 1990; Swales & Feak, 2004). The publication of research articles (RAs) is essential for doctoral completion and academic advancement, compelling researchers to write in English and submit their findings to journals for recognition within the academic community. For this purpose, Swales' CARS model has been widely adopted in scientific writing and has attracted a lot of attention in studies analyzing the structure of research articles and most notably of the Introduction section in various scientific fields, assessing the latter applicability and effectiveness (Posteguillo, 1999; Kanoksilapatham, 2005).

The CARS model posits that writers adhere to a common organizational framework when addressing two primary challenges, referred to as "competitions," in establishing their presence within a specific research domain (Swales & Feak, 2004). These challenges include first the competition to carve out a rhetorical space and second to draw readers into that space. To navigate these challenges effectively, the model outlines three key "moves", each accompanied by distinct steps that guide the creation of a compelling introduction for a research paper. These moves and their corresponding steps serve as a valuable template for crafting research papers introductions. The moves include first establishing a territory, which starts by highlighting the importance, relevance, or critical nature of a specific research area, thereby justifying the need for further exploration. The second move is about establishing a research niche, or in other words, it involves articulating a compelling argument that underscores the significance and value of one's specific research area. This can be achieved by identifying a notable gap in existing literature, questioning widely accepted beliefs, proposing a new hypothesis or need, or by building upon and expanding previous knowledge. The concluding move involves expressing how one's research will provide new insights or knowledge that distinguishes it from existing studies on the subject. This section also outlines the overall structure of the paper, guiding the reader through the organization of the arguments and findings.

2. Conceptual metaphor and the language of medical research articles

A metaphor can be defined as a mapping between different conceptual domains, as described by Lakoff (1993, p. 203). This involves a set of ontological correspondences where the implications derived from the Source Domain (SD) serve as a framework for understanding the conceptual relationships within the Target Domain (TD). Metaphorical expressions represent the tangible manifestation of connections between different conceptual domains. The analysis of medical discourse has largely overlooked the role of conceptual metaphorical mappings. Research by Lakoff and Johnson (1980) and Lakoff (1993) has

demonstrated that metaphors can shape specific interpretations and that metaphorical frameworks contribute to the coherence of abstract concepts. The role of metaphorical language is profound as it creates mental models through which readers can understand complex information, effectively rendering otherwise abstract health concepts more relatable. In addition to enhancing clarity and engagement, metaphors fundamentally mold the distinct identities of disciplines themselves. Furthermore, the comparative aspects of metaphor usage in different academic settings illustrate varying cultural conceptualizations of health.

Metaphorical mappings can be categorized into three main types, each serving to clarify complex concepts (Lakoff & Johnson, 1980). *Structural metaphorical mappings* relate one intricate domain to another, creating inference patterns and implications that facilitate a coherent understanding of the TD. *Ontological metaphorical mappings* transform abstract notions—such as activities, emotions, or ideas—into tangible entities like objects or people, exemplified by the metaphor "Ideas are objects." Lastly, *orientational metaphorical mappings* assign spatial orientations to abstract ideas, as seen in expressions like: "Happy is up" and "Sad is down," thereby establishing a conceptual framework based on spatial relationships. These mappings are grounded in our perceptions and experiences of movement and space, enriching our comprehension of abstract concepts.

It is of paramount importance to state that conceptual metaphors significantly impact rhetorical moves in research articles, providing persuasive frameworks that enhance understanding and facilitate argumentation. In particular, metaphors act as cognitive tools that transcend mere linguistic ornamentation, influencing how readers comprehend complex arguments to strengthen their claims in certain moves in the IMRD structure. Thus, the utilization of conceptual metaphors in the introductions of research articles significantly influences how readers perceive and engage with the presented material. This impact arises from the cognitive functions of metaphorical language, which shapes understanding and frames discourse through established conceptual mappings.

3. Literature review

3.1. Corpus studies and the place of rhetorical moves in previous research

Since the early 1980s, following the foundational work of Swales (1990), numerous scholars in the realm of academic discourse have focused on the structure of research articles (RAs), particularly their rhetorical aspects. However, many have concentrated on specific components of the IMRD (Introduction, Methods, Results, Discussion) framework. The Introduction section, for example, has been extensively examined by researchers such as I. Ozturk (2007) and E. Sheldon (2011). Within the more specialized domain of medical research articles (MRAs), significant studies on the IMRD structure include those by Skelton

(1994), Nwogu (1997), Fryer (2012), Davis (2015), Doykova (2018). Skelton was the first to employ a corpus-driven approach to analyze the overall IMRD structure of MRAs, while Nwogu focused on articles from prestigious journals like the Lancet and the New England Journal of Medicine, establishing clear criteria for the essential elements of MRAs. Fryer integrated Halliday's systemic functional linguistics (Eggins, 2004) with Swales' genre analysis in his master's thesis, which examined 16 articles on obesity utilizing Martin and Rose's theory of theme and hypertheme (Martin & Rose, 2003) to analyze rhetorical moves. Davis (2015) provided an in-depth examination of MRA, using a substantial corpus of 250 articles totaling over one million words. The standout feature of his research lies in the exploration of discourse markers and reporting verbs. All of the abovementioned studies align with and build on Swales' CARS model (Swales & Feak, 2004). Table 1 presents the rhetorical moves according to the above mentioned researchers.

