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The Use of Hedging in Discussion Sections of Applied Linguistics Research Articles with Varied Research Methods

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Abstract

The discourse of the discussion in research articles is regarded to be of considerable significance—as in this section the findings are interpreted in light of previous research and the authors' argumentations are put forward as a major contribution (see Hyland, 1999). For this reason, the content and structure of the discussion section have been explored in several studies; however, little attention has been focused on a comparative analysis of how hedges are used in the discussion sections of qualitative, quantitative, and mixed methods studies. To address this gap, the present study explored the use of hedges in 150 applied linguistics articles (50 qualitative, 50 quantitative, and 50 mixed methods studies). To this end, the study investigated forms and pragmatic functions of the hedges in the discussion sections, utilizing Varttala's (2001) and Hyland's (1998) models. The data were analyzed both qualitatively and quantitatively through use of rigorous coding and memoing strategies. The results of the study indicated that hedging forms in the discussion sections of quantitative applied linguistics articles had the highest frequency, followed by mixed methods studies and qualitative articles, respectively. Also, full verbs, auxiliaries, and adverbs were the most frequent categories of hedging; moreover, the results of Chi square test proved the significance of observed differences. The findings demonstrated that mixed methods studies tended to show similarities with quantitative articles regarding the use of hedging strategies. The results are interpreted in relation to the nature of each research method.

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Communicating research findings and knowledge in academic contexts, particularly in the written mode, has always seemed to be a technically challenging task. The arduous publication process aside, this might be due in part to the complicated nature of the academic content and also the linguistic demands of scientific writing. As for the linguistic dimension, research has shown that there are various components that authors take into account in reporting research. These range from the use of academic lexicon and formal tone to the use of discourse markers such as cohesive devices and hedges. Among such components, the use of hedges has attracted the researchers' attention because these devices can play an important role in conveying the message as well as conveying the author's degree of certainty about the message and, by extension, his/her honesty and modesty (see Salager-Meyer, 1994, p. 149).

In fact, the use of academically cautious language that is intertwined with components such as "contextual relevance" and "register awareness" (Sionis, 1995, p. 99) is considered to be an inevitable part of academic writing, particularly in regard to the genre of research article (Swales, 1990). On this basis, hedges and hedging strategies have been explored by researchers from various perspectives. More specifically, types and functions of hedges have been investigated in applied linguistics (e.g., Atai & Sadr, 2008; Behnam, Naeimi, & Darvishzade, 2012; Hu & Cao, 2011, Hyland, 1998a; Yang, Zheng, & Ge, 2015). However, a limited number of studies addressed variation of hedging strategies that might be a result of applying different research methods. Additionally, the study of hedging strategies used in the results and discussion sections of research articles can be very illuminating as these sections play a key role in communicating and interpreting the research findings. Along similar lines, although hedging strategies have been addressed in quantitative and qualitative research reports; little attention has been devoted to the use of hedging strategies in mixed methods research articles.

On the basis of the above mentioned issues, this study aims at investigating forms and functions of hedges in the discussion sections of quantitative, qualitative, and mixed methods research articles in applied linguistics journals. To this purpose, the study attempted to answer the following research questions:

1. What is the categorical distribution of forms of hedges in the discussion sections of qualitative, quantitative, and mixed methods research articles in applied linguistics?
2. Is there any significant difference among the categories of forms of hedges used in the discussion sections of these qualitative, quantitative, and mixed methods research articles in terms of their frequencies?
3. What is the categorical distribution of functions of hedges in the discussion sections of qualitative, quantitative, and mixed methods research articles in applied linguistics?
4. Is there any significant difference among the categories of functions of hedges used in the discussion sections of these qualitative, quantitative, and mixed methods research articles?

Review of Literature

Hedges are linguistic devices that control the degree of fuzziness in communicating messages (Lakoff, 1973; Zadeh, 1965), helping the authors express how certain they are about the truth value of their statements (Clemen, 1997). In this regard, hedges play a pivotal role in academic research reports. Thus a considerable number of papers explored the function and types of hedges in academic texts. This has led to the emergence of the definitions and typologies for hedges. According to Hyland (1996b, p. 478):

> A *hedge* is any linguistic means used to indicate either (a) a lack of complete commitment to the truth of an accompanying proposition or (b) a desire not to express that commitment categorically. Hedges are therefore the means by which a writer can present a proposition as an opinion rather than a fact.

Placing the focus on the major functions of hedges, Hyland's definition creates an extensive coverage for hedges in type and usage. In this light, one can draw a distinction between hedges used for general-purpose and specific-purpose communication. This would be indicative of the idea that on the basis of the discourse purpose, the nature of communication in various contexts, and the roles of the language users, the use of hedges might vary in regard to their forms and functions.

