

# **Hedging Expressions in Different Sections of English and Czech Medical Research Articles. A Comparative Study**

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## **Abstract**

*Hedging is a frequent phenomenon occurring both in spoken and written language to modify the strength of propositions and also their directness. This paper analyses the occurrence and communicative functions of hedging devices in English and Czech research articles drawn from peer-reviewed medical journals. Since scientific articles are not homogenous in structure, the frequency of hedges in the different sections according to the IMRAD format was examined. The research revealed that the most heavily hedged sections in both languages are Discussion and Introduction, followed by Methods in the Czech corpus and by Results in the English corpus. The least heavily hedged section is Results in the Czech articles and Methods in the English ones. However, the communicative functions of hedges are the same in both languages.*

*Keywords:* Hedging, medical discourse, research papers, IMRAD structure

## **1. Introduction**

In most cases, speakers do not express themselves categorically and directly but instead show their relationship to propositions, objective reality and recipients by using various linguistic means depending on the pragmatic effect the propositions are desired to have. When the force of the utterance is to be intensified, speakers use so-called *boosters* (Holmes 1984), or, in different terminology, *strengtheners* (Brown and Levinson 1987), *intensifiers* (Quirk et al. 1985), and *up-graders* (House and Kasper 1981). When the force of

utterances is to be weakened, speakers use so-called *hedges* (Holmes 1995, Lakoff 1972), or, expressed differently, *downtoners* (Quirk et al. 1985), *weakeners* (Brown and Levinson 1987), *down-graders* (House and Kasper 1981), and *softeners* (Crystal and Davy 1975). This paper focuses on the latter concept, hedging – i.e. cases in which speakers or writers attenuate the pragmatic force of their statements in order not to be too direct or exact, rather taking into account what effect their assertions may have on the recipient. Further, they present statements as their personal beliefs and thoughts, which are open to discussion.

Scientific writers do not have to express themselves precisely and explicitly in all situations. One of the reasons for this is their intention to indicate a certain level of uncertainty and doubt about their claims, especially when the accuracy of facts cannot be assured. In such a case, they use hedging expressions, and as a result their statements become more tentative, leaving space for other possible interpretations. In this way, the use of hedges contributes to the dialogic and interactional character of scientific communication.

Meyer (1997) compares the functions of hedging in oral communication and written academic discourse and explains the “paradoxical difference” between them. Hedging in spoken interaction is frequently considered a typical feature of a “powerless speech-style”, whereas one of its functions in written academic discourse is to “strengthen the argument” (21). According to Meyer, this contradiction rests in the fact that the function of spoken face-to-face communication is to “establish, modify and maintain interpersonal relationships rather than to discuss a topic or solve a problem exhaustively and efficiently. This should give more weight to politeness phenomena and should make hedging more desirable and acceptable” (21). Conversely, the aim of academic discourse is to produce “falsifiable” statements. “Claims should be made as strong as possible. The stronger they are, the easier they are to falsify” (21). He also states that the hedging devices used in spoken language differ to a great extent from those used in written academic discourse, or are even unacceptable in such written discourse, e.g. *sort of, I think, I'm afraid, as you may call it*.

Focusing on research articles, hedges are realized in various ways, e.g. as modal adverbs (*possibly, perhaps, probably*, etc.), modal adjectives (*possible, (un)likely, probable*, etc.), modal nouns (*assumption, possibility, suggestion*, etc.), modal verbs expressing possibility (*might, could, would*, etc.), epistemic verbs (*assume, seem, appear, suggest*), approximators (*approximately, roughly, about*), and introductory phrases such as *to our knowledge*.

This paper aims to investigate the phenomenon of hedging as one of the most frequent metadiscourse markers. It compares the occurrence and communicative functions of hedging devices in a corpus of English and Czech research articles to find out differences in the distribution of these linguistic means. Since scientific articles are not homogenous in terms of the occurrence of hedging, this study examines the frequency of hedges in the different sections of articles according to the IMRAD structure, and English and Czech medical research papers are compared from this point of view.