Table 1. Rhetorical moves in the Introduction section of MRA in five studies

Move	Skelton (1994)	Nwogu (1997)	Fryer (2012)	Davies (2015)	Doykova (2018)
1	Assert importance of the field of study	Present background information	Present study background	Study situation	Present background situation
2	Discuss previous literature	Review related research	Identify gap(s) in existing research	Describe the problem	Description of topic
3	Identify gap in the literature	Present new research	Statement of research purpose	Way to the solution	Description of solution
4	Aim of research				

The variations in the identification and classification of rhetorical moves can largely be attributed to the distinct corpora analyzed by different authors. Davis (2015) identifies five key factors that account for the discrepancies in the findings of the aforementioned researchers: *time, field, size, subjectivity*, and the presence of *anomalies* (outliers). The timing of publication plays a crucial role, reflecting the evolving nature of the genre, while although significant the size of the study is less relevant since all articles pertain to medicine. Subjectivity remains an unavoidable factor, and anomalies often arise when a particular move identified in one section by an author appears in a different section by another. These anomalies frequently depend on the unique requirements of the journals and the specificities of the field.

3.2. Metaphor in medicine

Research on the use of metaphor in medical discourse highlights its significant role in reflecting the disciplinary values inherent in academic medicine. Various studies indicate that the prevalence of metaphorical language, such as war, sports, and the body-as-machine, shapes the understanding of medical concepts and processes (Giannoni, 2009). Semino (2008, 2011) further examines how specific metaphors vary across different genres, adapting to serve distinct communicative and conceptual purposes. Her qualitative analyses reveal that metaphorical expressions in medical discourse are tailored to fit the social context of their use. Additionally, Potts and Semino (2019) investigate the metaphorical representation of cancer in contemporary English, uncovering prevailing perceptions of the disease and its implications. Ho (2019) contributes to this discourse by analyzing how cancer metaphors in advertising portray patients as warriors, emphasizing the cultural narratives surrounding illness. Salager-Meyer (1994) conducted a cross-linguistic analysis of medical metaphors, laying the groundwork for subsequent research in this area. More recently, Gibbs and Franks (2002) have explored the challenges associated with identifying metaphors in doctor-patient conversations regarding cancer, highlighting the complexities involved in medical communication.

The most significant conceptual metaphor in the realm of human health is undoubtedly TREATMENT IS WAR. This overarching category, known as War Metaphors, encompasses various expressions such as DISEASE IS THE ENEMY, PHYSICIAN IS A WARRIOR CAPTAIN, and PATIENT IS A BATTLEGROUND (Napolitano, 2019, p. 2; Navarro i Ferrando, 2021). While it is acknowledged that military terminology frequently permeates discussions of health and disease (Pearce et al, 2023), this dichotomy is central to one of the foundational orientational metaphors in Medicine: HEALTH IS UP, ILLNESS IS DOWN. This metaphor illustrates that being “up” correlates with the upright posture of a healthy person, whereas “down” signifies a stooped or recumbent position associated with illness (Karska and Prazmo, 2017, p. 109). Ontological metaphors, which are grounded in our physical experiences, inform these conceptualizations, with BODY IS MACHINE serving as a prominent example. This metaphor extends to ideas such as HEART IS PUMP, and contemporary scholars often refer to these as Engineering metaphors, which include expressions like DISEASE IS MALFUNCTION, PHYSICIAN IS AN ENGINEER OR TECHNICIAN, and PATIENT IS A MACHINE (Coulehan, 2003, p. 92).

There is however no studies analyzing the interface between rhetorical structure and conceptual metaphor typology of MRA. That is why this paper aims at filling this gap in relation to MRA Introduction section.

II. METHODS

3.3. Sample design

The research utilizes two corpora both comprising sixteen article Introductions each. The first corpus, dubbed Bulgarian journal corpus (BJC), is

built of articles published in Bulgarian medical journals, written in Bulgarian and translated into English, by professional translators, while the second corpus, dubbed International journal corpus (IJC), consists of International high impact factor, open access article introductions. The total number of words constituting BJC is 6591, averaging 412 per article Introduction, while IJC word count is 6278 with 392 words per article Introduction. All Bulgarian articles were published in official medical journals representing the respective medical fields taken from a broad variety of areas – orthodontics, surgery, pharmacy, neurology, ICU, anesthesiology, orthopedics, thoracic medicine, neurosonology, nephrology, pathology, infectious diseases, neonatology, occupational medicine, rheumatology. The same approach refers to the collection of articles constituting the IJC. It has to be borne in mind that most articles in both corpora amalgamate several medical fields as medicine has been increasing growing into a highly interdisciplinary science. Both corpora were compiled after a consultation with several specialists in different fields of medicine. The excerpted article introduction files were converted into txt files for more efficient processing. All citations, figures and other non-essential text materials were stripped off. In terms of metaphor identification, both corpora were analyzed by means of a text analyzer (both Wordsmith 6.0 and Antconc 4.3.1.) to find and classify the present metaphors. All word clusters (collocations and colligations) were checked for potential figurative meaning using a monolingual dictionary (https://dictionary.cambridge.org/). Additionally, all nouns were scrutinized for metaphorical usage.

3.4. Identifying rhetorical structure

The present research takes into account the abovementioned previous studies of rhetorical move structure in the field of medicine by Skelton (1994), Nwogu (1997), Fryer (2012), Davis (2015) and Doykova (2018). The differences in the number and definition of rhetorical moves identified in these studies were most likely a consequence of the different corpora the authors dealt with. In this respect Davis's (2015) and Doykova's (2018) studies are the most relevant because of the fact that they work with large corpora and the statistical error in their analyses is probably the smallest. Skelton (1994) first attempted to define the boundaries between conventional (obligatory) and unconventional (optional) moves, assuming the frequency as the relevant criterion – in his study, he accepted this boundary to be 65%, while for Nwogu it is 50%. In the present study we will accept a rhetorical move as conventional if it occurs in at least 60% of the articles in the corpora.

The current research draws from these previous studies, but performs a thorough analysis of rhetorical moves in both corpora in the light of the fact that each separate study is dependent on its specific corpora that may yield slightly different results in terms of rhetorical structure.