From a broad perspective, Prince, Frader and Bosk (1982) presented two distinct types of hedges with different functions: "shields" are used to hedge the speaker while "approximators" are used to hedge the proposition. Similarly, taking into account the interpersonal effects of propositions and their content, Hyland (1998a) treated the functions of hedges on the basis of how they affect the propositional content and the assertiveness of the writer/speaker.

More specifically, hedges and hedging strategies have become the focus of attention in academic writing. Considering the role of hedges in scientific research articles, Hyland (1996a) adopted a socio-pragmatic view toward their use in different discourse communities. Hyland (1996a, p. 439) argued that hedging strategies and functions could be influenced by variables such as "the degree of specification, verification, agentivity, and cooperation." Specification is related to the accuracy of description and hedges in this category are labeled "attribute hedges." Showing the degree of authors' confidence, verification can be interpreted as a sign of uncertainty about the truth value of a stated proposition and is classified as "reliability hedges." Agentivity expresses the nature of association between the writer and the proposition and falls into the category of "writer oriented hedges." The last function, cooperation, is a characteristic that shows the degree of readers' involvement in interpreting the writers' claims, which is labeled as "reader oriented hedges." In sum, according to Hyland (1996a, 1998a), there are two major categories of "content-oriented" and "reader-oriented hedges." Content-oriented hedges are further divided to two subcategories of "accuracy-oriented" (i.e., the propositional content) and "writer-oriented" (i.e., writer's commitment toward the content) hedges. As for accuracy-oriented hedges, Hyland proposed two subcategories of

"reliability hedges" (which hedge against the accuracy of content) and "attribute hedges" which are used to ensure accuracy of the statements).

Having considered both formal and functional criteria for identification of hedges, Salager-Meyer (1997) offered a taxonomy of linguistic devices through which hedging can be expressed: modal auxiliary verbs (e.g., *may, might, can, could, would, should)*, modal lexical verbs (e.g., *to believe, to assume, to suggest, to estimate, to tend, to think, to argue, to indicate, to propose, to speculate*), adjectival, adverbial and nominal modal phrases **(**probability adjectives: e.g., *possible, probable, un/likely*; nouns: e.g., *assumption, claim, possibility, estimate, suggestion*; adverbs e.g., *perhaps, possibly, probably, practically, likely, presumably, virtually, apparently),* approximators of degree, quantity, frequency and time **(** e.g., *approximately, roughly, about, often, occasionally, generally, usually, somewhat, somehow, a lot of),* introductory phrases (e.g., *I believe, to our knowledge, it is our view that, we feel that)*, if clauses **(**e.g., *if true, if anything) and* compound hedges.

More specifically, Hyland (1995) categorized the linguistic realization of hedging forms in the genre of scientific research articles based on an analysis of 26 articles. According to Hyland (1995, p. 36), writers use 5 main grammatical categories and 3 strategies to express epistemic modality in their papers:

> lexical verbs (e.g., indicate, suggest, appear, and propose), adverbial constructions (e.g., probably, possibly, presumably, etc.), modal adjectives (e.g., likely, possible, most and consistent with), modal verbs (e.g., would, may and could), modal nouns (e.g., possibility, assumption, estimate, and tendency), admission to a lack of knowledge (e.g., we do not know whether), reference to limiting conditions (e.g., if this scheme is correct, viewed in this way and according to our method), reference to a model, theory or methodology (e.g., we did not succeed and it is difficult to conclude).

Drawing on Ceismore, Markkanen, and Steffensen's (1993) taxonomy, Hyland (1998c) analyzed 28 articles from four different disciplines: microbiology, marketing, astrophysics and applied linguistics. His findings

showed that hedges were the most frequent category of metadiscourse in that corpus. He also found that interpersonal metadiscourse was much more frequent in applied linguistics and marketing than in biology and astrophysics. In a related study, comparing a 24000-word corpus of introductory textbooks and a 121000-word corpus of research articles in microbiology, marketing, and applied linguistics, Hyland (1999) found that metadiscourse markers, particularly connectives and code glosses, were used with a relatively high frequency of occurrence in the two corpora. Interestingly, the results revealed that there was a substantial difference between the uses of interpersonal meta-discourse markers in the two corpora.

Having chosen to work on 55 articles from social and natural science research, Abdi (2002) investigated the use of interpersonal metadiscourse markers (i.e., hedges, emphatics, and attitude markers). Abdi (2002) found that the use of hedges and attitude markers were significantly more frequent in social science articles while this difference was not significant about the use of emphatics. The results also showed that the authors of both social science and natural science articles used hedges significantly more than emphatics.