Research articles from the field of medicine were chosen because there have been many studies (Bazerman 1988, Hyland 1998, Varttala 2001, among others) examining the use of hedging in hard and soft sciences claiming that hedging is more prevalent in the latter. Arguments and explanations in soft sciences are not defined as precisely as in hard sciences, where the writers attempt to be as objective and neutral as possible; they are also more detached compared to authors in soft knowledge fields. Claims in soft sciences are

more open to negotiation and discussion because research results may be influenced by contextual factors. However, as we shall see later, hedging is also a frequent phenomenon in hard sciences.

## 2. Hedging in Scientific Discourse

Hedging devices are frequently used by scientific writers to reduce the illocutionary force of their claims. There has been a certain shift in understanding of what the language of scientific discourse should look like. Originally, when such discourse was associated with precision, it was thought that information should be presented as explicitly and exactly as possible. Yet, as evidenced by Hyland (1994), “research from a variety of disciplines has revealed how academic discourse is both socially situated and structured to accomplish rhetorical objectives [...]. Writing is a social act performed in a specific context for a particular audience [...], and thus the impersonal style which appears to minimise the involvement of social actors also marks the interpretive viewpoint of the writer” (239–240). Even though the situation has been changing recently, and the opinion that academic discourse is full of impersonal claims and objective statements has been left behind, the authors of scientific papers still cannot neglect the requirement for accurate thinking and the fundamental role of reason, as Daneš (82) points out.

Further, the use of hedges causes scientific language to be more dialogic. This indicates that writers take into account the readers and include them in the discussion about the arguments presented. Thus, the communication and transmission of scientific knowledge is an intersubjective and shared activity, and participants in this process constitute a discursive community. Hedging as a communicative strategy thus focuses not only on individual readers, but also on a particular research community by which the scientific author wants to be accepted. He knows that it is not only the argumentation presented in his text that matters, but also the way it is presented. In this connection Hyland (1996) states that “while writers seek to gain recognition in their field by making the strongest claims they can, such claims are likely to challenge existing assumptions of the discipline and undermine colleagues’ research agendas” (434). Therefore, scientific authors use hedging expressions to diminish the imposition and minimize the possible threat their assertions may pose to other members of the scientific community. This is confirmed by Swales, who states that hedges are devices for “diplomatically creating space in areas heavily populated by other researchers” (175). When the author hedges his statements, he shows, *inter alia*, a certain degree of distance from them. At the same time, he expresses modesty and also open-mindedness towards the claims of other researchers. In short, “hedges help negotiate the perspective from which conclusions can be accepted” (Hyland 434).

Some authors have expressed a completely different view of hedging by stating that the use of attenuating devices in scientific texts weakens the strength of arguments presented in the articles (cf. Holtgraves and Lasky 1999; Hosman 1989, i.a.). Similarly, Hosman and Siltamen (2006) point out that hedging in scientific texts is assessed negatively by recipients and weakens the argumentation.

Apart from associating hedging with imprecision and vagueness, conveying the author’s modesty, and mitigating the writer’s assertions due to reasons of politeness, there is also

another interpretation of the pragmatic function of attenuating expressions, one which is mentioned by Salager-Meyer. She maintains that such expressions can also be considered “ways of being more precise in reporting results” (3). She continues that “hedging may present the true state of the writers’ understanding, namely, the strongest claim a careful researcher can make” (3). This view is not a novelty in the approach to hedges; however. Rounds (1981; 1982) explains that the function of hedges is not only to make claims fuzzy, but that their use is also associated with negotiation of the objective presentation of the state of knowledge being discussed, which means the precise formulation of scientific claims. The phenomenon of hedging seems therefore to be rather dualistic in nature, as Clemen puts it: “Despite, or perhaps, because of their mitigating effect, hedges can increase the credibility of a statement (e.g. in academic texts). It is in this sense that hedging is better seen in the scope of discourse analysis as opposed to its narrower semantic aspect as prototypical modifier“ (244).

