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The Use of Epistemic Modality Markers as Hedges in Scientific Research Texts

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ABSTRACT

Epistemic modality reflects the writer's confidence level regarding the information provided in a statement. Scientific research, in which the author's or the researcher's word choices possess an important role in conveying information, requires cautious selection of modality markers as hedges or boosters. From this point of view, the present study aims to explore Turkish researchers' use of epistemic modality markers as hedges in English academic texts such as PhD dissertations, master's degree theses, and research articles. In this corpus study, two corpora of introduction and conclusion parts from 30 publications (10 dissertations, 10 theses, and 10 research articles) published in the fields of English Linguistics, English Language Teaching, and English Language and Literature departments were used as the data to answer the research questions. Corpus analysis of the data revealed that frequent occurrence of *may* and *can* in the introduction sections of the publications which indicates uncertainty among the authors while they seemed to be less uncertain in the conclusion parts of their publications. Moreover, it was concluded that Turkish researchers tended to make use of modal verbs more than any other forms of epistemic modality markers.

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Bilimsel Araştırma Metinlerinde Bilgisel Kiplik Belirticilerin Önermenin Kesinliğini Azaltan İfade Olarak Kullanımı

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ÖZET

Bilgisel kiplik bir ifadede sunulan bilgiye ilişkin yazarın özgüven düzeyini yansıtır. Yazarın sözcük seçimlerinin bilginin artarımında önemli rol oynadığı bilimsel araştırmalar, pekiştirici veya önermenin kesinliğini azaltan ifadeler olarak kiplik belirticilerinin dikkatle seçimini gerektirir. Bu bağlamda, mevcut çalışma Türk araştırmacıların doktora tezleri, yüksek lisans tezleri ve araştırma makaleleri gibi akademik metinlerde bilgisel kiplik belirticilerini önermenin kesinliğini azaltan ifadeler olarak kullanımını incelemeyi amaçlamaktadır. Bu bütünce çalışmasında, İngiliz Dilbilimi, İngilizce Öğretmenliği ve İngiliz Dili ve Edebiyatı alanlarında yayınlanmış olan 30 akademik yayının (10 doktora tezi, 10 yüksek lisans tezi ve 10 araştırma makalesi) giriş ve sonuç kısımlarından oluşan iki bütünce araştırma sorularını cevaplamak amacıyla veri olarak kullanılmıştır.Verilerin bütünce analizi, *may* ve *can* kiplik fiillerinin yayınların giriş kısımlarında sıklıkla kullanıldığını ortaya koymuştur ki bu da yazarların yayınların sonuç kısımlarında daha az tereddütlü iken giriş bölümlerinde daha fazla tereddüt taşıdıklarını göstermektedir. Bunun yanında, Türk araştırmacıların kiplik fiilerini diğer bilgisel kiplik belirticilerine kıyasla daha sık kullandıkları sonucuna varılmıştır.

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Introduction

As a distinct genre, academic writing possesses a number of unique rules such as avoiding to reflect personal judgements or biased prejudices that are not supported by scientific data (Hyland, 2000). In order to meet the demands of academic genre, the writers need to make use of certain structures indicating their stance in terms of the proposition's certainty or their confidence in the information presented and this refers to the notion of "epistemic modality" in linguistics (Coates, 1987, p.113). For instance, writers make use of hedges to modify and soften their claims and propositions (Hyland, 2000). In this sense, hedges imply doubt or uncertainty of the author's stance. Besides, hedges appear in academic discourse frequently in the form of epistemic modality markers (Mauranen, 1997). Furthermore, it has been suggested in the existing body of research that hedges as epistemic modality markers are used by academic research writers in differing frequencies, with various purposes and tendencies across different types of academic papers and sections of these papers (Dontcheva-Navratilova, 2016; Farrokhi & Emami, 2008; Kranich, 2009; Mojica, 2005; Vassileva, 2001). Hence, the primary concern of this study is to investigate the use of epistemic modality markers as hedges in the introduction and the conclusion parts of the academic texts written by nonnative Turkish writers of English. The rationale behind choosing the first and the last sections of academic publications is to compare and contrast the tendencies towards resorting to epistemic modality markers as hedges at the beginning and the end of academic works. A corpus study is conducted to analyze the usages and the frequencies of hedges in the two different sections of the academic papers. The findings are presented both quantitatively showing descriptive statistics of hedges, and qualitatively providing some examples of hedges in context.