Atai and Sadr (2008) analyzed the frequency and forms of hedges in the discussion sections of 108 research articles in applied linguistics. The articles utilized both descriptive and experimental designs and also were written by Persian and English native speakers. The findings of the study showed a significant difference in the use of hedges, in terms of type and frequency, between the two groups of authors. Particularly, using questions, a kind of hedging strategy, was found to be rare in the corpus of Persian native speakers and full verbs, adverbs, modalities and clausals were used more frequently in English native speakers' papers with experimental design. Moreover, English native speakers used adverbs, modalities, clausals and questions more frequently in their descriptive papers than Persian native speakers. The researchers concluded that "this makes discussion section of English native writers more in conformity with the rules of discourse community of applied linguistics (RAs)" (Atai & Sadr, 2008, p. 12).

In a more recent study, Behnam, Naeimi and Darvishzade (2012) analyzed hedging strategies in the conclusion sections of 100 applied linguistics research papers. The papers have been written by English native speakers and utilized qualitative and quantitative approaches. Behnam et al. (2012) used Hyland's (1996b) taxonomy of hedges for their study and found that there were significant differences between the use of hedges in qualitative and quantitative papers. They asserted that the "discussion sections of qualitative articles are more heavily hedged than discussion sections of quantitative articles" (Behnam et al., 2012, p. 27).

As can be inferred from this concise review, the concept of hedging has been explored across various languages, text genres, and disciplines. Also, a number studies addressed how methodological variation can affect the use of hedging strategies. However, such studies only investigated the use of hedging in quantitative and/or qualitative research articles. Thus, the use of hedging strategies in mixed methods research articles has remained underexplored. To address this issue, taking into account that the discussion section of a research article is its most heavily hedged section (Salager-Meyer, 1994, 1997), we attempted to place the focus of the present study on the use of hedging in the discussion sections of applied linguistics research articles that utilized qualitative, quantitative, and mixed method approaches.

Method

This study utilized a descriptive method to analyze the frequency of forms and functions of hedging expressions used in the discussion sections of applied linguistics research articles (RAs) across the three of research approaches (i.e., qualitative, quantitative, and mixed methods research). To this purpose, the discussion sections of 150 research articles were analyzed manually for exploring forms and functions of hedges. The frequencies of occurrence of the categories were also calculated. The forms and functions of hedges were analyzed on the basis of Vartalla's (2001) scheme and Hyland's (1998b) model respectively.

Data Collection

As a result of searching published lists of international academic journals (Egbert, 2007; Jung, 2004), a preliminary list of journals in applied linguistics was prepared. In the process of selecting these journals, comments of two expert informants (Ph.D holders in the field of TEFL with more than 10 years of teaching experience at university) were considered. Each journal's impact factor was also among the criteria of selection. Finally, 9 journals were selected based on the above mentioned criteria. These included *Studies in Second Language Acquisition*, *International Journal of Applied Linguistics*, *Applied Linguistics*, *System*, *ELT Journal*, *Language Teaching Research*, *RELC Journal*, *Modern Language Journal* and *TESOL Quarterly*.

In a process of purposive sampling, first 215 articles were chosen from the above mentioned journals. Among these articles, only single-author articles were selected. All the selected articles were then examined and only those with a distinct discussion section were selected. As for the criterion of research method, we scanned the methodology sections of these articles to ensure that the articles can be truly categorized into three different research approaches of quantitative, qualitative, and mixed methods studies. Moreover, all articles were scanned using the search function of the Adobe Reader software for key words like *qualitative, descriptive, quantitative, experimental, mixed methods, multi-method, mixed-method, and triangulation* to ensure the selection of a related sample.

Finally, a total number of 150 articles were selected (i.e., 50 qualitative, 50 quantitative, and 50 mixed methods articles). These articles were published over a period of 15 years, from 2000 to 2014. Giving a total of **237279** words, the discussion sections in qualitative, quantitative, and mixed methods studies had word counts of **81078**, **81235**, **74966** (total of) respectively.

Data Analysis

The analytic frameworks. The first analytic framework used in the present study was Varttala's (2001) typology—a revised version of Hyland's (1998a) taxonomy of hedges. Varttala's taxonomy was used previously by

several researchers (e.g., Atai & Sadr, 2008; Tahririan & Shahzamani, 2009), a fact that shows its relative credibility for the purpose analyzing forms of hedging. Figure 1 presents a brief and schematic representation of the typology.