In his study focusing on the pragmatics of politeness in scientific writing, Meyers (1989) proposes that the use of hedges in this discourse belongs among politeness strategies. In this way he advances the theory of politeness formulated for the first time in 1978 by Brown and Levinson (1987) and the concept of “face”, or public self-image. Positive politeness is connected with the effort to maintain or improve face, and thus gain recognition. Negative politeness is characterized by the effort not to be threatened and imposed on by others. Thus, Brown and Levinson understand a scientific claim as a face-threatening act. Hedging may be, in this context, a way in which a scientific writer may avoid conflict. However, this theory of politeness has been criticized by several scholars, e.g. by Daneš (2000) and Schmidt (1980), who claimed that politeness should not be reduced to the “mitigation of face-threatening facts” or to “strategic conflict avoidance”. Schmidt even stated that this theory is a “pessimistic, rather paranoid view of human social interaction in language, viewing politeness as a response to threats of face rather than as an essentially positive phenomenon” (104). Another strongly criticized aspect of Brown and Levinson’s theory of politeness is its alleged universality. However, as Daneš points out, it cannot be applied to all cultures, since politeness is culture-specific (for more details on this issue see Daneš (2000)).

As has already been mentioned elsewhere (for more details see Kozubíková Šandová 2016), many studies concentrating on the phenomenon of hedging in academic discourse in different languages have been published (cf. Clyne 1991, Salager-Meyer 1994, Čmejrková and Daneš 1997, Kreutz and Harres 1997, Vassileva 1997, del Olmo 2005, Martín-Martín 2008, Varttala 2001, i.a.). All these studies confirm the assumption that hedging is linguistically and culturally determined.

### **3. Corpus Description and Methods**

This study analyses a corpus of randomly chosen research articles that were published in British and Czech medical journals with an impact factor (*The British Medical Journal, BMJ Open, The Lancet, Česká a Slovenská neurologie a neurochirurgie, and Epidemiologie, mikrobiologie, imunologie*). The periodicals were published in 2014 and 2015. The sub-corpus created from British articles contains 60,619 words, and the Czech sub-corpus

consists of 60,638 words. Only the Introduction, Methods, Results, and Discussion sections were included in the word count and comparative analysis. Abstracts, tables, references, and notes were omitted. Medical research articles written only by English and Czech native speakers were chosen for this study.

As regards languages, English was chosen because it is the most important and most frequently used language within the international research community. Czech was chosen since it is the author's mother tongue and also because it is in a completely different position compared to English. The number of native speakers of Czech is much lower and the research community is therefore very small. It is interesting to compare these two languages, to identify the differences in the use of hedging devices, and also to determine the extent to which English has influenced Czech in this area.

In both sub-corpora, all hedging expressions were identified, categorized and compared with the aim of determining the occurrence of hedges in different sections of medical research articles and examining the differences between the British and Czech corpus. Since scientific articles are not homogeneous in terms of the occurrence of hedges in the different sections, the frequency of hedging expressions according to the IMRAD structure was examined.

Hedging devices represent a very heterogeneous group of expressions, ranging from lexical and grammatical to syntactic means, or, as Brown and Levinson (1987, 146) put it, they can be realized in an "indefinite number of surface forms". Some scholars take a wider approach to hedging and include a variety of language means which other scholars do not consider hedges at all. Moreover, hedging is regarded as a pragmatic phenomenon, so it is equally important to take into consideration the specific context in which a potential hedging expression is used. This study adopts a framework proposed by Hyland (1996), which considers epistemic verbs (e.g. *seem*, *appear*, *suggest*), epistemic modal verbs (e.g. *might*, *may*, *could*), epistemic adjectives (e.g. *possible*, *likely*, *probable*) and epistemic adverbs (e.g. *possibly*, *perhaps*, *probably*) to be the most frequent means expressing hedging. Approximators (such as *about*, *around*, *roughly* or *approximately*) were also included in this analysis because they modify the illocutionary force of propositions.