3.5. Metaphor identification

Perhaps the clearest and most accurate procedure of metaphor identification was proposed by the Pragglejaz group (Pragglejaz, 2007) known as the Metaphorical Identification Process (MIP), which was further developed by Steen et al. (2010) and upgraded later into Metaphor Identification Procedure Vrije Universiteit (MIPVU). The procedure aims to determine for each lexical unit in the discourse whether its use in a certain context can be described as metaphorical. Furthermore, it is stated that the procedure employs a maximalist rather than a minimalist approach, whereby a large number of words could be considered metaphors, taking into account their use in a certain context.

In their essence both MIP and MIPVU are relatively simple procedures relying on the juxtaposition between (what is considered) literal and figurative use in view of Conceptual Metaphor Theory. This research has also adopted Steen's maximalist view on metaphor identification (Steen et al, 2010), which is reflected in MIPVU procedure.

Both procedures state that in identifying a metaphor, i.e., in determining the basic meaning of lexical units as well as in determining the lexical units themselves, it is necessary to consult monolingual dictionaries.

3.6. Metaphor typology identification

This paper focuses on a specific aspect of conceptual metaphor analysis, highlighting the linguistic dimensions of metaphor usage while clarifying the levels of metaphoric schematicity and complexity as outlined in Kimmel's classification (Kimmel, 2002, p. 45-61). The analysis draws on Lakoff and Johnson's (1980) framework, which categorizes metaphors into ontological, orientational, and structural types. While this classification is not exhaustive, it is widely accepted and indicates varying degrees of schematicity among metaphors. Ontological and orientational metaphors typically involve straightforward imagery, whereas structural metaphors necessitate more intricate and layered mappings. Additionally, the study incorporates Kövecses's distinction between simple and complex metaphors (Kövecses, 2010), which is informed by Grady's (1997) classification of metaphors into primary and compound forms. Simple metaphors can contribute to the construction of complex metaphors, as each simple metaphor encapsulates a broader concept. Consequently, multiple metaphors or a sequence of metaphors and metonymies can converge to create a complex conceptual blend, which can be expressed linguistically as a composite (Kimmel, 2002, p. 58).

3.7. Statistical significance

The study is statistically significant. Pearson's $\chi 2$ test of independence has shown that there is a statistically significant association between the two variables of metaphor and sub-register ($p < 0.05$), which means that the null hypothesis of independence can be rejected.

III. RESULTS

3.8. Rhetorical structure of the studied corpora

Table 2 presents the identified rhetorical structure of the article Introductions from both corpora.

Table 2. Rhetorical moves of the Introductions from both corpora with related percentage from the whole introductory text for each move

Corpus - Move/ Steps	Bulgarian Journals Corpus (BJC) -	International Journals Corpus (IJC)
Move 1.	Introduction of general topic (GT) – 30% of all text in the BJC article Introductions • Step 1. Importance of GT • Step 2. Short reference to previous studies / Argumentation	Introduction of general topic (GT) – 24% of all text in the IJC article Introductions • Step 1. Description of problem with GT (disease/method/treatment) • Step 2. Narrowing down to a specific topic in conjunction with GT
Move 2	Problem with GT – 21% of all text in the BJC article Introductions • Step 1. Limitations of used methods/treatments/procedures • Step 2. Argumentation/reference to previous studies	Problem with ST – 33 % of all text in the IJC article Introductions • Step 1. Description of problem • Step 2. Argumentation/reference to previous studies
Move 3 30	Narrowing down to a specific topic (ST) – 35% of all text in the BJC article Introductions • Step 1. Reference to new method/procedure/treatment • Step 2. Argumentation/reference to previous studies	Discovering a specific research gap – 31% of all text in the IJC article Introductions • Step 1. Description • Step 2. Argumentation/reference to previous studies
Move 4	Aim of research – 14% of all text in the BJC article Introductions • Step 1. Analysis of new method/procedure/treatment • Step 2. Argumentation in favour of the above	Aim of research - 12% of all text in the IJC article Introductions ➢ Step 1. Solution to the specific gap problem

It must be stated in relation to the identified rhetorical structure presented in Table 2 that the introduction sections of the BJC articles are far less uniform than the ones from the IJC articles. Nevertheless, the presented move/step structure is present in 63% (10 out of 16) article introductions and can be considered conventional. Greater variations occur mostly at the level of steps and not moves, which is reflected in the presented structure in Table 2. As far as the rhetorical structure of the introduction sections from the articles in the IJC, they are far more coherent with 81 % (13 out of 16) article introductions following the presented structural pattern, both move-and-stepwise.

Although Move 1 in both corpora relates to the introduction of the general topic, the way this move is interpreted in terms of rhetorical structure differs significantly. In BJC this introduction is lengthier (in terms of linguistic representation – from three to eight sentences – 30% of all the text in the Introduction sections in BJC) and includes in most cases either a reference to previous studies or an extended argumentation about the general topic importance, or both. Move 1 in IJC is shorter than the respective one in BJC (normally two to four sentences – 24% of all the text in the Introduction sections in IJC) and is more coherent content-wise – it normally starts with a problem presented by the seriousness of a disease and then proceeds with narrowing the topic down to a more specific aspect of the diseases.

The rhetorical structure of the next moves differs accordingly, as Move 2 in BJC is a continuation of the previous move and is more connected with the general topic, while the same move from JJC deals with the narrow focus introduced in Move 1. Move 3 in BJC article introductions focuses on a more pertinent to the specific focus of the article aspect, while the same move in IJC highlights the possible research gap which could be filled by the respective study. Move 4 in the introductions in both corpora is occupied by the aim of the study - the narrow focus the research pursues. What is noteworthy is that this move is realized in two steps in BJC article Introductions, while in the respective ones in IJC it is presented mostly in a single sentence. That could be accounted for by the fact that the research gap structural move is not so clearly pronounced (at least linguistically speaking) in the articles from the BJC. The research gap move is inextricably linked to the expression of some criticism related to former studies, which could be observed in the articles from IJC, while it is almost non-existent in the ones from BJC.