1.Model auxiliary verbs
2.Full verbs
  2.1. Nonfactive reporting verbs
  2.2. Tentative cognition verbs
  2.3. Tentative linking verbs
3.Adverbs
  3.1.Probability adverbs
  3.2.Adverbs of indefinite frequency
  3.3.Adverbs of indefinite degree
  3.4.Approximative adverbs
4.Adjectives
  4.1.Probability adjectives
  4.2.Adjectives of indefinite frequency
  4.3.Adjectives of indefinite degree
  4.4.Approximative adjectives
5.Nouns
  5.1.Nonfactive assertive nouns
  5.2.Tentative cognition nouns
  5.3.Nouns of tentative likelihood
6.Clausal elements
7.Questions
8.other

Figure 1. Classification of hedging forms (Varttala, 2001, p. 289).

As for the second analytic framework, Hyland's (1998a) polypragmatic model was used to classify the function served by each hedging form. A brief account of the typology is depicted in Figure 2.

A: content oriented hedges
    A1. Accuracy oriented hedges
        A1.1. Attribute hedges
        A1.2. Reliability hedges
    A2. Writer oriented hedges
B: Reader oriented hedges

Figure 2. Classification of hedging functions (Hyland, 1998a, p. 156).

Content Analysis

In the present study, each hedging form was analyzed in its own context and only forms with epistemic meaning counted as an example of hedging. Once a word or expression was considered to be a hedge, it was assigned to one of the above mentioned categories of forms and functions. Whenever, a word or an expression proved to be vague to us, we would first discuss the case to reach a consensus; and in case of no clear consensus, we would discuss the issue with an expert (i.e., a PhD holder who specialized in discourse analysis) until an agreement could have been achieved. Based on this process, the frequencies of forms and related functions of hedges were estimated. Then, the data were checked for explaining the observed differences and the significance of differences.

More specifically, having excluded direct quotations, footnotes, charts, and figures from the corpus, we analyzed all the discussion sections manually to identify hedging expressions. Then all the identified expressions were analyzed in their contexts to make sure that they show epistemic stance of the authors—i.e., with regard to their uncertainty, tentativeness, and degree of commitment to a proposition. For example, the lexical verb *indicate* can be interpreted as both *suggest* and *denote*. Also, the adjective *apparent* can make sense as both *obvious* and *seeming.* The latter meanings for both words represent an epistemic stance and would be counted as an occurrence of hedging.

Afterwards, each recognized hedging expression (lexical or clausal) was assigned to a formal and functional category and the frequencies of these hedging expressions were estimated. To ensure the reliability of the coding, 10% of the whole corpus was analyzed by another coder, an MA

holder in TFEL with a background in content analysis. The inter-rater reliability value for the frequency of hedging forms and functions were .89 and .91, respectively, ensuring a relatively high inter-rater reliability.

Chi-square tests were utilized to analyze the data to explore any difference among the subcategories of the forms and functions of hedging expressions (lexical and clausal) used in the applied linguistics discussion sections with three different research approaches (qualitative, quantitative, and mixed methods studies).

Results and Discussion

Distribution of Hedging Forms

As shown in Table 1, the hedging forms had different frequencies of occurrence in the corpus.

Table 1

Total Number of Hedging Forms in the Discussion Section of Applied Linguistics Research Articles

Quantitative		Qualitative		Mixed method studies	
Frequency	Per 1000	Frequency	Per 1000	Frequency	Per 1000
3,413	42.01	2,398	29.57	2870	38.28

According to Table 1, the hedging forms in the discussion sections of quantitative applied linguistics articles have the highest frequency (42.01 per 1000 words, f = 3413), followed by mixed methods studies (38.28 per 1000 words, f = 2398) and qualitative articles (29.57 per 1000 words, f = 2398) respectively. This finding supports Atai and Sadr's (2008) results stating that frequency of hedges in the discussion sections of applied linguistics articles with experimental designs is significantly higher than the frequency of hedges in the discussion sections of applied linguistics articles with descriptive designs. This, however, stands in contrast to Behnam et al. (2012) who found that the discussion sections of qualitative articles are significantly more hedged than the discussion sections of quantitative articles. The discrepancies in the results of these studies can be related to general issues such as the sample and context variations and the discourse used in different research communities of practice. More specifically, the

serious concern about providing objective discussions and presenting generalizability claims in the discussion section of quantitative articles would probably make authors more cautious about their language use, leading to an increased use of hedges. In qualitative research, on the other hand, authors are not obliged to provide statistically supported generalizability claims or discuss the findings in a purely objective tone. This may lead to a less frequent use of hedging devices in qualitative discussions.

To answer the first research question, we analyzed the categorical distribution of hedging forms in the corpus of the present study. The category of *full verbs* is the most frequently occurring one. This category have the highest frequency in quantitative articles (9.93 per 1000 words and f = 807), followed by mixed methods studies (9.47 per 1000 words and f = 710), and qualitative articles (7.06 per 1000 words and f = 573).