#### **4. The Occurrence of Hedges in Different Sections of Research Articles**

In this section I will discuss the incidence of hedges in different parts of medical research papers, as they are not distributed evenly throughout all parts of the papers. Both English and Czech research papers are structured in the same way: Introduction, Methods, Results, and Discussion.

The content of the sections of British and Czech articles is also more or less the same. In the Introduction there is a description of the topic of the article and a presentation of research aims. The methodology of the research is described in Methods. Empirical findings and quantitative results are presented in Results, and finally in the Discussion section a more detailed interpretation of research findings appears, together with a comparison to previous research into the same topic, the limitations of the results, and also implications for future research.

What constitutes a difference between the English and Czech corpus is the length of particular sections of the articles, as can be seen in Table 1 below. The shortest section in the English scientific texts is the Introduction, with a mere 5,715 words in total, while in the Czech articles it is the Results section, with 9,649 words in the whole corpus. The longest section in the English articles is Methods. In the Czech texts, it is the Discussion section. As various parts of the research articles differ in length, the occurrence of hedging expressions was counted as the frequency per 1,000 words in each section.

Section	English research articles	Czech research articles
<b>Introduction</b>	22.75 (5,715 words)	12.23 (10,306 words)
<b>Methods</b>	7.33 (20,750 words)	4.73 (17,321 words)
<b>Results</b>	7.89 (14,331 words)	2.49 (9,649 words)
<b>Discussion</b>	25.53 (19,823 words)	15.41 (23,362 words)

Table 1 Hedges in particular sections of research articles (normalized frequency per 1,000 words / number of words)

If we look at the difference between the least hedged and most heavily hedged parts of the articles, we find out that in the English corpus it is 18.2, while in the Czech corpus the difference is 12.92. This means that in the Czech corpus hedging expressions are distributed somewhat more evenly.

The most heavily hedged section in both corpora is Discussion, even if in the Czech corpus hedges do not appear as frequently as in English. These results indicate that more than on the results *per se*, authors focus on the interpretation and discussion of the results and attempt to situate them in the wider context of other research results on the same topic. Also, they hypothesize more about what the findings may mean and attempt to formulate more general explanations. It may also happen that the authors are not sure about their results and prefer not to formulate precise claims. All these explanations are reflected in Examples 1 and 2 from the Discussion sections.

(1) *Alternatively, the trend **may be** due to increasing under-recognition of severe mental illness in people with intellectual disability, although the **relatively** high crude incidence rates we found **suggest** that this is not the case. Another explanation **would be** that the true incidence of severe mental illness is falling, **possibly** owing to improvements in public health that have reduced precipitating factors.* (EA 11)

(2) *Secondly, people with hypertension and peripheral arterial disease **may be** more likely to be screened for cardiovascular disease than people without those disorders.* (EA2)

Hyland (1998) states that “one function of hedges is to contribute to a relationship by alerting readers to the writer’s perspective towards both propositional information and to

the readers themselves” (5), which means that hedges are employed to show the author’s attitude both to the proposition and the recipients.

In the following example from the Czech corpus, the authors discuss the limitations of their study. Viewed in the wider context of this article, it also reflects authorial modesty.

- (3) *Limitem této studie je však relativně malý soubor pacientů s ne zcela přesně srovnatelnou vstupní velikostí úchytky šilhání v době vzniku potíží mezi studijní a kontrolní skupinou.* (CA 19)

Using a hedging device, in this case a modal verb expressing epistemic modality, the authors express subjective uncertainty and assumptions about possible factors that influenced the results of their study (Example 4).

- (4) *Dalším faktorem mohl být podstatně nižší věk našich pacientů ve srovnání se studii CRYSTAL AF a výše zmínovanou observační studií Zieglera et al.* (CA 2)

Scientific authors sometimes approximate their research results to an ideal or usual state of knowledge, and in this way they aim to express themselves with precision. They modify the strength of their claims by using hedges that weaken the force of their arguments (Examples 5 and 6).