3.9. General quantitative outline of metaphor typology in the studied corpora

Table 3 and Table 4 present the identified metaphors in the two corpora. Figure 1 gives the word-to-metaphor ratio in the two corpora by move.

Table 3. Identified metaphor typology in the Bulgarian Journals Corpus

Bulgarian Journals Corpus				
Move No // Type/Token	ONTOLOGICAL	STRUCTURAL	ORIENTATIONAL	By Move
Move 1	342	88	14	444
Move 2	245	98	33	376
Move 3	384	122	42	548
Move 4	204	41	6	251
TOTAL	1175	349	95	1619

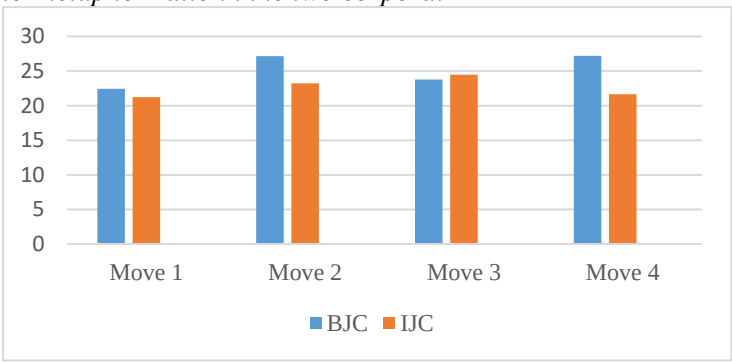
Table 4. Identified metaphor typology in the International Journals Corpus

International Journals Corpus				
Move No // Type/Token	ONTOLOGICAL	STRUCTURAL	ORIENTATIONAL	By Move
Move 1	194	120	6	320
Move 2	316	153	12	481
Move 3	305	161	10	476
Move 4	112	46	5	163
TOTAL	927	480	33	1440

In terms of numerical values, the linguistic expressions of conceptual metaphors (lexical items) constitute ≈ 24,56% of all words in the Introduction sections of the articles from BJC and ≈ 22,93% of the respective introduction sections of the articles from IJC. This slightly higher percentage of word-to-metaphor ratio in the articles from BJC may be explained by the greater presence of lexical items denoting technical terms some of which can be viewed as ontological metaphors conceptualized as entities.

As can be seen from both tables, the number of ontological metaphors in BJC is greater than the respective one in JIC, while the vice versa is true in relation to the number of structural metaphors. Both tables show negligible numbers regarding orientational metaphors. Figure 1 illustrates the word-to-metaphor ratio in the four moves of both corpora. The values associated with the BJC are higher in all moves except for Move 3, which is connected with establishing a research gap in the articles from the IJC. Move 3 in the Introduction sections of the articles from BJC also lays its focus presenting the main purpose of the respective study, but is less concerned with pointing out a specific unchartered territory.

Figure 1. Approximate rhetorical move values in percentage of the word-to-metaphor ratio in the two corpora.



4. Move analysis of metaphor typology in the two corpora

Move 1 in both corpora typically adheres to the structure of the introductory section of an argumentative essay, which is fitting since every article fundamentally presents an argument that supports a specific claim. The language used in the selected introductory sections and especially in the opening moves (Move 1 and Move 2) aims to transition seamlessly from discussing the broader

topic to identifying the specific problematic area that defines the research niche to be explored. As far as Move 1 is concerned, this is achieved in two steps – Step 1 (Move 1) introduces the general topic, which may refer to a disease, method, treatment technique etc. There is a slight difference in Step 1 between the introductions in the two corpora; while most introductions from BJC highlight the importance of the general topic, those from IJC either directly pinpoint a problem with the former, or define a disorder. Step 2 differs significantly in the two corpora. In BJC, it most frequently refers to a short literature review associated with the general topic, while in IJC introductions Step 2 directly proceeds with the narrowing the general topic down to a more specific point, directly related to the research gap. This difference in the rhetorical structure though is to some extent reflected in the conceptual metaphor typology and organisation, although the predominant types of metaphor are similar.

Example 1 – Move 1, Step 1

- "Ischemic stroke is one of the most frequent causes of death and functional impairment worldwide,[1]…" - a token of generic level metaphor/ BJC (2)[2]
- "Multiple system atrophy (MSA) is a progressive neurodegenerative disorder that encompasses three syndromes…" – generic is specific type of metaphor/ IJC (1)

Generic level metaphors are the most frequently observed ones in Move 1 in both corpora, as the latter deal with defining concepts. Other than that, there are some notable dissimilarities between the two corpora in terms of metaphor typology. In BJC, the most prevalent structural metaphors are: SUBSTANCE/CONTAINER IS CHANNEL OF PROCESS, SUBSTANCE CAUSES CHANGE, DISEASE IS AN IMPAIRMENT, etc.; while in IJC they are: DISEASE IS THE ENEMY, IMPROVEMENT IS GROWTH, DISEASE IS MALFUNCTION. The last item is an instantiation of the more general metaphor BODY IS A MACHINE.

Example 2 - Move 1, Steps 1 and 2

- "Gingival crevicular fluid (GCF) is the medium in which changes in the profile…", SUBSTANCE IS CHANNEL OF PROCESS, BJC(1)
- "In ophthalmologic literature macular edema (ME) is considered one of the leading causes of impaired vision…", DISEASE IS AN IMPAIRMENT, BJC(7)
- "Stroke is nowadays one of the major global health problems, comprising 75.2% of deaths and 81.0% of stroke-related disability…", DISEASE IS MALFUNCTION, IJC (2)

[1] Some of the examples may not be cited in full, for the sake of conciseness.
[2] The number in parentheses indicates the number of the article from the respective corpus as presented in the appendices.