Table 2
The Number of Hedging Forms in each Category Based on Varttala's (2001) Model

	Hedges								Total
	Aux.	Full verbs	Nouns	Adjective	Adverb	Clausals	Questions	Other	
Quan.	620	807	378	535	574	272	34	193	3413
Qual.	453	573	289	355	331	194	27	176	2398
Mixed	491	710	352	477	417	213	39	171	2870
Total	1564	2090	1019	1367	1322	679	100	540	8681

The second most frequent form of hedges in all three parts of the corpus was *auxiliaries*, which had the highest frequency in quantitative articles (7.63 per 1000 words and f = 620), followed by mixed methods studies (6.54 per 1000 words and f = 491), and qualitative articles (5.58 per 1000 words and f = 453). After these two categories, *adjectives*, *adverbs*, *nouns*, *clausal elements*, the category of *other*, and *questions* occurred with lower frequencies. The results of this analysis are illustrated in figure 2 below.

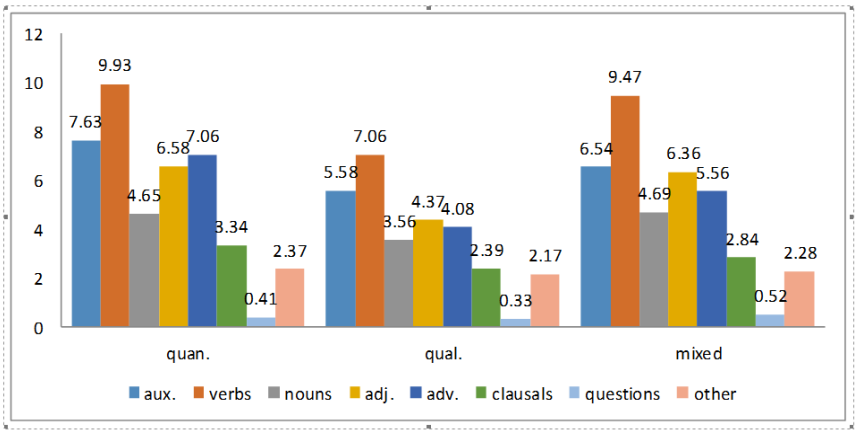

Figure 3. Comparison of total frequencies of hedging forms in the three categories of research articles (i.e., quan, qual, mixed).

As for the second research question, a chi-square test (see Table 3) was run to examine the significance of observed differences in the frequency of the above mentions categories of hedging forms. As revealed in Table 3, the result of the chi square test showed that the observed differences in the frequencies of hedging forms used in the discussion sections of Applied Linguistics articles with three different types of methods (quantitative, qualitative, and mixed methods) were statistically significant: χ^2 (14, N = 8681) = 27.491, p < .05.

Table 3

Chi-square Test for the Categories of Hedging Forms in Three Types of Applied Linguistics Articles

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.491[a]	14	.017
Likelihood Ratio	27.220	14	.018
Linear-by-Linear Association	.059	1	.808
N of Valid Cases	8681		

The following are some examples of hedging forms from the relevant corpus.

> (Quan. RD) This account of how planning time **may** have had a facilitative effect on subsequent, unplanned discourse is in line with explanations for why output practice […]. (Nielson, 2014, p. 288)

> (Mixed. RD) This methodology combined with the need to reduce informational content, **may** account for some cases of the reduction in non-restrictive RCs in lower level texts compared to advanced texts. (Allen, 2009, p. 594)

As mentioned earlier, *may* is the most frequent auxiliary in all parts of the corpus. This result could be explained in light of the sense in which this word is frequently used—i.e., the concept of "possibility/probability" (Quirk, Greenbaum, Leech, & Svartvik, 1985). The use of *would* and *could* was also notable in this corpus; this could be a suitable choice in that the use of auxiliaries in the past form would indicate more uncertainty about the stated proposition (Montgomery, 1982).

Analyzing the above sentences, one can find that most auxiliaries occur in one of these two structures: *auxiliary + to be* or *auxiliary + full verb*. Authors of qualitative articles tended to use the former structure more while the authors of quantitative articles prefer to use the latter. Auxiliaries used in the discussion sections of mixed methods studies appeared more in the latter format (more similar to quantitative articles). This may be indicative of the influence of positivistic stance and quantitative research discourse on the author's writing.

