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**SUMMARY  
DOCTORAL THESIS**

**HEDGING IN MEDICAL RESEARCH ARTICLES:  
NATIVE VS. NON-NATIVE SPEAKERS OF ENGLISH**

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**KEY WORDS:** hedging, native speakers of English, non-native speakers of English, written academic discourse, medical research articles, genre, discourse community, target readers, knowledge claims, comparative corpus analysis, pragmatic approach, ESP, EMP.

## **SUMMARY**

The topic of this thesis is closely connected with my teaching and research activity as a lecturer in English as a Foreign Language and English for Specific Purposes at the Department of Modern Languages of “Iuliu Hațieganu” University of Medicine and Pharmacy, Cluj-Napoca, Romania. In this capacity, I have become aware of the fact that publishing English-language research articles in international journals is one of the main requirements of the highly competitive academic environment of our times, alongside with participation in fund-generating scientific research projects, as both these activities lead to individual and institutional recognition, prestige and reward. In time, I have also gained an understanding of the challenges that my colleagues face as non-native academics aiming to express their identity and publish research results in international medical journals. Besides solid research skills and English-language proficiency, knowledge of rhetorical strategies and writing conventions are essential prerequisites for successful international publication and recognition.

Therefore, given the current importance of publishing medical research articles in English-language international journals, I carried out a preliminary survey of the literature on the reading and writing practices of non-native speaking academics, which revealed the absence of studies on Romanian medical academics or students. As a result, I considered that a study in this field could fill a research gap, generate opportunities for further research and lead to practical teaching solutions in English for Specific Purposes. Moreover, given the importance of appropriately expressing knowledge claims especially in the *Discussion* sections of research articles in order to ensure article acceptance and author recognition, particular focus on a rhetorical strategy generally employed to this end drew my attention as a topic worthy of exploration, at the same time helping me narrow down the research field from medical research articles in general to the specific practice of hedging.

In this context, a comparative corpus analysis of hedging in medical research articles written by native vs. non-native speakers of English, and a study on the awareness of hedging in native vs. non-native undergraduate medical students were regarded as relevant investigations and were therefore conducted using a corpus of authentic materials in order to

test research hypotheses, enable interpretations, identify opportunities for further research and reach conclusions applicable to English for Medical Purposes as part of the English for Specific Purposes field.

The thesis adopted a pragmatic approach to written academic discourse as it focused on the intentions, expectations and background knowledge of language users in connection with specific linguistic and social contexts of language use. Methods such as the critical review of the relevant literature, genre and critical genre analysis, comparative corpus analysis, quantitative analysis and interpretation were used. The thesis is organized into four main chapters preceded by an Introduction and followed by General conclusions, an alphabetical list of abbreviations, the Bibliography section, and two appendices.

Chapter I presented the prevailing characteristics of present-day written academic discourse and medical research articles in order to set the theoretical framework of the current thesis, identify research gaps, formulate study hypotheses and suggest appropriate research tools available.

First, English was confirmed as the international language of written academic discourse, medical communication and education due to the massive number of English-language research articles published in international journals according to databases, the high impact factor, visibility and citation opportunities associated with English-language publications, the increasingly larger number of universities in non-Anglophone countries, Romania included, offering English-medium instruction to international students, the incentives provided by numerous national academic systems, including the Romanian one, which reward English over national language publication, or the implementation of the Bologna system by the European Union.

At international level, the consequences of this predominance include issues connected with linguistic power, inequality or complacency, which lead to decreased multilingualism, increased monolingualism, the loss of first language specialized registers, lexis, rhetorical traditions and the gradual peripheralization of national languages, whereas the local consequences include a growing pressure on Romanian medical academics to function in English, i.e. to read, publish, teach, attend conferences and be evaluated based on the outcomes of these activities. These conclusions were drawn based on reviewing the available literature in the field, including work carried out by researchers such as Baethge (2008), Bhatia (1997), Crystal (2003), Ferguson (2007 and 2013), Flowerdew (2013), Hamel (2007),

Hutchinson and Waters (1987), Hyland (1996a, 1997, 2007b, 2009b, 2011b and 2013), Maher (1987), Mauranen *et al* (2010), Nickerson (2013), Swales (1997 and 2004) or Tonkin (2011).

