
**HEDGING IN RESEARCH MEDICAL ARTICLES: A CROSS-LINGUISTIC
BULGARIAN-ENGLISH STUDY**

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Abstract: In linguistics, the word “hedge” has the meaning of “mitigating”, “reducing the power of expression”. It was Brown and Levinson [1], who, based on Goffman's work [2], [3], introduced the concepts of “Positive Face” and “Negative Face”. The latter is the need for an individual not to be interrupted, while the former is the desire to be liked and approved by others (Goffman, 1967). Hedging, from a theoretical point of view, is a form of the author's Ethos and identity, their degree of presence in the text. It also suggests that there may be factors in language interaction that make it possible for the sender's message to be perceived as a “threat” - for example, when using the English personal pronoun “YOU” in summarizing, the recipient can subconsciously associate themselves with the referrer of the personal pronoun. Given that scientific hypotheses are proven or refuted in RMA, it is quite natural for the authors to resort to different strategies of distancing or expressing solidarity (Meyers 1989). Objectification strategies of expression also determine the authorial place in the scientific discourse in the socializing community. The author's ethos can be explored by analyzing the different epistemic markers associated with their drive for persuasion and confidence. The study presents a quantitative and qualitative analyses of research medical articles with regard to their strategies for objectification. It is based on a corpus of 207 articles in Bulgarian and 129 in English, all excerpted from prestigious high impact factor journals. The analysis of the different hedging markers has been implemented by using Wordsmith Tools word analyzing programme, version 6.0. (Scott 2012). By examining the different markers for the presence or absence of the author in the text, we can grasp the architectonics of the RMA - not only the certainty encoded in rhetorical conviction, but also the most important feature - the “topos” of authorial perception in the scientific discourse. From the data obtained with regard to hedging, it can be concluded that in both languages, hedge structures are strongly determined by the standards imposed by the discourse community and are similar in volume and content, while the linguistic means inherent in the respective language mediate and define differences in surface structures - especially in view of the greater expression of modal verbs in the articles from the English corpus and the “offset” in the BC articles respectively - mainly by means of depersonalization strategies. The very rhetorical structure of the articles of both corpora implies insignificant differences as regards the structure and distribution of hedge forms. In general, the rhetorical function of these forms has an equivalent linguistic force in the excerpted texts of the two large corpora.

Keywords: hedging, medical articles, cross-linguistic study, Bulgarian, English

1. INTRODUCTION

In the study of academic registers, a particular place in the plan of pragmatics occupies the so-called “Hedging theories”. In linguistics the word “hedge” has the meaning of “mitigating”, reducing the power of expression. It was as back as Brown and Levinson [1], who using Goffman's framework [2], [3], introduced the concepts of *Positive Face* and *Negative Face*. According to Goffman (1967), the notion of *Negative Face* exemplifies the individual need not to be interrupted, while *Positive Face* refers the desire to be liked and approved by others. On the basis of these two ideas, we can distinguish between positive and negative strategies of politeness that preserve the writer's integrity and their status. Hedging theories suggest that there may be factors in language interaction that make it possible for the sender's language message to be perceived as a “threat” - for example, when using the English personal pronoun “YOU” when summarizing, the recipients can subconsciously associate themselves with the referrer of the personal pronoun. Given that RMA put forward scientific hypotheses, which are either proven or contradicted, it is quite natural to resort to different strategies of distancing or expressing solidarity [4], [5]. It is necessary to point out that, according to Meyers, in academic discourse, hedging is expressed in the use of various hedge forms including *lexical means*, *impersonal structures*, *Passive Voice* and the *tense system* [4], [6]. The aim of the present study is to explore the functional and formal means of expressing hedging strategies in Bulgarian and English RMAs.

2. TAXONOMY OF HEDGE FORMS

Salager-Meyer [7] offers a typology of hedge forms. In her view, hedging is instantiated by the following hedge structures:

- Shields – epistemic modal verbs *may, can*; modal auxiliaries *seem, appear*, verbs related to the veracity of the proposition such as *suggest*, adverbs such as *probably, likely*
- Approximators - expressing quantity, degree, frequency - *approximately, roughly, occasionally, quite, often*
- Emotionally-charged intensifiers - *extremely (difficult), surprisingly (easy), unexpectedly*
- Compound hedge forms - *it may suggest that, it would seem likely.*

Apart from Salager-Meyer’s taxonomy [7], there are other more detailed and recent classifications such as Martín-Martín’s [8] Czerwionka’s [9] Flores-Ferrán and Lovejoys’ [10]. In Table 1, we present the categories of mitigating devices:

Scholars	Mitigation devices
Martín-Martín [8]	Modal auxiliary verbs Semi-auxiliaries Epistemic lexical verbs Verbs of cognition Modal adverbs Modal nouns Modal adjectives Approximators of quantity, frequency, degree and time First personal pronouns Quality-emphasizing adjectival and adverbial expressions Agentless passive and impersonal constructions Impersonal active constructions
Czerwionka [9]	Interpersonal markers, Discourse markers Epistemic markers
Flores-Ferrán and Lovejoy [10]	parenthetical verbs hedges pauses tag questions, challenge questions discourse markers

Table 1. Taxonomy of hedge forms by three scholars

We consider Martín-Martín’s classification as the fullest and most detailed and use it as our basis, taking heed of the other tools suggested by the abovementioned authors.