Similar to the previous studies (Atai & Sadr, 2008; Hyland, 1996a; Tahririan, & Shahzamani, 2009; Varttala; 2001), the most common hedging form in the present study was *epistemic full verbs*. The normal frequency of this category in the quantitative, qualitative, and mixed methods studies was 9.93 per 1000 words (f = 807), 7.06 per 1000 words (f = 573) and 9.47 per 1000 words (f = 710), respectively. The following are a number of sample excerpts:

(Quan. RD) Studies have **suggested** that the process involved in word recognition in logographic scripts is similar to that involved in reading alphabetic scripts. (Shen, 2003, p. 51)

(Mixed. RD) The increased lexical repetition may also increase redundancy, which is **believed** to be beneficial for lower level readers. (Allen, 2009, p. 592)

(Qual. RD) It **appears**, at least for DEBI, that the multilingual essay legitimates the multi competent everyday processes which appear to permeate her language learning experiences. (Belz, 2002, p. 74)

As indicated in the above examples, one class of epistemic full verbs (*nonfactive reporting verbs, e.g., suggest, indicate, argue* and *predict*) induce the concept of tentativeness with regard to authors' own findings and in many instances (especially in the quantitative and mixed methods studies) they were accompanied with non-human subjects like ―the results or hypothesis. The second and third categories of full verbs based on Varttala's model (*tentative cognition verbs*, e.g., *believe, expect, consider, perceive* and *interpret;* and *tentative linking verbs,* e.g., *appear, tend* and *seem*) help the authors express their findings in a non-categorical way. These verbs also relate the propositions to authors' ideas and opinions not facts and in this way reduce the force of a claim so in this meaning they can also have a politeness function (beside mitigation).

Varttala (2001) discussed that modal adverbs were the most frequent category of hedges in technology articles (5.57 per 1000 words). He also found that modal adverbs are considered to be the third and fourth most frequent hedging technique in medicine (2.61 per 1000 words) and economics (4.72 per 1000 words) articles, respectively. In the corpus of present study, in line with Atai & Sadr (2008), epistemic adverbs were the third most frequent hedging form after modal verbs and full verbs.

(Mixed. RD) The other examinee that was not assessed accurately, non-anxious Examinee 3, most **likely** gave the impression of being

anxious because of some idiosyncratic elements of her behaviour. (Gregersen, 2007, P. 217)

(Qual. RD) While this adds **significantly** to one's word count, the results in Table 5 remind us that it was unrelated to gains in TL proficiency. (Delaney, 2012, p. 479)

(Quan. RD) The findings also show that students tend to neglect certain parts of speech when choosing vocabulary items. For whatever reason learners **often** seem to favor one part of speech at the expense of others. (McCrostie, 2007, p. 251)

(Mixed. RD) For instance, the opening time phrase ('Five years ago') in idea unit #1 is identical in August and October, and **slightly** altered in November. (Larsen-Freeman, 2006, p. 608)

(Qual. RD) In particular, such rules portray pre-N and post-N positions as mutually exclusive for **almost** all adjectives when, in fact, they are not. (Anderson, 2007, p. 301)

In the corpus of the present study, there was not a noticeable difference in the frequency of adjectives (f = 1367) and adverbs (f = 1322). In Hyland's (1996a) study adjectives were the third most frequent forms to show modality; however, Varttala (2001) reported that adjectives are the forth common hedges after modal verbs, full verbs, and adverbs. He also mentioned that adjectives are rare in the corpus of fields like economics and technology. A number of examples relevant to this category from the corpus of the present study are presented below:

(Quan. RD) what is most **likely** is that a learner will perform well in this quite inauthentic context, yet fail to use it correctly in spontaneous production. (Williams, 2001, p. 335)

> (Qual. RD) It seems **likely**, for example, that feedback from Sea view might be less favorable than that from Luxton, simply because the reports on the former program were more critical. (Elder, 2009, p. 28)

> (Mixed. RD) Learner-centredness has been fashionable for a number of years now, and, of course, this is quite rightly so. Nobody would want to see our schools revert to the kinds of Dickensian institutions that were once reasonably **common**. (Griffiths, 2012, p. 475)

> (Quan. RD) The results regarding pedagogically targeted L2 features indicate **significant** learning gains in the short and medium term. (Eckerth, 2008, p. 133)

> (Qual. RD) Thus, the children of the elite socioeconomic class are to be found in elite schools, a **major** function of which is the maintenance […]. (Burnett, 2011, p. 20)

> (Quan. RD) In the frog story narrative, children also performed very **close** to the monolingual baseline, whereas adults showed divergent patterns. (Polinsky, 2011, p. 323)

In qualitative and mixed methods studies, *likely*, the most frequent (probability) adjective in the present corpus, was commonly used in structures like more/most + likely; while in qualitative articles this word mostly occurred in structures like tentative linking/ to be verbs + likely.

Additionally, nominal expressions can have modality potential as well (Perkins, 1983; Varttala, 2001) and in the corpus of this study they were the fifth common word class with hedging quality which is similar to the findings of Atai and Sadr's (2008) and Hyland (1996a) .