Next, the social dimension of academic discourse was established based on its ability to facilitate learning, teaching and the construction of knowledge through appropriate linguistic means and conventions adopted by various discourse communities, in this way constructing social roles, academic identities, as well as individual and institutional hierarchies at both national and international level.

In particular, written academic discourse was regarded as a vital tool for the achievement of these ends. Its analysis revealed several characteristics such as an inability to exist in the absence of genuine scientific research activities, a clear distinction between facts and interpretation, an ‘institutional-individual’ duality reflecting two types of goals that academics must achieve simultaneously, disciplinary differences between the hard and soft sciences generating different rhetorical strategies, writing styles and author identities, as well as its persuasive and interactive nature which allows authors to negotiate their claims and readers to be active participants in the creation of scientific knowledge through the acceptance or denial of claims, in this way also establishing academic hierarchies.

Therefore, although academic writing has been regarded as impersonal and objective, recent research shows that several rhetorical strategies such as the use of personal pronouns, citations, self-references, boosters or hedges are employed by writers in order to successfully support their claims and convince readers of the validity, relevance and usefulness of their findings, especially within the current academic, social and economical context which stresses the importance of publishing in international journals for increased visibility, prestige and subsequent funding.

Research on general academic discourse and writing was carried out by Askehave and Swales (2001), Barton (2004), Bawarshi *et al* (2010), Bazerman (1988, 2004), Bhatia (1993, 1997, 2002, 2004, 2008a, 2008b, 2010), Bhatia *et al* (2008), Bruce (2008), Cutting (2002), Flowerdew (2013), Gosden (1992, 1995), Huckin (2004), Hyland (1997, 1998b, 1998c, 2000, 2001a, 2002a, 2002b, 2002c, 2003, 2005a, 2005b, 2006a, 2007a, 2007b, 2009a, 2009b, 2009c, 2011a, 2011b), Hyland and Tse (2004), Hyland and Salager-Meyer (2008), Langdon-Neuner (2009), Paltridge (2006), Salager-Meyer (1999, 2008), Skelton (1987) and Swales (1988, 1990, 1993, 2004, 2009, 2010), while Adams (1983, 1984), Atai *et al* (2005), Baethge (2008), Basturkmen (2012), Behnam *et al* (2012), Ferguson (2013), Fryer (2012), Hyland (2006b), Kilicoglu (2008), Millán (2010), Nwogu (1997), Salager-Meyer (1994b), Salager-

Meyer *et al* (2003), Skelton and Edwards (2000), Skelton and Whetstone (2012) focused on specific aspects related to the particularities of academic medical discourse. The most suitable methodological tools for the investigation of written academic discourse were found to include genre analysis for the identification of specific textual features and genre conventions, critical genre analysis for also taking into account the private goals and intentions of language users, corpus analysis for providing quantitative and qualitative evidence of previously identified or presumed characteristics, and ethnographic studies for backing up findings. Relevant research in the field of genre analysis includes contributions from Askehave and Swales (2001), Bawarshi and Reiff (2010), Bazerman (1988, 2004), Bhatia (1993, 1997, 2002, 2004, 2008a, 2008b, 2012), Bruce (2008), Hyland (2009c, 2011a), Johns *et al* (2006), Salager-Meyer (1994a), Swales (1988, 1990, 1993, 2004, 2009) and Tardy (2011).

The study of the medical research article as a genre, which took into consideration the features of the medical discourse community and the significance of discourse competence in written academic discourse revealed the following duality: besides its initial reporting function with the purpose of spreading scientific knowledge, the scientific article is now more than ever regarded as a means of achieving individual and institutional recognition and prestige.

The research article was also found to be an interactive product. First, interaction takes place prior to publication and involves drafting, redrafting, editing and peer-reviewing during negotiations with editors and reviewers. Then, if knowledge claims are expressed appropriately through disciplinary-approved rhetorical strategies such as hedging, they are accepted by the target readers, further cited and ultimately regarded as scientific truth, while article authors gain recognition and reward. This dual characteristic of claims matches the ‘institutional-individual’ duality that characterizes written academic discourse, as well as the two main functions of publication: to create scientific knowledge, and to establish academic hierarchies and distribute rewards. In this context, research is seen as a search for collective agreement, the research article as the most appropriate tool for achieving institutional and individual goals and the scientific knowledge claim, often expressed in hedged form, as a central tool to this end.