Modality in General

It is reported that the semantics and the syntax of modality create one of the most intriguing problems for grammatical analysis of English (Palmer, 2001). Similarly, in languages all around the world, modality can be marked in several ways such as *mood*, *modal verbs*, *particles* and *clitics* (Palmer, 2001); and this creates a similar problem depending on the complexity of the system. The existence of some or all of the ways mentioned depends on the formation and the nature of the languages. The language may have a simple modality system and employ only modal verbs, or it may include many of the modality markers with a complex nature of modality system. In order to have a better insight into the complex framework of modality, several terms and definitions should first be clarified.

According to Hoye (1997), the discussion of modality and many modal concepts such as probability, possibility, certainty, and necessity has a longer history than thought, and even dates back to Ancient Greek times. Hoye also believes that human beings have a tendency to classify and label their attitudes and experiences in terms of what they *might* or *must* be, or *might have been* or *must have been*, rather than what and how they actually were (1997, p.40). As for the definition of key terms and concepts, the situation gets even more complicated. For example, Van der Auwera and Plungian (1998) state that ''modality and its types can be defined and labeled in several ways, and there is no one single correct way'' (p.80). In this regard, it is safe to say that the explanation or the definition of modality is a difficult one to be made without having a closer look at other related aspects.

Traugott (2011) defines modality as a semantic super-category whereas modals are mostly thought of as structural expressions. In other words, modals are just one of the linguistic structures that indicate or function as modality expressions. Modality expressions

can be made *grammatically* and *lexically*. For example, in a sentence like "*You must fasten your seat belt*." the verb *must* is a modal verb and it is a grammatical modal expression. However, in a sentence like "*It is necessary for you to wear your seat belt*." *necessary* is a lexical term, and thus do not function as a modal auxiliary. As it can be observed in the two examples above, the same meaning can be expressed by different modality expressions. Likewise, different meanings can also be conveyed by the same modality expressions depending on the context and the use. According to Traugott (2011), modality and modal utterances "(i) are non-factual (or '*irrealis'*), (ii) relativize states of affairs to a series of probable worlds, and (iii) involve speaker's comment on the necessity or possibility of the state of affairs" (p.282).

Subcategories of Modality

As Nuyts (2005a) states in his paper, it is not an easy task to define the best way to subcategorize modality. In terms of semantic basis, "*epistemic* and *deontic*" types of modality subcategories are commonly found in the literature. "Deontic" modality concerns obligation, desirability, and permission whereas "epistemic" modality concerns inferences and conclusions. In other words, it is related to the speaker's estimation of the likelihood that a certain state of affairs is, has been, or will be true in the world under consideration (Traugott, 2011). While discussing especially deontic modality, it should be remembered that another term used almost equivalently to "deontic" is "root" (Coates, 1983; Palmer, 1990). Indeed, one can name other types of modality listed in the literature, but for the present study, only epistemic and deontic modality concepts will be briefly explained and epistemic modality will be dealt with in more detail.

Epistemic and Deontic Modality

The term "epistemic" is one of the key concepts while discussing modality in English. This term applies to the notions of both *possibility* and *necessity* and the degree of commitment of the speaker to what he says (Palmer, 2001). In other words, epistemic modality is more concerned with the attitude of the speaker to the state of the proposition. Another explanation to the term is that it is the speaker's assessment of probability and predictability. It is external to the content, being a part of the attitude taken up by the speaker: his attitude, in this case, towards his own speech role as "declarer" (Halliday, 1970, p.349).

Deontic modality, on the other hand, refers to the types of modality that contain an "element of will". At this point, the clear difference between the epistemic and the deontic modalities arise. Deontic modality is more concerned with the action by others and the speaker himself. According to Palmer (2001), the most important types of deontic modality are *directives* and *commissives*. In this respect, in deontic modality, there is an intervention of the speaker in the speech act by presenting obligations or giving permission.

Epistemic Modality and Hedging

As Rounds (1982) and Mauranen (1997) also suggest, hedging is a common and even an indispensable feature of academic discourse and it provides the authors with the opportunity to express their certainty and uncertainty towards their propositions, and their confidence levels. Epistemic modal markers such as hedges function as the speaker's comment on the status of information in a proposition. To be more precise, they mark "certainty, doubt, actuality, precision, or limitation" (Biber et al., 1999, p.972). Then, it is safe

to claim that speakers can express their lack of confidence in the propositions made in their statements. According to Kranich (2009), epistemic modal markers can be used as hedges to build a more balanced author-reader relationship in which the author does not try to persuade the reader what to believe. Hyland (1998) also notes that the use of an epistemic modality expression as a hedging device may be driven by a desire to be politer, to express topics in a less direct way, and to avoid a possibly harsh conflict with the reader or listener. Finally, it is stated that the term "epistemic modality marker" refers to linguistic forms, whose primary function is the promotion of the writer's commitment (boosters) or lack of commitment (hedges) to the truth of the expression (Vazquez & Giner, 2008). Thus, it can be concluded that the hedges make a text or utterance less direct, more communicative and more interpersonal. Additionally, as a communicative strategy, Markkanen and Schröder (1987) claim that hedges can be used to conceal the writer's attitude and that they may cause textual manipulation, and that they cause the reader not understand who is responsible for the truth value of what is expressed. In a way, hedges create a safety zone for the authors of academic texts for their propositions. They also argue that certain pronouns, expressions, the passive, certain rhetorical tools in addition to modal verbs, adverbs and particles can be included in hedges to fulfil this aim.