We have also presented a brief overview of the verb forms used in the articles. It relates to the verbs with a commentary function that are directly associated with the expression of position and hence to categorical assertions. We referred to Tadros [11] and Thompson and Ye [12], who divide the verbs into *factive, non-factive*, and *counterfactive*. The first group expresses consensus with existing opinion, the author does not give a clear sign of the veracity of their statement or opinion through the second verbs, whereas counterfactive verbs provide information that is considered false.

3. METHODOLOGY

The research is based on two corpora of 207 articles in Bulgarian and 129 in English respectively, all excerpted from prestigious high impact factor journals. The articles vary in range, encompassing 34 fields in medicine. For the analysis of complex syntactic forms, we have performed a manual analysis of the excerpted texts, setting up small corpora for this purpose, including 24 articles in Bulgarian and 18 in English. As for the hedge devices themselves, we have analyzed *epistemic modal verbs, epistemic lexical verbs, adverbs, adjectives, nouns, personal pronouns, approximators* and *means of depersonalization*.

4. RESULTS

Table 2 presents the findings distributed by their place in the RMA in the Bulgarian corps.

Bulgarian corps 7613 t. 18.3576/1000	Introduction 2578t 48.8396/1000	Methods 127t. 1.63/1000	Results 1447t 11.422/1000	Discussion 3461t. 21.940/1000
1. Epistemic modal verbs	13t.	-	-	156 t.
2. Epistemic lexical verbs	-	-	-	34t.
3. Verbs of cognition	-	-	56t	87t.
4. Adverbs	234t	-	-	244t
5. Nouns	458t	77t	325t	611t
6. Adjectives	948t	50t.	469t.	1008t
7. Approximators	236t.	-	46t	445t.
8. Personal pronouns	-	-	-	96t.
9. Means of depersonalization	689t.	-	551t.	777t.

Table 2: Hedge forms, marked by tokens, distributed in the sections of RMA in the Bulgarian Corps.

We have also given the ratio per 1000 words in both corpora and its distribution by section.

English corps 7444t. 20.0119/1000	Introduction 2690 t. 72.7/1000	Methods 245.t. 2.055/1000	Results 710t. 8.299/1000	Discussion 3799t. 29.1789/1000
1. Epistemic modal verbs	508t.	35t	208t.	1207 t.
2. Epistemic lexical verbs	112t.	28t	34t.	463t.
3. Verbs of cognition	58t.	93t.	26t	101t.
4. Adverbs	635t	12t.	9t.	328t
5. Nouns	457t	18t	325t	303t
6. Adjectives	660t	65t.	147t.	878t
7. Approximators	469t.	49t.	268t	545t.
8. Personal pronouns	-	-	-	98t.
9. Means of depersonalization	203t.	34t.	-	754t.

Table 3: Hedge forms, marked by tokens, distributed in the sections of RMA in the English Corps

Table 2 and Table 3 present the distribution of hedge forms by type, as well as their number. Nine criteria are covered, with criterion 3 - covering verbs designating mental activity, and criterion 9 - impersonal structures and personifications.

At first glance, the bulk of hedge forms in the Bulgarian Corps is to be found in the *Discussion* and *Introduction* sections. Less often, hedge structures are used in the *Methods*, as could be expected, as the rhetorical goal of this part of the RMA is not related to comment. To some extent, the *Results* section also does not abound in hedge forms, as it is a natural extension of the previous part.

The most common forms of hedge in the Bulgarian articles are adjectives and nouns with epistemic meaning, as well as the structures for depersonalization. There is also a significant number of approximators, epistemic adverbs and embedded clauses. Modal verbs and epistemic lexical verbs and verbs of mental activities are not commonly used as part of the hedge strategy.

The English Corps shows similar results (Table 3). More than half of the hedge forms have been identified in the *Discussion* section, and only 13% in the *Methods* and *Results* sections, respectively. Also, the data reflecting the distribution of the different criteria are similar.