Numerous authors studied the research article or referred to its various aspects in connection with different research topics. Some of these are, in alphabetical order, linguists: Alonso Alonso *et al* (2012), Atkinson (1992, 1999), Basturkmen (2012), Bazerman (1988), Booth (1982), DiMarco and Mercer (2004), Ferguson (2013), Flowerdew (2013), Fryer



(2012), Hyland (1996a, 1997, 2003, 2007b, 2009b, 2011b), Hyland and Salager-Meyer (2008), Knorr-Cetina (1981), Moreno *et al* (2012), Mungra and Canziani (2013), Nwogu (1997), Okamura (2006), Peacock (2014), Salager-Meyer (1991, 1994b, 2008), Skelton (1994), Skelton and Edwards (2000), Swales (1990), and members of the international scientific and medical discourse community: Medawar (1964), Barraclough (2004), Bollaci and Pereira (2004), Langdon-Neuner (2009), Pierson (2004), Saint *at el* (2000), Smith (2006) or Trelle (2002).

One of the consequences of English having become the international language of scientific research is the increased focus on the reading and writing practices of non-native academics, including the impact of linguistic and cultural factors on reading and writing habits, second language writer identity, writer-reader interaction in academic prose, ESP teaching and learning strategies, or the ongoing debate on linguistic inequality, which might affect publication output and impact.

The importance of differentiating between facts and opinions for successful communication in scientific and academic settings was highlighted by Swales (1990), Salager-Meyer (1994), Markkanen and Schröder (1997) or Fraser (2010). In this context, several studies revealed that non-native readers were generally unable to identify and interpret hedges appropriately in written academic texts (Adams Smith, 1984; Salager-Meyer, 1997; Hyland, 2000; Lewin, 2005; Alonso-Alonso *et al*, 2012), possibly due to lower levels of language proficiency or different degrees of authorial presence, which influenced pragmatic transfer from L1 to L2.

Differences between the way native and non-native academic writers construct their author identity and interact with target audiences were identified by Hyland (2002a), Paltridge (2006), Hamel (2007), Mauranen *et al* (2010), or Behnam *et al* (2014). Using citations, making reference to already published results, making knowledge claims, revealing or concealing a point of view and hedging for conventionally expressing a cautious attitude were identified as the most problematic areas for NNS academics (Flowerdew, 1999). *Discussion* sections of research articles were also found to be the most difficult to write for NNSs (Okamura, 2006; Moreno *et al*, 2012), possibly due to the highest density of hedges found in this section (Adams Smith, 1984; Myers, 1989; Swales, 1990; Hyland, 2006b; Salager-Meyer, 1994b; Varttala, 1999; Martín-Martín, 2008).

Research also revealed differences between the way NSs and NNSs employ hedges for establishing their identity in scientific RAs. Thus, Dutch, Spanish and Iranian authors were

found to underhedge when compared with NSs (Burrough-Boenisch, 2005; Martín-Martín, 2008; Mirzapour and Rasekh Mahand, 2012); while English and Norwegian writers of RAs in linguistics and medicine hedged significantly more compared to French academics (Vold, 2006). Similarly, RAs written by French, Finnish, Bulgarian and Spanish scientists were reported to contain fewer hedges than those of NSs of English, while German, Polish and Czech academics used more hedges and thus adopted a more tentative authorial style, which led to the conclusion that hedging in written academic discourse is culture-specific (Hyland and Salager-Meyer, 2008).

The absence of studies on the reading and writing habits of Romanian medical academics or students was noticed following the review of the existing literature in the field, which indicated the existence of a research gap in this area.