As it was also mentioned earlier, academic or scientific genre can be seen as a world of doubt, indirectness, and uncertainty and thus, it is inevitable to employ hedges in academic writing (Mauranen, 1997, p.115). In Hyland's taxonomy of metadiscourse (Hyland 2005a), hedges are listed as a distinct category from that of boosters. The high number of hedges in academic papers can be explained by the idea that they can have several roles such as displaying a vision of honesty and humility (Swales 1990, p.433), transferring vagueness and tentativeness to form more acceptable statements to readers (Salager-Meyer 1994, p.150), expressing positive and negative politeness or negotiating the right representation of the state of knowledge discussed (Myers, 1989).

In terms of epistemic functions, there is a tendency among the scholars to focus on the use of modal verbs such as *will, may* and *would* which are used to express *doubt* and *certainty*. However, there is another strong claim by Holmes (1990) they that there are more than 350 other lexical devices used to express certainty and doubt, and they include "epistemic verbs" like *think, know, believe*; "adjectives" such as *likely, perhaps, clear*; "adverbs" like *indeed, probably, definitely*; and nouns like *doubt* and *possibility*. Furthermore, devices of imprecision like *about* and *almost* have an influence on the epistemic strength of statements and expressions such as *frequently* and *usually* also affect definiteness and contribute to the scales of probability and usuality (Holmes, 1990).

In short, hedges can be explained as self-reflective linguistic items presenting epistemic modality and modifying the illocutionary force of speech acts (Holmes, 1990), promoting the writer's commitment to a proposition, showing doubt about the truth of a proposition (Crismore et al., 1993), ''withholding commitment and open dialogue'' (Hyland, 2005b, p.49) acknowledging alternative viewpoints or the subjectivity of one's own position, and mitigating the force of an utterance for the sake of politeness (Holmes, 1990).

In the literature, a number of studies have attempted to shed light into the use of hedges in scientific papers. For instance, in an early study, Hyland (1998) examined a comprehensive amount of research article data (N=56) in order to analyze the use of hedges and boosters in academic papers in eight disciplines. His findings suggested that research articles in the field of humanities included 70 per cent of all the hedges occurred in his corpus.

In a more recent study, Takimoto (2015) investigated the use of hedges and boosters as epistemic modality markers in eight different fields of study. The findings revealed that hedges and boosters were more frequently used in social sciences research articles than in

natural sciences. These findings were attributed to the nature of discourse and rhetoric in different disciplines and subjectivity of propositions in those disciplines.

In his contrastive study of hedges in English and Farsi scientific research articles, Falahati (2006) found that the discussion parts of the research articles he analyzed included more hedges than the introduction parts. Likewise, he concluded that hedges appeared in differing frequencies across disciplines and languages.

Farrokhi and Emami (2008) compared the use of hedges and boosters in social sciences and natural sciences research articles in order to explore the authors' confidence in different rhetorical sections of the publications. The results showed that epistemic modality markers (hedges and boosters) were more frequently employed in social sciences articles and their frequency also differed across the sections of the papers analyzed. For instance, it was discovered that hedges appeared most frequently in the discussion and conclusion parts of the papers while they were found the least in the abstract and introduction parts of the studies. Besides, they found that modal verbs and lexical verbs were the most commonly used hedges in the social sciences research articles. Another finding of the study was that native writers of English research articles employed hedges and boosters more frequently than the nonnatives authors.

Existing research in the literature makes it clear that hedges are employed by native and nonnative authors in differing frequencies and varying distributions across the sections of scientific research papers (Farrokhi & Emami, 2008). Moreover, it is also stated that the tendencies towards using epistemic modality markers as hedges depend considerably on context specific conditions such as language (Falahati, 2006), discipline (Takimoto, 2015), and even socio-cultural norms (Hyland & Milton, 1997). In the context of the present study, therefore, it is hypothesized that Turkish nonnative English academic writers may have differing tendencies to make use of hedges to express their propositions in different sections of academic research papers. They may also be inclined to use hedges more often in the introduction parts of the papers than in the conclusion parts since they may feel hesitant about their statements or claims without concrete empirical evidence in the beginning.