- With improvements in anesthetics and later antibiotic treatment…,a further development came with the introduction of laparoscopic appendectomy (LA)…", IMPROVEMENT IS GROWTH,CONTROL IS MOVEING TO A LOCATION, IJC (3)

What seems a noteworthy difference between the two corpora is evident in the numerical values of schematic level metaphors. Move 1 in BJC abounds in ontological metaphors, while although shorter, Move 1 in IJC has a greater number of structural metaphors. The identified orientational metaphors are also more in number in BJC. This can be accounted for by the more technical subject matter of Move 1 of the BJC article introductions, which necessitates a greater usage of generic level metaphors underlying more expert like definitions in the form of *entity*^{1} *is entity*^{2}.

Move 2 may seem similar in the article introductions in the two corpora in terms of the interpersonal and textual metafunctions (Halliday, 1994), as both discuss a problem but as far as rhetorical organisation and metaphor typology, exhibits some notable differences. The article introductions from BJC mostly discuss new burgeoning methods/techniques/substance related the general topic discussed in Move 1, while those from the IJC focus more on the shortcomings of the presented broad concepts mentioned earlier.

Example 3 - Move 2

Step 1

- "Although they are mostly successful in a technical aspect, the success rate of such a surgery even with a venous graft is still rather low,…The reasons for the low rate of success are not quite clear…", LACK OF KNOWLEDGE IS FAILURE/ DARKNESS, DOWN IS WEAK, BJC (2)
- "In the last two decades, indications for the application of this type endo-prosthesis have greatly expanded…" GROWTH IS STRENGTH, BJC (4)
- "The first paper to present a benefit of LA… but there has been no consensus in this debate ever since…", LACK OF AGREEMENT IS LACK OF KNOWLEDGE, IJC (3)

Step 2

- "There has been an increasing number of studies the past decade that address the issue of developing and applying ever more effective drug release systems…" SEEING IS UNDERSTANDING, IMPROVEMENT IS GROWTH, UP IS BETTER, BJC (3)
- "Therefore, a reliable and precise etiologic classification of this disease is highly important for both daily clinical practice and research purposes…" STABILITY IS UP, IJC (2)
- "Clinicians now also have access to standardized, validated tools for rating disease severity…", TOUCH IS CONTROL, IJC (7)

Although not as frequently used as the ones in the above examples, other notable structural metaphors in this move in the BJC article introduction are IMPROVEMENT IS MOVING INTO A CONTAINER, SUBSTANCE CAUSES PROBLEMS, PROCESS IS A CONTAINER etc. In the other corpus, worthy of mention are structural metaphors such as: DISEASE IS MALFUNCTION, PHYSICIAN IS AN ENGINEER OR TECHNICIAN, STRONG IS STABLE etc. Move 2 in the article introductions from the IJC is lengthier than the respective move in the other corpus, that is why the total number of metaphors in the former is greater, but in relative share (see Fig. 1) the percentage of metaphors in the latter is greater. Yet, structural metaphors in Move 2 in the article introductions from IJC outnumber the respective count in BJC in percentage.

Move 3 is, in essence, about creating a research space in both corpora. The rhetorical structures of the article introductions is also very similar with the only difference of note being the more critical tone of the IJC articles introductions. The most frequently used conceptual metaphors in Move 3 in BJC article introductions are SUBSTANCE/METHOD/PROCEDURE LEADS TO IMPROVEMENT, SUBSTANCE FIGHTS/CURES DISEASE/DISORDER/SYMPTOM, STRENGTH IS UP, NEW METHOD IS ADVANCEMENT OVER OLD METHOD etc. In the respective move in IJC article introductions the prevalent ones are: NOT SEEING LEADS TO LACK OF UNDERSTANDING, CAUSATION IS CONTROL, KNOWLEDGE IS LOOKING INTO A CONTAINER, SUBSTANCES ARE CONTAINERS, etc.

Example 4. Move 3

- “Statins have been reported to be effective in Parkinson’s disease. … Learning ability and memory have been found to improve after treatment with statins…” SUBSTANCE LEADS TO IMPROVEMENT, BJC (8)
- “However, the mechanisms of their action are different, it remains unclear whether the combination has a synergistic effect.” NOT SEEING LEADS TO LACK OF UNDERSTANDING, IJC(10)
- “To our knowledge, there is no other study that investigates the effects of nebivolol that causes an increase in NO levels in vascular endothelium, on liver regeneration.” KNOWLEDGE IS LOOKING INTO A CONTAINER, IJC (4)
- “Based on the multifactorial causes of POAF, different classes of drugs have been used for prophylaxis. They include …” SUBSTANCES ARE CONTAINERS, IJC (6)

The move is not analyzed in steps, as there is no great difference in terms of metaphor typology related to the two steps that constitute the move. The number of generic level metaphors is greater in the excerpted article introductions from BJC than the one from IJC, while as regards structural metaphors, IJC article introductions are also more numerous. Interestingly, orientational metaphors in

BJC article introductions are more than four times as numerous as the respective ones in IJC in this move, which can be a reflection of the more comparative characteristics of the Bulgarian journals article introductions related to this move.

Move 4 is about the aim/purpose of the respective study in both corpora. The texts from the Bulgarian journals article introductions related to this move are more voluminous than the ones from IJC and the number of ontological metaphor in BJC underlying generic level metaphors is almost double that of the ones from IJC. Some of the most frequently used structural metaphors are: PROCESS IS CHANGE IN A CONTAINER, KNOWLEDGE IS LOOKING INTO A CONTAINER, CREATING IS MOVING TO A LOCATION, JUDGEMENT IS KNOWLEDGE in BJC, while in IJC they are: KNOWLEDGE IS LOOKING INTO A CONTAINER, LIGHT IS UNDERSTANDING, etc.