The second chapter focused on hedging in written academic discourse. Hedges were studied as a linguistic and pragmatic phenomenon in general contexts by authors such as Lakoff (1972), Fraser (1975), Brown and Levinson (1978) or Prince *et al* (1982), and in written academic discourse mainly by Adams Smith (1984), Chafe (1986), Skelton (1987; 1988; 1994), Crystal (1988), Myers (1989), Crompton (1997), Hinkel (1997), Markkanen and Schröder (1997), Varttala (1999; 2001), Hyland (1994; 1996a; 1996b; 1997; 1988a; 1988b; 1998c; 2000; 2001a; 2001b; 2005b; 2006b), Burrough-Boenisch (2005), Kilicoglu and Bergler (2008), Hyland and Salager-Meyer (2008), Salager-Meyer (1994b; 1998a; 2000), Millán (2010), Fraser (2010), Puhan *et al* (2012) and Alonso Alonso *et al* (2012).

The theoretical study presented in this chapter revealed conflicting views on the lexical forms and pragmatic functions of hedges starting with a still-existing lack of consensus on a viable, working definition indicated by the most recent research in the field (Salager-Meyer, 2000; Varttala, 2001; Lewin, 2005; Vold, 2006; Vasquez and Giner, 2008; Fraser, 2010). Hedges were mainly associated with fuzziness and vagueness (Lakoff, 1972), avoidance of personal commitment (Brown and Levinson, 1978; Prince *et al*, 1982), modality (Coates, 1983; Palmer, 1986), evidentiality (Chafe, 1986), precision and accuracy (Adams Smith, 1984; Skelton, 1987), politeness (Myers, 1989), author modesty (Swales, 1990), interactivity (Hyland, 1996a, 1996b, 1998a).

Researchers have always acknowledged the importance of the socio-pragmatic context for the correct usage and interpretation of hedges (Salager-Meyer, 2000; Hyland and Salager-Meyer, 2008; Fraser, 2010; Millán, 2010; Alonso-Alonso *et al*, 2012), which was seen as an integral part of the pragmatic competence required for successful written academic

communication (Fraser, 2010; Alonso-Alonso *et al*, 2012; Hyland and Salager-Meyer, 2008). Hedges were also studied in connection with cultural factors (Lewin, 2005; Vold, 2006; Martín- Martín, 2008; Hyland and Salager-Meyer, 2008; Millán, 2010; Alonso-Alonso *et al*, 2012), cross-linguistic and cross-disciplinary variation (Varttala, 2001; Hyland, 2001a; Hyland and Tse, 2004; Vold, 2006; Millán, 2010; Vasquez and Giner, 2008; Alonso-Alonso *et al*, 2012), the response of the target readers (Hyland, 2000; Lewin, 2005; Alonso-Alonso *et al*, 2012), and their use and interpretation by native vs. non-native speakers of English (Hinkel, 1997; Varttala, 1999; Hyland, 2000; Hinkel, 2005; Burrough-Boenisch, 2005; Martín- Martín, 2008; Hyland and Salager-Meyer, 2008; Alonso-Alonso *et al*, 2012), often with the help of corpus analysis studies (Salager-Meyer, 1994b; Skelton, 1994; Hyland, 1996a, 1996b, 1988a; Varttala, 1999; and almost all original research contributions published in the 21<sup>st</sup> century). The finding of practical teaching solutions has always been a constant concern for academic researchers, especially for those involved in the ESP field (Salager-Meyer, 1994b; Hyland, 2000; Lewin, 2005; Vold, 2006).

Given the absence of unanimously recognized definitions or classifications, hedges were regarded as a mental attitude or subjective phenomenon (Salager-Meyer, 1994b, 2000) whose interpretation is influenced by reader expectations and background knowledge (Lewin, 2005; Vold, 2006; Alonso-Alonso *et al*, 2012), as well as an open functional class (Fraser, 2010), or polypragmatic phenomenon with overlapping functions (Varttala 2001; Hyland, Hyland, 1996a, 1996b, 1998a, 2005c; Hyland and Salager-Meyer, 2008; Alonso-Alonso *et al*, 2012). Given the numerous linguistic forms and frequently overlapping pragmatic functions of hedges, the multifaceted characteristics of the current academic environment, as well as the multitude of writers and readers whose individual, linguistic, disciplinary or cultural background may shape their use and perception, this last view was also regarded as the most pertinent, and was therefore adopted in this thesis. Besides having a polypragmatic character, in this thesis hedges were also viewed as politeness strategies, not necessarily because of their protective value in relation with writers and readers, but because they promote interaction as part of the cooperative endeavor that characterizes communication in today's written academic discourse.