This study, therefore, aims to contribute the existing body of research by comparing the types and frequency of the use of hedges in the introduction and the conclusion parts of academic papers written by Turkish writers. For this reason, it attempts to answer two major research questions:

1) What are the frequencies of hedge use in the introduction and the conclusion parts of English research papers written by Turkish researchers?
2) Do Turkish researchers tend to use a specific type of hedge in the introduction and the conclusion parts of academic papers?

Methodology

Research Design

The study is a mixed methods corpus analysis using both quantitative and qualitative linguistic data. In order to answer the research questions specified under the previous heading, the researcher performed an analysis of corpus data gathered from a total of 30 academic publications written by Turkish researchers.

Population and Sample

The data of this study consisted of two parts: the introduction part data and the conclusion part data. In other words, a corpus of introduction parts of PhD dissertations, master's theses and research articles was formed and another corpus of the same genres was formed as a separate data source. In some papers, conclusion and discussion parts were presented together in one section and these parts were also included in the "conclusion" part corpus of this research.

The corpora of the study consisted of 30 papers in total. 10 of them were PhD dissertations written by Turkish nonnative PhD students of English linguistics, English language teaching, or English literature departments of various Turkish universities. Similarly, other 10 of the papers were master's theses written by the same profile of master's degree students. Finally, the last 10 of the papers used were written by Turkish researchers and scholars who were also nonnatives of English. Three types of academic texts were chosen as the data sources because they reflect the general language proficiency profile of proficient nonnative English speakers in Turkey. Similarly, since the authors of the papers from the fields of ELT, linguistics, and English literature are thought to be proficient in English, they were chosen as the subjects of the study through purposeful sampling.

Instruments

The dissertations and theses whose introduction and conclusion parts were compiled as the data for the present study were all randomly selected and downloaded from Thesis Database of Turkish Higher Education Council. The research articles used were also randomly selected and downloaded from Anadolu University Electronic Journal Library and online journals subscribed by the University. All the works were granted permission to download and use with reference to the authors. As to the way in which the hedges were chosen and analyzed, the target hedges were selected based on the lists and frameworks presented in Hyland (1996) and Hu & Cao (2011)'s studies. The data collected were analyzed using the software called Concordance. Concordance is online software with a downloadable version which helps the researcher to analyze the data uploaded in terms of frequency, percentage, and use in specific contexts.

Data Collection and Analysis

One of the most common and dominant type of hedges is claimed to be epistemic modality markers (Hyland, 1998, p.149; Salager-Meyer, 1994; Varttala, 2001). Lyons (1977, p.797) notes that "any utterance in which the speaker explicitly qualifies his commitment to the truth of the proposition expressed by the sentence he utters . . . is an epistemically modal, or modalized utterance". In the light of these views and statements, the present study focused on epistemic modality markers as hedging devices giving clues about the writer's anticipation of the opposition to a proposition (Hyland, 1996), cautiousness (Salager-Meyer, 1994, p.150) and unwillingness to make absolute truth claims (Thompson, 1993). The markers were selected according to their frequency in the corpus of 30 papers. All epistemic modality markers were identified and counted using the Concordance tool while deciding on the markers to be used in this study. While counting the items, plural, 3rd person singular, past tense or negative inflections of the items were also taken into consideration in the data analysis. An item needed to express the truth value of a particular propositional content and be in the form of a lexical or grammatical unit in order to be counted as an epistemic modality marker.

Findings

Hedges, as mentioned before, are seen in academic texts quite frequently. However, they do not show up at the same degree and frequency in different types and parts of academic texts (Salager-Meyer, 1994). That is why this study aims to investigate the difference of the frequency and use of hedges in the introduction and the conclusion parts of academic texts written by nonnative academic writers. To begin with, a brief summary of the data profile is presented in Table 1.

Table 1: *Overall Number and Percentage of All Hedges in the Related Corpora.*

	N (all tokens)	***f***	**%**
Introduction	25.734	98	0.38
Conclusion	33.441	212	0.63
Total	59.175	310	1.01

As it can be seen in Table 1, there were more tokens in the conclusion part corpus (N=33.441) than introduction part corpus (N=25.734). This was probably due to the fact that the authors sometimes merged the conclusion and the discussion sections into one and they usually kept the introduction short and moved on to the review of the literature after a brief introduction section. As a natural result of the high number of tokens, there were more hedges (*f*=212, 0.63 %) in the conclusion corpus of the study. Of course, this is not enough to say that the authors tended to use hedges more frequently in the conclusion sections, but when we have a closer look at the frequency and the percentages together, it can be observed that the overall percentage of hedge use was higher in the conclusion sections (*f*=212, 0.63 %) than in the introduction sections (*f*=98, 0.38 %).