Example 5. Move 4

- "The aim of this study was to investigate how learning and memory are affected…", KNOWLEDGE IS LOOKING INTO A CONTAINER, BJC (8)
- "The aim of this study is to evaluate the effectiveness of the non-surgical treatment…" JUDGEMENT IS KNOWLEDGE, BJC (6)
- "This study was designed to investigate the effect of the pre-administration of parecoxib sodium combined with..." KNOWLEDGE IS LOOKING INTO A CONTAINER, IJC (10)
- "This paper will also highlight some of the institutional constraints…" LIGHT IS UNDERSTANDING, IJC (7)

Although it is difficult to enumerate the most frequently used lexical items in all the moves, Move 4 is one exception as its aim is the narrowest, which leads to some uniformity in lexical representation in both corpora. Thus, the most widely observed surface representations of conceptual metaphors in Move 4 are the verbs *investigate*, *examine*, *evaluate*, *highlight* etc.

IV. DISCUSSION

As noted above, the rhetorical structure of BJC article introductions is more diverse and inconsistent, which may be a consequence of lack rigorously imposed standards in journals across the medical fields in the Bulgarian medical research area. This fact along with other factors, such as translation fallacies (the belief that the best translation of scientific texts is the literal one), the greater emphasis on technical language etc, contribute to some notable differences in the number and type of conceptual metaphors identified in the two corpora. The comparative analysis of rhetorical move structures and metaphor typologies between the Bulgarian Journals Corpus (BJC) and the International Journals Corpus (IJC) reveals nuanced insights into how cultural and linguistic contexts shape academic discourse.

First, in terms of cultural Influence on rhetorical uniformity The greater structural coherence in IJC introductions suggests adherence to internationally accepted academic norms, likely influenced by rigorous editorial standards and peer review processes. In contrast, the variability in BJC introductions may reflect localized academic traditions and translation effects, where rhetorical conventions are less standardized or influenced by literal translation practices.

Second, as far as metaphor density and technical lexicon are concerned, the higher metaphor density in BJC, particularly ontological metaphors, may stem from the technical nature of translated texts. These metaphors often serve to reify abstract medical concepts, making them more tangible for readers. On the other hand, IJC articles, while more concise, favour structural metaphors that align with broader conceptual frameworks (e.g., DISEASE IS MALFUNCTION), suggesting a more metaphorically strategic approach to framing research problems.

Third, metaphors embedded within rhetorical moves serve as strategic cognitive instruments that shape the persuasive trajectory of research article introductions. Rather than merely decorating language, they function as conceptual scaffolds that guide readers through the argumentative progression—from establishing relevance to articulating research gaps and aims. Their distribution across moves reflects not only disciplinary conventions but also the writer's intent to frame complexity, assert novelty, and evoke engagement, revealing how metaphorical choices subtly reinforce the communicative goals of each rhetorical stage.

V. CONCLUSION

Although statistically significant, this study is by no means exhaustive, and its findings may diverge from those of similar research, as noted earlier (see 3.1). Nevertheless, to the best of our knowledge, it represents the first attempt to explore the intersection of rhetorical move structure and metaphor typology within a cross-cultural framework in the field of medical research writing.

The results highlight the critical role of genre awareness and metaphorical literacy in academic writing instruction. For non-native English writers—particularly those navigating the transition from local to international publication standards—understanding how metaphors operate within rhetorical moves can significantly enhance textual clarity, argumentative strength, and adherence to genre conventions. This insight is especially valuable in English for Academic Purposes (EAP) and English for Specific Purposes (ESP) contexts, where metaphor analysis can serve as a powerful tool for bridging linguistic form with communicative intent.

Looking ahead, future research could expand the scope of metaphor typology analysis by incorporating cross-linguistic comparisons involving two or more languages, or by conducting more granular investigations into specific metaphor types. While this study contributes to the broader field of metaphor research, its deeper aim is to illuminate the complex discourse mechanisms that

shape academic genres—thus advancing the pedagogical and analytical goals of English for academic purposes.

REFERENCES:

Coulehan, J. (2003). Metaphor and medicine: Narrative in clinical practice. *Yale Journal of Biology and Medicine*, *76*(2), 87–95. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582695/

Davis, R. (2015). *A genre analysis of medical research articles* (Doctoral dissertation, University of Glasgow). http://theses.gla.ac.uk/6724/

Doykova, I. (2018). *Structural and linguistic features of the scientific article on medicine in English* (1st ed.). Varna.

Eggins, S. (2004). *Introduction to systemic functional linguistics* (2nd ed.). A&C Black.

Flowerdew, L. (2005). An integration of corpus-based and genre-based approaches to text analysis in EAP/ESP: Countering criticisms against corpus-based methodologies. *English for Specific Purposes*, *24*(3), 321–332.

Fryer, D. (2012). Analysis of the generic discourse features of the English language medical research article: A systemic-functional approach. *Functions of Language*, *19*(1), 5–37.

Giannoni, D. S. (2009). Disciplinary values in English academic metaphors. *Linguistica e Filologia*, *28*, 173–191. https://doi.org/10.6092/LEF_28_P173

Gibbs, R. W., Jr., & Franks, H. (2002). Embodied metaphor in women's narratives about their experiences with cancer. *Health Communication*, *14*(2), 139–165.

Grady, J. E. (1997). *Foundations of meaning: Primary metaphors and primary scenes* (Doctoral dissertation). University of California, Berkeley.

Halliday, M. A. K. (1994). Contexts of English. *Perspectives on English: Studies in Honour of Professor Emma Vorlat*, 2, 449.

Ho, J. (2019). Heroes or criminals: Discursive representation of cancer patients in health awareness advertisements. *Visual Communication*, *20*(2), 159–183. https://doi.org/10.1177/1470357219887521

Kanoksilapatham, B. (2005). Rhetorical structure of biochemistry research articles. *English for Specific Purposes*, *24*(3), 269–292.