Chapter 3 reported a comparative corpus analysis study of hedging in medical RAs written by native vs. non-native speakers of English, which was carried out as part of my original contribution within this doctoral research. The purpose of the analysis was to confirm or deny the existence of differences regarding the use of hedges by NSs and NNSs of

English in the *Discussion* section of medical RAs published in international journals. To this end, I created a corpus containing a total of 20 research articles (ten written by authors affiliated to “Iuliu Hațieganu” University of Medicine and Pharmacy, Cluj-Napoca, Romania, and ten by authors affiliated to US universities or clinics) using previously established inclusion and exclusion criteria.

According to the methodology of this study, a *hedge* was any linguistic device (word, expression or sentence) used by scientific writers in order to: present propositional content as accurately and reliably as possible, avoid taking direct personal responsibility for the content presented and express knowledge claims as personal opinions in order to avoid denial and encourage reader participation. According to Hyland (1996a, 1996b, 1988a), who provided the most comprehensive classification of hedges in scientific research articles according to the available literature, the study mainly focused on the identification of epistemic lexical verbs, adverbs, adjectives, modal verbs, nouns, and non-lexical hedges (limited knowledge; limitations of model, theory or method, or to experimental limitations), which were regarded as having polypragmatic functions: accuracy-oriented, writer-oriented or reader-oriented, depending on their context of occurrence and individual interpretation.

I also made a distinction between *hedged original knowledge claims* (hedges that introduce the research being reported in a RA) and *hedged cited knowledge claims* (hedges used to present cited information that authors mention in order to explain, support or compare their findings with, and which are clearly linked with the list of references) in order to establish how authors in the studied articles positioned themselves in relation not only to their, but to other people’s claims.

I formulated the following research questions prior to the study: Are there any differences between the studied RO RAs and AM RAs as far as the frequency of hedging is concerned? Are there any differences between the studied RO RAs and AM RAs as far as the lexical forms of hedges are concerned? Are there any differences between the studied RO RAs and AM RAs as far as the pragmatic functions of hedges are concerned? Are there any differences between the studied RO RAs and AM RAs as far as hedged original and cited knowledge claims are concerned?

The results of the study confirmed that hedges are important rhetorical strategies in line with the requirements of written academic discourse, as well as the existence of both differences and similarities between the NSs and NNSs studied.

The following differences were found: NNSs used significantly fewer hedges than NSs, NSs used a more varied and nuanced style of writing with diverse linguistic realizations of hedges as indicated by the higher number of adverbs and lexical hedges recorded in AM RAs, NNSs relied more than NSs on the use of non-lexical hedges referring to limited knowledge in the field but also to experimental limitations which affected the results of their studies, significantly more ROHs were found in RO RAs than in AM RAs, RO RAs contained more hedged cited claims than AM RAs, RO RAs contained significantly more cited WOHs than AM RAs, RO RAs contained a higher percentage of NLHs than AM RAs.

The following similarities were observed between RO RAs and AM RAs: comparable patterns as far as the linguistic realizations of hedges were concerned, *may* was the most frequently used modal verb with a hedging function, similar patterns as far as the pragmatic functions of hedges were concerned, WOHs were the most frequent type of hedge according to pragmatic function, followed by AOHs and ROHs.

Other conclusions were also drawn following this corpus analysis: ROHs mainly displayed a protective function; besides hedging, the strong reliance on cited information in the *Discussion* sections of the RAs studied was regarded as an indirect protection strategy; similar to written academic discourse in general, medical research articles are also characterized by intertextuality and duality.

The limitations of this study included the relatively small number of research articles in the corpus and a possible degree of subjectivity involved in the interpretation of hedges due to various factors. The following opportunities for further research were identified: comparative studies of RAs written by Romanian vs. native speakers of English affiliated to institutions from other English-speaking countries, studies on the differences between RAs written in Romanian and English, ethnographic research targeted at the reading and writing habits of Romanian academics, research focusing on boosters in research articles written by native vs. non-native speakers of English.

As for possible practical applications derived from the present study, these results will be taken into consideration when designing the syllabus and curriculum for an English for Medicine and Pharmacy course as part of a soon to be implemented master's degree program in Medical Education at "Iuliu Hațieganu" University of Medicine and Pharmacy, Cluj-Napoca.