Before making a comparison of the use of hedges in the introduction and the conclusion corpora of the study, a general rank order of the hedges employed in the whole sample was calculated and presented in this section. In this way, the reader has an opportunity to make another comparison with the whole data sample, and the rank order of this sample.

Table 2 below, shows the overall order of the frequency of hedging markers in the introduction and conclusion corpora of the research as a whole.

Table 2: *Most Frequent Hedges and Their Percentages in the Whole Data*

#	**Hedges**	**Frequency**	**Percentage**
1	Can	54	0.19
2	May	34	0.11
3	Should	29	0.10
4	Suggest	27	0.09
5	Mostly	22	0.07
6	About	17	0.05
7	Often	16	0.05
8	Could	14	0.04

9	Attempt	14	0.04
10	Perhaps	10	0.03

It is clear from the table that *can* as a modal auxiliary, is the most frequently used marker in the whole data (0.19 %). As previously mentioned, modal auxiliaries are claimed to be the most common type of modality markers and these data seem to prove this claim. *Can* is followed by two other modal verbs in the frequency order shown in Table 2. *May* (0.11 %) and *should* (0.10 %) are other most frequent markers in the table. Only top ten markers are presented in the table, and a more detailed picture of the frequency in each corpus will be provided in the following sections.

Comparison of the Hedges in Two Corpora

As Salager-Meyer (1994) also confirms, the frequency of hedge use depends on the type and part of the academic texts. In the light of this assumption, in order to see any probable difference between the two parts chosen for this study, a comparison of the order, frequency, and percentage of hedge use was made between the introduction section corpus and the conclusion section corpus (see Table 3).

Table 3: *Order, Frequency and Percentage of Hedges*

	Introduction Corpus			**Conclusion Corpus**		
#	**Hedges**	**Frequency**	**Percentage**	**Hedges**	**Frequency**	**Percentage**
1	May	28	0.10	Can	34	0.13
2	Can	20	0.07	Should	18	0.07
3	Suggest	18	0.06	Mostly	12	0.04
4	Should	11	0.05	Suggest	9	0.03
5	Attempt	10	0.05	Often	9	0.03

One can see from the table that *may* as a modal auxiliary was the most common hedge in the introduction sections of the academic papers analyzed in the study (*f*=28, 0.10 %). This can be explained by the fact that while introducing a topic, a study or research, one cannot usually be much assertive and thus, use the modal verb *may* quite frequently. Similarly, at the beginning of such papers, as Kranich (2009) also suggests, the authors tend to use epistemic modal markers as hedges to build a more balanced author-reader communication and they do not seem to try to persuade the reader to believe in what they are going to write (see example 1). In the introduction corpus, *may* is followed by *can* with another high frequency (*f*=20, 0.07

%) in the sample (see example 2). This is another clear indicator of uncertainty demonstrated by nonnative English writers in Turkey.

*(1) … teachers of English **may** have gaps….*

*(2) … it **can** also be argued that ….*

Suggest is another hedge frequently used in the introduction sections. In the papers used for corpus data, it was observed that the subjects had a tendency to use this "main verb" type of hedge while referring to previous studies in the literature in order to introduce their own studies. For instance, in example (3), the author attempts to express the importance of previous experiences and refers to a previous study to support their claim.

*(3) … personal-construct theory **suggests** that …*

After *suggest*, another modal verb *should* appears in the frequency table (*f*=11, 0.05 %). Along with its use as hedge, "*should"* may be employed with some other semantic and pragmatic uses depending on the context. For this reason, corpus data should be analyzed in detail for a second check (see example 4).

*(4) … L2 writers **should** be able to ….*

Finally, similar to *suggest*, *attempt* (*f*=10, 0.005 %) also comes up as a main verb in the corpus of introduction sections. As it can be seen in examples (5) and (6), this main verb is frequently used to explain the aim of the studies. However, while explaining the aims of the researchers, the marker helps them to avoid certainty and assertiveness that may harm the relationship with the reader and that may turn out to be a humility at the end of the paper.

*(5) This chapter will **attempt** to define ….*

*(6) … the present study does not **attempt** to account for ….*

On the other hand, in the "conclusion corpus" of the study, the order of modality markers was a bit different from the one in the introduction corpus. For example, unlike the introduction corpus, *can* was at the top of the list with a higher number and percentage than *may* (see Table 3). In Figure 1, it can be observed that this modal verb is mostly used in the passive form rather than active form. In this perspective, *can* performs as a strong hedging device in the written English samples of academic work in Turkey (see example 7).