> (Qual. RD) Also related to the issue of research is the **suggestion** that 'the role of extensive reading needs to be examined more closely for its potential contributions to student success in advanced EAP settings' (Grabe, 2001, p. 26) such as those investigated here. (Macalister, 2010, p. 70)

> (Quan. RD) Orthographic knowledge only really begins to take hold of speech perception when children (and learners) become actively engaged in learning to read. This **trend** may, in part, explain why the ZN group was unable to make any improvement from the pre- to the posttests. (Pytlyk, 2011, p. 554)

Besides lexical hedges, clausal elements of sentences can have hedging effects as well.

Varttala (2001, p. 146) believes that this categorization is questionable in practice. By this he meant that clausal elements can be assigned to more than just one of these three fold model. So he treated these hedging strategies as a one category named "clausal elements".

> (Qual. RD) **It would appear that** where some structures depend on general acquisitional processes, others are more likely to draw on 'a general problem solving module. (Ellis, 2006, p. 460)

> (Mixed. RD) **If learners are found to identify with fluent Indonesian users of English**, then Indonesian models of English should complement native-speaker models, certainly at early stages of learning. (Lamb, 2004, p. 17)

> (Qual. RD) **As indicated earlier**, students were guided to pool their knowledge via group work in order to feedback translation of key vocabulary to the teacher; based on this input […]. (Forman, 2011, p. 261)

In addition to lexical hedges and clausal elements, interrogative mode can have hedging effects. Questions were the least frequent in the corpus of the present study. This finding supports Atai and Sadr (2008) and Varttala's (2001).

> (Mixed. RD) What, one wonders, is the perceived difference between homework and revision? Perhaps homework is set by the teacher, whereas revision is more likely to be self-directed? (Griffiths, 2007, p. 97)

> (Quan. RD) Could it be that the learners only benefit (in terms of opportunities to focus on form) from certain collaborative tasks when the other dyad member is of equal or greater ability? (Leeser, 2004, p. 73)

To code the instances of hedging which would not fit the categories found in previous research, we used the label "other" as proposed by Varttala (2001). Several forms of phrases and vocabulary items were assigned to this category. Most of these items indicated quantification. The following examples would illustrate the use of these hedging devices.

> (86, Mixed. RD) A closer investigation reveals a striking contrast between these two. For example, **most of** the 'already acquired 'categories can be characterized as being passive – simply observing what goes on in the classroom. (Gatbonton, 2008, p. 175)
>
> (88, Quan. RD) Because this population consisted of an extremely heterogeneous group of ESL learners in the USA, with representatives from **at least** 13 different L1 backgrounds who had been studying for [...]. (Nielson, 2014, p. 287)

Overall, there was not a great variation in terms of general patterns of hedging use in the three sub-parts of the corpus (the discussion sections of qualitative, quantitative, and mixed methods studies). Observed differences were mostly related to the frequencies of occurrence, not rhetorical patterns. One possible interpretation could be the sameness of the discipline for the three categories (i.e., all articles have been chosen from the field of applied linguistics) and language (i.e., all articles have been written in English) in all three sub parts of the corpus. It seems that hedging could cause more variation in cross disciplinary and cross linguistic studies (Vold, 2006).

In most of the categories and related subcategories, the quantitative corpus had the highest frequency of hedges followed by mixed methods and qualitative corpora. In fact, writers of mixed methods and quantitative studies somehow showed a similar behavior in using hedging strategies. It might be possible that methods of sampling caused this similarity. Having analyzed 50 mixed methods studies, we learned that out of 50 articles, 22 articles were quantitative dominant, 11 articles were qualitative dominant, and 17 articles were equal status mixed methods studies. We infer that the

dominance of quantitative methods over qualitative methods in the present corpus could be a probable reason for the similarities of hedging patterns in the discussion sections of quantitative and mixed methods studies.

Distribution of Hedging Functions

In order to answer the third and fourth research questions, Hyland's (1998a) polypragmatic model was used. Each hedging form was counted and assigned to one of the four categories of the above mentioned model. The four main functions of Hyland's model are "attribute hedges", "reliability hedges" (as the subcategories of "accuracy oriented" hedges), "writer oriented hedges", and "reader oriented hedges". Based on Hyland (1996a), while accuracy hedges are used mainly for the purpose of precision, writer oriented hedges are used to save the writers' face most of the time. Reader oriented hedges are used with the aim of building a relationship with readers and show respect for their opinions. Figure 4 and Table 4 illustrate the frequencies of these functional categories and this classification and Table 4 shows the frequencies of these categories and the distribution of the hedging functions, respectively.