Chapter 4 reported a study on the awareness of hedging in English-language medical research articles in NS vs. NNS undergraduate medical students at "Iuliu Hațieganu"

University of Medicine and Pharmacy, Cluj-Napoca. The purpose of the study was to confirm or deny the hypothesis of the existence of differences between NS and NNS undergraduate medical students as far as hedging awareness was concerned, especially given the importance of differentiating between facts and opinions for successful communication in scientific and academic situations (Swales, 1990; Salager-Meyer, 1994; Markkanen and Schröder, 1997; Fraser, 2010), as well as the inability of NNS readers to identify and interpret hedges correctly (Salager-Meyer, 1997; Adams Smith, 1984).

To this end, I designed reading tasks based on examples from the corpus of medical research articles created for the previous study, which I then organized into two separate Worksheets. I also formed two groups of undergraduate medical students: a group of 20 native-speakers of English from the United Kingdom, Australia, Germany, the United States of America and South Africa; and a group of 20 native-speakers of Romanian who were studying English for Medical Purposes at the time of the study. Students from both groups were asked to complete the worksheets containing reading tasks followed by multiple-choice questions.

I formulated the following research questions prior to the study: Are there any differences between the two groups of NS and NNS undergraduate medical students as far as the number of identified hedges is concerned? Are there any differences between the two groups of NS and NNS undergraduate medical students as far as their identification of the possible place of occurrence of a hedged sentence is concerned? Are there any differences between the two groups of NS and NNS undergraduate medical students as far as the expected pragmatic functions assigned to hedges are concerned? Are there any differences between the two groups of NS and NNS undergraduate medical students as far as the pragmatic functions assigned to hedges irrespective of the expected answers are concerned?

The results confirmed that hedging is a multifactorial phenomenon mainly characterized by the subjectivity associated with individual interpretation, as well as the existence of the following differences between the two studied groups: the students in the NNS group identified more hedges than those in the NS group, more students in the NNS than in the NS group considered that hedged sentences are more likely to occur in a research article, more students in the NNS than in the NS group identified the expected pragmatic functions assigned to hedges, as far as the pragmatic functions assigned to hedges irrespective of the expected answers were concerned, NNSs identified significantly more WOHs but significantly fewer ROHs and hedges as conventions compared to NSs. A similarity was also

observed: there were no differences between the two groups as far as the identification of specific expected pragmatic functions (AOHs, WOHs and ROHs) was concerned. Therefore, given the results obtained, the study denied the hypothesis according to which non-native users are unable to distinguish between facts and opinions.

In conclusion, the results of both studies presented in this thesis denied the theory of linguistic inequality supported by researchers such as Crystal (2003), Flowerdew (2013), Hyland and Salager-Meyer (2008), Okamura (2006), Hamel (2007), or Tonkin (2011), at the same time confirming that academic experience overrides the NS – NNS distinction (Swales, 2004; Ferguson *et al*, 2011), and that non-native academics are not disadvantaged by the use of English as a shared research language (Tardy, 2004; Ferguson *et al*, 2011; Muresan and Perez-Llantada, 2014). Despite the differences found, no major linguistic or rhetorical problems that would prevent Romanian medical academics and undergraduate students from functioning successfully in the international academic environment were identified. Opportunities for further research were also outlined and practical applications in the field of ESP were suggested.

The relevance and originality of this thesis lie in the novelty of the proposed research, given the absence of studies on Romanian medical academics and undergraduate medical students in connection with written academic discourse, the production and reception of research articles, hedging or English for Specific Purposes. Further studies are needed in order to confirm these results and to design practical teaching solutions in the field of English for Medical Purposes in Romanian higher-education settings.

## **ALPHABETICAL LIST OF ABBREVIATIONS USED IN THE SUMMARY**

AOH = accuracy-oriented hedge

AM RA= research article written in English by native speakers of English affiliated to a US institution

EMP = English for Medical Purposes

ESP = English for Specific Purposes

L1 = first language

L2 = second language

NLH = non-lexical hedge

NS = native speaker

NNS = non-native speaker

RA= research article

ROH = reader-oriented hedge

RO RA= research article written in English by native speakers of Romanian

WOH = writer-oriented hedge

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