*(7) This information **can** be linked ….*

***Figure 1**: Concordance Screen for the Uses of "can" in Academic Papers' Conclusion Sections*

Context...	W...	...Context	Line	R..
Spoken communication	can	simply be defined as a combination of sounds and	85	
In foreign language (FL) teaching, the classroom discourse	can	be regarded as	164	
strategies in the FL. The quality of FL classroom discourse	can	also be a highly	166	
Studies of language	can	be divided into two main areas as studies of structure and	300	
language use and it	can	be employed to explore almost any area of linguistic research	309	
Real life' language use	can	be explained with natural language data which forms a	316	
corpus. A corpus	can	be described as a body of occurring language, any collection of	317	
electronic database (Baker et al., 2006). According to Sinclair (1996), a c...	can	be	321	
upon which some general linguistic analysis	can	be conducted" (Meyer, 2002, p. xi). A	325	
in corpus. McEnery &Wilson (2001) claims that an empirical research	can	be carried	330	
kinds of linguistics analysis. Therefore, it	can	be accepted that a corpus-based study	332	
Empirical corpus data	can	be contributed to different fields of language centered	347	
Semantics, Mindt (1991) demonstrates how corpus	can	be utilized in order to provide	368	
i.e., the overall structure formed with the arguments, which	can	be referred to as the	462	
text. This information	can	be linked by a variety of discourse relations such as	467	
(CCR) pattern for the purposes of the present study. Therefore, it	can	also be argued	482	
	can	use are the vocabulary, discourse connectives, metaphors, anaphors an...	494	
language teaching/learning	can	also be viewed as a process of identification	579	
Seeking answers to this question	can	also be interpreted as a quest for finding out	597	
resources, lexicon that	can	account for constructing multiple voices?	615	
• What suggestions	can	be drawn from the analysis of the books in terms of	618	
they are ultimately acquirable. This disagreement	can	be found in both the UGbased SLA and critical period literature. Represe...	749	
	can	expect L2 learners' proficiency, for example, to play an important role, and	769	
studies show that L2 learners' employment of formulaic sequences is oft...	can		827	
the native speakers, such as in this case and it	can	be seen that, were not used at all. He also found that Hong Kong L2	843	

Another remarkable finding is that *can* is followed by another modal verb, *should* (*f*=18, 0.07 %). From the evidence found, it is safe to suggest that *should* is usually used to speculate about possible uses of the results or to make suggestions for further studies (see example 8).

*(8) … higher educational institutions **should** be the ….*

Mostly (*f*=12, 0.04 %), *suggest* (*f*=9, 0.03 %), and *often* (*f*=9, 0.03 %) are the last three markers of the top 5 markers in conclusion corpus of the present study. *Often* is the only marker that was not in the top five list of introduction corpus. It is also the only adverb type of marker in the whole list. Strangely, the authors preferred to employ this adverb more frequently in the conclusion sections rather than the introduction sections of academic papers (see examples 9 and 10).

*(9) … grammatical morphemes **often** become …*

*(10) … aspects of language ability, **often** referred to ….*

In short, the analyses of corpora data revealed that there were similar frequency orders between the introduction and the conclusion sections of English academic papers written by nonnative Turkish master's and PhD students, and scholars in Turkey. However, even small, there are differences in the sequence and frequency of hedges between the two corpora. These differences should not be underestimated and a detailed investigation into the underlying reasons of such differences should be made in further studies.

Conclusion and Discussion

This corpus study has attempted to investigate the use of hedges in the introduction and the conclusion sections of academic papers. The analysis of the introduction and conclusion corpora proves that the tendency to make use of modality markers differ at the beginning and at the end of the scientific papers. The variances between the two rhetorical sections seem to verify the early proposition that the types and frequency of the use of modality vary in different types of texts and across the parts of the texts analyzed (Salager-Meyer, 1994). Besides, the findings validate the assumption that the use of epistemic modality markers differs across the cultural contexts of the academic discourse (Dontcheva-Navratilova, 2016).

In the present study, it was discovered that hedges were more frequently employed as epictemic modality markers in the conclusion section corpus. This finding may be due to the tentativeness of the conclusions drawn from the findings. That is, the writers may not want to sound too assertive by using hedges instead of boosters in their statements. Similarly, Falahati (2006) also presents that discussion sections of research articles contain more hedges than introduction sections. Although the present study does not contain discussion section data in the corpora analyzed, it is evident that the tendency towards using more hedges towards the end of the academic papers overlap in both studies. In another study, Farrokhi and Emami (2008) also conclude that discussion and conclusion sections are the one containing the most hedging devices while introduction sections contain the least of them among the rhetorical sections of scientific papers. Due to the nature and the flow of the academic papers analyzed, introduction sections contain more empirical research data than the conclusion, so the claims are stronger in this section, which leads to less use of hedging devices.