Karska, K., & Prażmo, E. (2017). Didactic potential of metaphors used in medical discourse. *Linguistics Beyond and Within*, *3*, 102–116.

Kimmel, M. (2002). *Metaphor, imagery, and culture: Spatialized ontologies, mental tools, and multimedia in the making* (Doctoral dissertation). University of Vienna.

Kövecses, Z. (2010). *Metaphor: A practical introduction* (2nd ed.). Oxford University Press.

Lakoff, G. (1993). The contemporary theory of metaphor. In A. Ortony (Ed.), *Metaphor and thought* (pp. 202–251). Cambridge University Press.

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. University of Chicago Press.

Martin, J. R., & Rose, D. (2003). Information contained in clinical trial reports. *Journal of Information Science*, *2*, 165–168.

Napolitano, S. (2019). Metaphors in healthcare: To better comprehend and to improve awareness. *English Posts Narrative Medicine*.

Navarro i Ferrando, I. (2021). Metaphorical concepts and their cognitive functions in medical discourse: Research papers vs. press articles. *ESP Today*, *9*(1), 150–174.

Nwogu, K. (1997). The medical research paper: Structure and functions. *English for Specific Purposes*, *16*(2), 119–138.

Ozturk, I. (2007). The textual organization of research article introductions in applied linguistics: Variability within a single discipline. *English for Specific Purposes*, *26*(1), 25–38.

Pearce, J., Chiavaroli, N., & Tavares, W. (2023). On the use and abuse of metaphors in assessment. *Advances in Health Sciences Education*, *28*(4), 1333–1345.

Posteguillo, S. (1999). The schematic structure of computer science research articles. *English for Specific Purposes*, *18*(2), 139–160.

Potts, A., & Semino, E. (2019). Cancer as metaphor. *Metaphor and Symbol*, *34*(2), 81–95. https://doi.org/10.1080/10926488.2019.1611723

Pragglejazz Group. (2007). MIP: A method for identifying metaphorically used words in discourse. *Metaphor and Symbol*, *22*(1), 1–39.

Salager-Meyer, F. (1994). Hedges and textual communicative function in medical English written discourse. *English for Specific Purposes*, *13*(2), 149–170.

Semino, E. (2008). *Metaphor in discourse*. Cambridge University Press.

Semino, E. (2011). The adaptation of metaphor across genres. *Review of Cognitive Linguistics*, *9*(1), 130–152. https://doi.org/10.1075/rcl.9.1.07sem

Sheldon, E. (2011). Rhetorical differences in RA introductions written by English L1 and L2 and Castilian Spanish L1 writers. *Journal of English for Academic Purposes*, *10*(4), 238–251.

Skelton, J. (1994). Analysis of the structure of original research papers: An aid to writing original papers for publication. *British Journal of General Practice*, *44*(387), 455–459.

Steen, G. J., Dorst, L., Herrmann, B., Kaal, A., Krennmayr, T., & Pasma, T. (2010). *A method for linguistic metaphor identification: From MIP to MIPVU*. John Benjamins.

Swales, J. (1981). *Aspects of article introduction*. Birmingham, England: Aston University, The Language Studies Unit.

Swales, J. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.

Swales, J. M., & Feak, C. B. (2004). *Academic writing for graduate students: Essential tasks and skills* (Vol. 1). University of Michigan Press.

APPENDIX 1. LIST OF ARTICLES IN THE BULGARIAN JOURNALS CORPUS

Andonova, V. Y., Georgiev, G. S., Georgieva, V. T., Petrova, N. L., & Kasarova, M. (2013). Indomethacin nanoparticles for applications in liquid ocular formulations. *Folia Medica*, *55*(1), 76–82.

Cheshmedzhiev, M. V., Mircheva, I. S., Jordanov, E. D., & Kovacheva, N. R. (2014). Fourier analysis of peripheral blood pressure and flow in intraoperative assessment of infrainguinal arterial reconstructions. *Folia Medica*, *56*(2), 102.

Geneva, I. E., Krasteva, M. B., & Kostianev, S. S. (2014). Somatosensory evoked potentials in full-term neonates with perinatal asphyxia. *Folia Medica*, *56*(2), 88–95.

Hristov, S. (2023). Early results with the Delta Xtend shoulder arthroplasty as primary treatment or proximal humerus reoperation. *The Journal of the Bulgarian Orthopaedics and Trauma Association*, *60*(1), 15–26.

Kamenova, B., & Morev, E. (2025). Anaesthesia and intraoperative neurophysiological monitoring in surgical correction of idiopathic scoliosis in childhood.

Proceedings of the Bulgarian Academy of Sciences, *78*(5), 743–752. https://doi.org/10.7546/CRABS.2025.05.13

Kehayov, I. I., Batakliev, I. V., Kitov, B. D., & Dichev, A. D. (2011). Delayed posttraumatic unilateral occipital epidural hygroma in early childhood. *Folia Medica*, *53*(1), 65–68.

Kevorkyan, A. K., Petrova, N. S., & Angelova, N. G. (2012). A survey of occupational risk exposures and behaviour of healthcare workers. *Folia Medica (Plovdiv)*, *54*, 44–50.

Kostadinova, V., Radkov, Y., Stoeva, T., & Miteva, D. (2015). COPD exacerbations and C-reactive protein. *Official Journal of Bulgarian Respiratory Society*, *35*.

Krasimirova, E., Velikova, T., Tumangelova-Yuzeir, K., Ivanova-Todorova, E., Kyurkchiev, D., Kalinova, D., ... & Rashkov, R. (2016). A wide immunological profile in the diagnosis of progressive systemic sclerosis. *Revmatologiia (Bulgaria)*, *24*(2), 35–51.

Lalabonova, C. K. (2015). Impact of dental anxiety on the decision to have implant treatment. *Folia Medica*, *57*(2), 116.