- (5) *Approximately 50% of prescriptions for antipsychotics in primary care to people without intellectual disability are given in the absence of a record of severe mental illness [...].* (EA 11)

- (6) *Přičinou humánních kampylobakterových infekcí je zhruba v 90% Campylobacter jejuni [...].* (CA 14)

Another recurrent feature in the Discussion sections of medical research articles are hedges that weaken the presence of the author in the text. This is a face-saving strategy of the writer, who aims to avoid criticism from other scientific writers. To illustrate:

- (7) [...] although the severity of disability **seems to be milder than previously.** (EA 3)

- (8) **Zdá se, že nevýhodu prostorové ohraničenosti má i měření přímého průtoku krve mozkem [...].** (CA7)

The principal communicative function of the Discussion section in both corpora is to summarize research findings and explain results, to draw conclusions, to refer to previous research and to raise questions concerning possible future developments. As Salager-Meyer puts it, “it is in this last section of research papers that writers speculate, argue, contrast and extrapolate from the described results, and at the same time avoid stating results too conclusively so as the readers can note that the authors are not claiming to have the final word on the subject” (19).

The second most heavily hedged section of medical articles in both corpora is the Introduction, where scientific authors formulate their hypotheses and the aims of their research and try to anticipate objective results – while also remaining aware that they are putting forward a single study which cannot be exhaustive and definitive and therefore cannot produce answers to all possible questions. The Introduction contains preliminary hypotheses and assumptions which the authors usually hedge to create some space for interpreting the findings. They introduce their research topic, place it within the context of other work on the same topic and previous research, and explain the need for carrying out such research. Thus, on the one hand, the author shows that he is taking into account the previous work on the topic and (usually) that he respects it, but on the other hand he diplomatically states that there are some gaps in the earlier research which should be filled. This holds for both the English and Czech corpus. To illustrate:

(9) *Having an accurate model for predicting future dementia in population based settings would be beneficial for several reasons. Firstly, targeting whole population for modification of behaviour and reduction of risk factors might not always be cost effective [...]. A complementary approach could be to target high risk individuals by developing a model to accurately identify these individuals as early as possible without being too broad in risk selection.* (EA 13)

(10) *Longer IPIs may reflect subfertility, which has been found to be associated with cardiovascular disease (CVD).* (EA 9)

(11) *Několik málo předchozích studií referuje záchyt FiS u cca 3-4% mladých pacientů do 50 let v době přijetí pro akutní iCMP.* (CA 2)

(12) *Pokud by se potvrdila hypotéza, že mezi těmito demencemi existují specifické rozdíly v postižení prostorové orientace a že tyto rozdíly lze účinně měřit, mohlo by testování prostorové orientace napomoci v diferenciální diagnostice syndromu demence neurodegenerativní etiologie.* (CA 15)

In the other two sections the English and Czech data differ in terms of the occurrence of hedges. In the English corpus, the third most heavily hedged section is the Results section, followed by Methods; in the Czech corpus it is the other way round, and the least heavily hedged section is Results. However, the difference between the Results and Methods sections in the English texts is not particularly marked. The Czech Results sections were the shortest sections, and were limited only to the presentation of the results of the quantitative analysis; the commentary on the results followed in the Discussion section. Thus, the Czech authors of medical research articles present their results in a more straightforward way than the English writers.

The Results sections in the English articles also presented quantitative results; however, we can also find brief interpretations of these outcomes in the Results sections, especially when the results were not accurate or were rather surprising and the authors might have felt the need to justify them (Examples 13 and 14).

(13) *Although an interaction between lamotrigine and folic acid had not been anticipated, it seemed that folic acid was associated with an impaired lamotrigine response in the first 12 weeks.* (EA 6)

(14) [...] *this was not observed in any other sensitivity analyses, suggesting that this inverse association may be due to chance.* (EA 2)

The Methods sections were the least hedged part in the English corpus. The reason is that the authors simply described their methodology and did not wish to make any firm claims before having at least some research results. Apart from the methodology, the authors also described laboratory instruments, equipment and other devices used for the research. The authors utilize hedges in the Methods section if they are not sure about the methodology used and also when they expect some problems which may occur when they apply a particular research procedure.