The findings reveal that the most frequently used hedges are two modal verbs; *can* and *may* in the whole data (both introduction and conclusion sections). In the introduction section corpus, *may* and *can* ranked 1st and 2nd in the list, and this clearly indicates that the authors prefer to express uncertainty using modal verbs at the beginning of the papers. The finding seems to support the previous assertion in the literature that *may*, as a modal verb, is a frequent modal verb to express hedging used in academic writing (Mojica, 2005). This finding is also in line with Kranich's (2009) paper which also points to the academic writers' neutral or even hesitant stance at the beginning of scientific research papers by employing modal verbs as hedging devices. Finally, nonnative English writers may be feeling more confident to use modal verbs rather than other forms of epistemic modality. In the conclusion section corpus, while *can* ranks the first, *may* is not in the top five of the list. Although previous discussions on the use of modal verbs *may* and *can* may be valid for this finding, the absence of *can* among the most frequent modality markers needs special emphasis. This finding may be related to the authors' relatively more confident claims in which *may* would sound too hesitant towards the end of their work. Another discussion of the finding can be that the authors' may try to avoid repetition by replacing *may* with other markers such as *can*. Besides, the conclusion corpus demonstrates frequent use of *should* as another modal verb, which is often utilized to state recommendations for further studies at the end of scientific research papers.

Another remarkable finding of the study is that most of the hedges are in the form of modal verbs, which is a common conclusion in the related literature (Mojica, 2005; Vassileva, 2001). In the introduction corpus, 60 per cent of the top hedges are modal verbs. The other two are main verbs. In the conclusion corpus, 40 per cent of the most frequent hedges are also modal verbs. The other three are main verbs and adverbs functioning as hedges. Thus, it is

again safe to conclude that Turkish academic writers of English academic papers tend to use modal verbs as hedges more frequently than any other form. In a similar study, it is also presented by Farrokhi and Emami (2008) that nonnative academic writers of English tend to make use of modal verbs and lexical verbs more than all the other forms of modality expressions. Besides, they claim that nonnative English scientific research writers use a more limited variety of modality markers when compared to native writers, which is a finding supported by the predominant use of modal verbs as epistemic modality markers by Turkish scientific research writers.

Recommendations

In this study, only data from Turkish nonnative writers of English academic papers in the field of foreign language teaching and related fields were collected. Thus, the findings are representative for only those with a similar background and profile. That is why another study comparing and contrasting the use of epistemic modality markers as hedges across different disciplines including natural sciences can come up with a more comprehensive picture of Turkish scientific research writers' tendencies towards using hedges in different disciplines and rhetorical sections. In addition to this, the study's findings are descriptively presented with frequencies and rank orders. Although, these parameters may provide an overall understanding of the use of epistemic modality expressions as hedges in scientific papers, they are not adequate resources to fully explain the variations found between the order and frequency of hedges. Therefore, one must not ignore the underlying reasons for the difference between the introduction and the conclusion corpora in terms of the orders and the frequencies of epistemic modality markers as hedges. For this reason, a more comprehensive investigation into the possible reasons of these changes can be made in the further studies. For instance, interviews with the authors of the scientific papers from different disciplines may serve as a useful source of data for such research.

REFERENCES

Biber, D., Johansson, S., Leech, G., Conrad, S. & Finegan, E. (1999). *Longman Grammar of Spoken and Written English.* Longman Publications Group.

Crismore, A., Markkanen, R., & Steffensen, M. (1993). Metadiscourse in persuasive writing: a study of texts written by American and Finnish university students. *Written Communication, 10*(1), 39–71. https://doi.org/10.1177/0741088393010001002

Coates, J. (1983). *The Semantics of Modal Auxiliaries*. London: Croom Helm.

Dontcheva-Navratilova, O. (2016). Cross-cultural variation in the use of hedges and boosters in academic discourse. *Prague Journal of English Studies,* 5(1), 163-184.

Farrokhi, F.,& Emami, S. (2008). Hedges and Boosters in Academic Writing: Native vs. Non-Native Research Articles in Applied Linguistics and Engineering. *Journal of English Language Pedagogy and Practice*, 1(2), 62-98.

Falahati, R. (2006). The use of hedging across different disciplines and rhetorical sections of research articles. [Papers from the 22nd Northwest Linguistics Conference] (www.sfu.ca/gradlings/NWLC-Proceedings.htm).