Petrov, I., Klissurski, M., Stankov, Z., Tasheva, I., & Polomski, P. (2020). Endovascular treatment in acute ischemic stroke: Collaboration between neurologists and cardiologists in a single center. *European Heart Journal*, *414*.

Petrova, D., Bankova, I., Tsruncheva, R., Stanchev, N., Pencheva, V., Miletieva, D., ... & Karakasheva, R. (2016). Diabetes mellitus in patients with liver cirrhosis. *Thoracic Med*, *8*(2), 48–63.

Ribagin, L. S., & Rashkova, M. R. (2012). Matrix metalloproteinase-8 and interleukin-1beta in gingival fluid of children in the first three months of orthodontic treatment with fixed appliances. *Folia Medica (Plovdiv)*, *54*(3), 50–56.

Stefanova, V. P., Tomov, G. T., & Tsanova, S. T. (2015). Morphological study of border area of pulp-capping materials and Er: YAG laser prepared hard dental surface. *Folia Medica*, *57*(1), 49.

Tancheva, S., Valcheva-Kuzmanova, S. V., Radev, R. Z., Marinov, M. D., Boychev, B., Stoeva, T., ... & Nenov, K. S. (2011). A model of experimental acute hematogenous pyelonephritis in the rat. *Folia Medica*, *53*(2), 63.

Todua, F., Gachechiladze, D., & Beraia, M. (2017). Brain focal impairment and hemodynamic parameters in patients with unilateral high-grade internal carotid artery changes. *Neurosonology and Cerebral Hemodynamics*, *13*(1), 12–21.

APPENDIX 2. LIST OF ARTICLES IN THE INTERNATIONAL JOURNALS CORPUS

Chen, M. H., Wang, J. D., Chou, C. M., & Lin, C. C. (2017). Factors determining bone mineral density in patients with biliary atresia after a successful Kasai operation. *Pediatrics & Neonatology*, *58*(2), 128–134.

Egbuta, C., & Mason, K. P. (2020). Recognizing risks and optimizing perioperative care to reduce respiratory complications in the pediatric patient. *Journal of Clinical Medicine*, *9*(6), 1942.

Fukae, J., Fujioka, S., Yanamoto, S., Mori, A., Nomi, T., Hatano, T., ... & Tsuboi, Y. (2017). Serum uric acid level is linked to the disease progression rate in male patients with multiple system atrophy. *Clinical Neurology and Neurosurgery*, *158*, 15–19.

Gardner, J. (2017). Securing a future for responsible neuromodulation in children: The importance of maintaining a broad clinical gaze. *European Journal of Paediatric Neurology*, *21*(1), 49–55.

Ideo, F., Niazi, S., Mezzena, S., Mannocci, F., & Cotti, E. (2022). Prevalence of apical periodontitis in patients with autoimmune diseases under immunomodulators: A retrospective cohort study. *Journal of Endodontics*, *48*(6), 722–729.

Köse, S., & Murat, M. (2021). Examination of the relationship between smartphone addiction and cyberchondria in adolescents. *Archives of Psychiatric Nursing*, *35*(6), 563–570.

Lee, S. J., Lee, T. K., & Moon, J. E. (2025). High-risk features of carotid sonography predicting cardiovascular events among the stroke patients with atrial fibrillation. *Journal of Neurosonology and Neuroimaging*, *17*(1), 11–19.

M'Baloula, J., Tougeron, D., Boilève, A., Jeanbert, E., Guimbaud, R., Abdelghani, M. B., ... & Muller, M. (2024). Olaparib as maintenance therapy in non-resectable pancreatic adenocarcinoma associated with homologous recombination deficiency profile: A French retrospective multicentric AGEO real-world study. *European Journal of Cancer*, *212*, 115051.

Maldonado, A. A., Spinner, R. J., Frank, J., & Sauerbier, M. (2020). Exploration of the axillary nerve through an open posterior endoscopic-assisted (OPEA) approach: First clinical experience. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, *73*(2), 209–213.

Nakao, M., Nagai, T., Tada, A., Koya, T., Ishizaka, S., Mizuguchi, Y., ... & ELMSTAT-HF Investigators. (2025). Prognostic value of reticulocyte production ability in patients with chronic heart failure. *Canadian Journal of Cardiology*.

Sumer, F., Colakoglu, M. K., Ozdemir, Y., Ozsay, O., Ilter, O., Bostanci, E. B., & Akoglu, M. (2017). Effect of nebivolol on liver regeneration in an experimental 70% partial hepatectomy model. *Asian Journal of Surgery*, *40*(5), 375–379.

Svensson, J. F., Patkova, B., Almström, M., Eaton, S., & Wester, T. (2016). Outcome after introduction of laparoscopic appendectomy in children: A cohort study. *Journal of Pediatric Surgery*, *51*(3), 449–453.

Thean, D., Gebauer, D., Wan, K., Vujcich, N., & Goonewardene, M. (2018). Retrospective comparison of the number of screws used for fixation of skeletal anchorage plates in orthodontics, and their failure rates. *British Journal of Oral and Maxillofacial Surgery*, *56*(10), 941–945.

Vp, K., & Pn, V. (2025). Acute gastric dilatation with necrosis in a child. *Asian Journal of Research in Surgery*, *8*(2), 291–295.

Zhang, Z., Jung, J., Kim, A., Suboc, N., Gazal, S., & Mancuso, N. (2023). A scalable approach to characterize pleiotropy across thousands of human diseases and complex traits using GWAS summary statistics. *The American Journal of Human Genetics*, *110*(11), 1863–1874.

Zhao, B. C., Huang, T. Y., Deng, Q. W., Liu, W. F., Liu, J., Deng, W. T., ... & Li, C. (2017). Prophylaxis against atrial fibrillation after general thoracic surgery: Trial sequential analysis and network meta-analysis. *Chest*, *151*(1), 149–159.