(15) *A significant test result suggests that the categorical model is a better fit to the data and a linear time trend assumption may not be appropriate.* (EA11)

(16) *After 12 weeks, new treatment for depressive symptoms could be initiated as clinically appropriate if a response to allocated treatment was considered to be inadequate or if new symptoms emerged.* (EA 6)

(17) *Výhodné může být otevření velké cisterny, čímž mozeček dále poklesá. [...] Je to manévr, který je většinou nutný pro realizaci samotného přístupu. Bohužel je málo známo, že asi v 1% případů může vzniknout závažná porucha žilní drenáže s hemoragickou infarzací mozečku a možnými fatálními následky.* (CA 5)

(18) *Transkalózní přístup může být v indikovaných případech velmi výhodný.* (CA 5)

## 5. Conclusion

As has been shown, hedging appears quite frequently as a communicative strategy in medical research papers, even though it has often been argued that the language of scientific texts is exact and matter-of-fact. A corpus of English and Czech medical articles which were excerpted from peer-reviewed impact-factor medical journals was examined to determine the occurrence and communicative functions of hedging expressions in particular sections of these scientific papers.

Hedging in medical texts performs several pragmatic functions that were very similar in both corpora. Generally, scientific writers do not want to make claims that could sound categorical, definitive, or face-threatening. Rather, they use hedges to indicate that their assertions are open for dialogue and that they want to involve the reader in the argumentation process. Further, by employing hedging, the authors also reduce their involvement with the scientific claims made in the texts.

Overall, the English scientific authors employed a higher number of hedging devices than the Czech authors and also a wider range of devices. As regards the incidence of hedges across the different sections of research articles, there are slight differences between the two corpora. These differences concern the Results and Methodology sections (see Table 1), and are connected with the character of the articles as such: in the Czech Results sections only quantitative analysis is presented, whereas in the English articles the quantitative analyses in the Results sections are usually accompanied by interpretations and commentaries on the results. The Methodology sections usually contain descriptions of methods used in the particular study, equipment etc.; in the Czech articles, additionally, brief preliminary comments on the possible research results may be found.

The most heavily hedged sections (both in the English and Czech corpus) are Discussion and Introduction, because the writers pay particular attention to the valid interpretation of their claims and research results. Moreover, they hypothesize more about what the results may mean and about possible consequences for future research. What differs is the occurrence of hedges in the other two sections. In the English articles, hedges appear more frequently in Results than in Methods, while in the Czech corpus it is the other way round. This indicates that the presentation of research outcomes is more straightforward in the Czech medical papers. Focusing on the difference between the most and least heavily hedged sections of the articles, we can see that the difference is greater in the English texts, which means that the distribution of hedges in the Czech corpus is more balanced.

The findings of this study mentioned in the previous paragraph are in line with similar research conducted by Varttala (2001), but are different from those presented by Salager-Meyer (1994). According to her results, the two most heavily hedged sections are Discussion and Results. Martín-Martín (2008) focused on the occurrence of hedges in psychological research texts in English and Spanish. As regards distribution across the individual article sections, he found that there were no major differences. In both languages, hedges occurred in the Conclusion and Discussion sections most frequently. These findings may be connected with the specific content of those particular sections and also with what exactly we consider to be a hedging device – because, as I have mentioned, hedges have diverse surface forms. Also, some authors take a wider approach to hedges and consider, for instance, the passive voice in some contexts as an attenuating device.

To sum up, hedging is an important phenomenon and an integral part of any scientific text because it allows scientific writers to present their claims with modesty and appropriate precision. Thus, hedging should be regarded as positive since it makes the writer's arguments more dialogic and open for discussion. It also develops a relationship between the author and the text recipient. However, the results of this study are not conclusive, and further research in hedging in scientific discourse from different points of view is needed.

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