Halliday, M. (1970). Functional diversity in language as seen from a consideration of modality and mood in English, *Foundations of Language* 6, 322–361. https://doi.org/10.5040/9781474211970.ch-005

Holmes, J. (1990). Hedges and boosters in women's and men's speech. *Language & Communication, 10*, 185–205. https://doi.org/10.1016/0271-5309(90)90002-s

Hoye, L. (1997). *Adverbs and Modality in English*. London: Longman.

Hu, G. and Cao, F. (2011), "Hedging and boosting in abstracts of applied linguistics articles: a comparative study of English and Chinese-medium journals", *Journal of Pragmatics,* Vol. 43, pp. 2795-2809. https://doi.org/10.1016/j.pragma.2011.04.007

Hyland, K. (1994). Hedging in academic writing and EAP textbooks, *English for Specific Purposes* 13, 239-256. https://doi.org/10.1016/0889-4906(94)90004-3

Hyland, K. (1996). Writing without conviction? Hedging in scientific research articles. *Applied Linguistics*, 17(4), 433–453. https://doi.org/10.1093/applin/17.4.433

Hyland, K. (1998). *Hedging in Scientific Research Articles.* Amsterdam and Philadelphia, PA: John Benjamins Publishing Company.

Hyland, K. (2005b). Stance and engagement: a model of interaction in academic discourse. *Discourse Studies,* 7, 173–192. https://doi.org/10.1177/1461445605050365

Hyland, K., & Milton, J. (1997). Qualification and certainty in L1 and L2 Students' writing. *Journal of Second Language Writing, 6* (2), 183-205.

Kranich, S. (2009). To hedge or not to hedge: the use of epistemic modal expressions in popular science in English texts, English–German translations, and German original texts. *Text & Talk - An Interdisciplinary Journal of Language, Discourse & Communication Studies*. Volume 31, Issue 1, pp. 77–99.

Lyons, J. (1977). *Semantics.* London: Cambridge University Press.

Markkanen, R.& Schröder, H. (1987). "Hedging and Its Linguistic Realizations in German, English and Finnish Philosophical Texts: A Case Study." In *Erikoiskielet ja käännösteoria. Vakki-seminaari VII. Vöyri 31.1.-1.2.1987,* 47-57. Vaasa: Vaasan korkeakoulu.

Mauranen, A. (1997). Hedging and modality in language revisers' hands. In H. Markkanen, H. Schröder (Eds.), *Hedging and discourse: Approaches to the analysis of a pragmatic phenomenon*, de Gruyter, Berlin (1997), pp. 115–133.

Mojica, L. (2005). Filipino authors' ways of showing detachment/commitment. *Linguistic Society of the Philippines*, 511-525.

Myers, G. (1989). "The pragmatics of politeness in scientific articles." *Applied Linguistics* 10: 1 35. https://doi.org/10.1093/applin/10.1.1

Nuyts, J. (2005a). *The modal confusion: on terminology and the concepts behind it*. Modality: studies in form and function, ed. by Alex Klinge and Henrik Høeg Muller, 149–86. London: Equinox.

Palmer, F.R. (1990). *Modality and the English Modals*. 2nd Edition, London: Longman. Palmer, F. R. (2001). *Mood and Modality (2nd ed.)*. Cambridge: Cambridge University Press.

Rounds, P. (1982). *Hedging in Written Academic Discourse: Precision and Flexibility*. The University of Michigan. Mimeo.

Salager-Meyer, F. (1994). Hedges and textual communicative function in medical English written discourse. *English for Specific Purposes*, *13*(2), 149-170. https://doi.org/10.1016/0889-4906(94)90013-2

Takimoto, M. (2015). A corpus-based analysis of hedges and boosters in English academic articles. *Indonesian Journal of Applied Linguistics, 5*(1), 95-105.

Traugott, E. C. (2011). Modality from a historical perspective. *Language and Linguistics Compass, 5*, pp. 381–396. https://doi.org/10.1111/j.1749-818x.2011.00280.x

Van der Auwera, J. & Plungian, V. A. (1998). Modality's semantic map. *Linguistic Typology. Volume 2, Issue 1*, pp. 79–124. https://doi.org/10.1515/lity.1998.2.1.79

Varttala, T. (2001). Remarks on the communicative functions of hedging in popular scientific and specialist research articles on medicine. *English for Specific Purposes, 18*(2), 177–200. https://doi.org/10.1016/s0889-4906(98)00007-6

Vassileva, I. (2001). Commitment and detachment in English and Bulgarian academic writing. *English for Specifc Purposes*, 83-102.

Vazques, I. & Giner, D. (2008). Beyond mood and modality: epistemic modality markers as hedges in research articles. A cross-disciplinary study. *Revista Alicantina de Estudios Ingleses,* 21, 171-190.