As for the different hedge forms, the main modal verbs used in the English Corps are: *may, might, could, should, and would*. In the category of epistemic modal verbs, we have also included the semi-auxiliaries *seem* and *appear*. In the Bulgarian texts, the only modal verb with epistemic meaning that has been identified is *moga* in the lexical form *mozhe* and *predpolagam* as an epistemic lexical verb in the impersonal reflexive form *predpolaga se*. The most common approximators in the Bulgarian Corps are: *chesto, sravnitelno, obiknoveno, povecheto, znachitelno* and a combination of the aforementioned. In the English articles, the most frequent approximators are: *highly, approximately, significantly, frequently, most, relatively*. The analysis of the adjectives with hedge function shows the relatively higher number of such lexical units in the Bulgarian texts - 2475 tokens, while in the English texts, they are 1750. The lemmatic variety in the Bulgarian Corps with respect to the *Introduction* and *Methods* sections is considerably larger than the one in the English Corps, perhaps related to the fact that the adjectives are a way of replacing the missing modal tools in the Bulgarian language. The same ratio is valid for the nominative hedge forms, as their number is twice as many in the Bulgarian Corps. Hedge structures are very often in combination - epistemic modal cluster (*mozhe + bi*) / + a colligation of adjective and noun with modal meaning - *provides compelling evidence, etc*. Pronouns are a small part of hedge structures, but their role is important, as they are perhaps the most direct form of distancing from being categorical. If we look at the distribution of the hedge forms, it should be noted that pronouns are located only in the *Discussion* section, mainly in the *Conclusion*. Their use has a dual meaning: on the one hand, the pronouns emphasize the importance of the study, and on the other it restrains it by comparing it (implicitly or explicitly) with other studies, while placing it on a par with the other research itself is a form of politeness (Positive Face).

As for the verbs with a commentary function, we have made an analysis of five verbs from the Bulgarian Corps and seven from the EC, which are used most frequently in reflecting on both own results and foreign experience. From the verbs in the BC, two are used with a factive function – *pokazvam* and *dokazvam*. We noted that all five verbs – *pokazvam, ustanovyavam, dokazvam, schitam, pozvolyavam* - were used to create Positive Face, i.e. agree with scientific facts or foreign opinions. Regarding the seven verbs in the English Corps – *report, find, suggest, observe, show, indicate, consider* - three are considered factive – *find, observe* and *show*. We have defined the status of *report* as a factive one in the English Corps, while with *suggest* the situation is more complicated and in many cases it is used to express a cautious opinion while *indicate* and *consider* are definitely non-factive.

Depersonalization strategies include three subcategories:

- Use of impersonal constructions
- Use of Passive Voice
- Use of personification (conceptual metaphor)

Impersonal structures of the type: *ustanoveno e, nablyudavat se, konstatirat se* are common in the Bulgarian Corps, and *it is / known / reported / assumed* in the English Corps are definite ways of hedging, especially in terms of expressing one's own opinion, which may differ from what is generally accepted. The use of Passive Voice is also fairly common in both corpora, as it imparts more logic and impartiality to the text, at the same time, the lack of an explicit agent and the focus on the result is another depersonalization strategy.

Another important feature of hedge forms is the metaphorical transformation viewed as the reconstruction of logical semantic relations through verbs, i.e. as a process or event. Forms such as “this paper argues...”, “nasheto prouchvane identifikatsira...”, serve as inanimate entities serving as animate agents (subjects). In the present study, such structures have been found primarily in the *Introduction* and in particular in the formulation of the *aims of study* and in the *Discussion*.

5. DISCUSSION

The ratio hedge forms, serving for distancing from categorization by article sections is similar in both corpora, the only significant difference being in the higher percentage of units in the *Results* section of the Bulgarian Corps, with more than twice the percentage of that in the English Corps. This fact may be explained in part by the presence of the multiple non-linear structures in the category of depersonalization strategy in the Bulgarian articles and partly by the presence of unconventional commentaries in the *Results*. Regarding the distribution of the individual elements of the category, the different approaches, requirements and language tools in the two languages are clearly visible. The main difference in the typology and distribution of the hedge forms in either corps is the presence of a small number of modal and epistemic verbs in the Bulgarian texts, which recompenses the lack of this functional rhetorical element with a greater presence of nouns, adjectives and depersonalization strategies (mostly impersonal structures). For their part, modal verbs remain the main linguistic mechanism of the hedge in English-language texts. The use of approximators and adverbs is also more pronounced in English Corps. It is also interesting to note the more balanced

use of hedge forms in the English articles, while in the Bulgarian texts, there is a dearth of modal verbs (which is understandable due to the poorer lexical inventory in Bulgarian) and other verbs denoting thought activity.

6. CONCLUSION

From the data obtained with regard to hedging it can be concluded that in both languages, the hedge structure is strongly determined by the standards imposed by the discourse community and is similar in volume and content, as linguistic means mediate and define differences in the surface realization - especially in view of the greater expression of modal verbs in the articles of the English Corps and respectively the "offset" in the articles from the Bulgarian Corps through other language tools - mainly by means of adjectives and depersonalization strategies. The very rhetorical structure of the articles of both corpora implies insignificant differences as regards the structure and distribution of hedge forms. In general, the rhetorical function of these forms has an equivalent linguistic power in the excerpted texts of the two corpora.

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