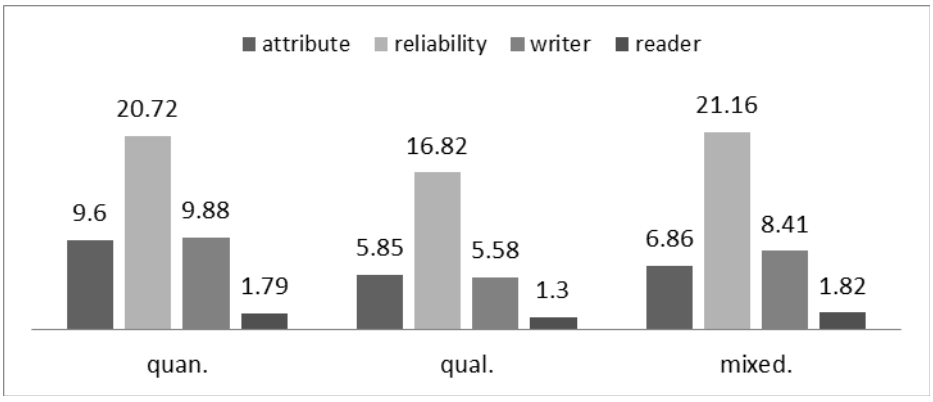

Figure 4. Normal frequencies of the four functional categories of hedges

Table 4
Distribution of Hedging Functions

			Quan. RD		Qual. RD		Mixed. RD		Total	
			f	%	f	%	f	%	f	%
Content Oriented	Accuracy Oriented	Attribute Reliability	780	22.85	475	19.80	515	17.94	1,770	20.38
			1684	49.34	1364	56.88	1587	55.29	4,635	53.39
	Writer Oriented		803	23.52	453	18.89	631	21.98	1887	21.73
Reader Oriented			146	4.27	106	4.42	137	7.44	389	4.48
Total hedges			3,413	100	2,398	100	2,870	100	8681	100
Total words			81,235		81,078		74,966		237,279	

According to table 4, out of 237,279 words which have been analyzed, 8681 instances of hedging were tracked. Reliability hedges has the highest frequency (f = 4635, 53.39 percent of total number of hedges), followed by writer oriented hedges (f = 1887, 21.73 percent of total number of hedges), attribute hedges (f = 1770, 20.38 percent of total number of hedges) and reader oriented hedges (f = 389, 4.48 percent of total number of hedges). The quantitative corpus had the highest frequency of hedges (f = 3413, 42.01 per 1000 words) followed by the mixed methods (f = 2870, 38.26 per 1000 words) and qualitative corpora (f = 2398, 29.57 per 1000 words).

Moreover, reliability hedges were the most frequent type of hedging function in all the three corpora and this finding supports the findings of several prior studies (e.g., Atai & Sadr, 2008; Behnam et al., 2012; Hyland, 1996a; Hu & Cao, 2011). Frequency of these hedging forms was the highest in the mixed methods corpus (f = 1587, 21.16 per 1000 words), followed by the quantitative (f = 1684, 20.72 per 1000 words) and the qualitative corpora (f = 1364, 16.82 per 1000 words).

Having analyzed the frequency of each hedging function, we conducted a chi square test to explain the significance of observed differences among the frequency of the above mentioned four categories of hedging (Table 5). The results showed that the observed differences between the frequencies of

hedges in the four categories of Hyland's (1998a) model was significant: χ^2 (6, N = 237279) = 51.615, $p < .05$.

Table 5

Chi-square Test for the Frequencies of Functional Categories of Hedging

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.615[a]	6	.000
Likelihood Ratio	52.005	6	.000
Linear-by-Linear Association	4.678	1	.031
N of Valid Cases	8678		

In conclusion, the frequency of hedges in the discussion sections of quantitative applied linguistics articles was higher than that of mixed methods and qualitative articles. Being in line with the findings of Atai and Sadr (2008), this finding goes rather contrary to Behnam et al.'s (2012) results; that is, they have found that the discussion sections of qualitative applied linguistics articles are more heavily hedged.

A possible explanation for this difference could be Hind's (1987, p. 146) writer versus reader responsibility languages. Although this classification has been proposed to explain differences of cross linguistic studies, it may shed some light on the discrepancies among the results obtained in the above-mentioned studies. According to Hind (1987), in reader responsibility languages (like Chinese and Japanese) the author is not so much obsessed with convincing the reader but the main focus is on propositional content. It could be the reason of lower frequency of hedges in qualitative articles, in that rhetorical behavior of qualitative papers are more or less similar to reader responsibility languages.

Conclusion

Research articles are used to publicly propose new ideas and the use of cautious language is an important factor influencing the credibility of such contributions (Nivales, 2011). More specifically, "situational

appropriateness", "contextual relevance" and "register awareness" are important factors to talk cogently in each academic community.

To address this important issue with regard to the three different research traditions, the present study explored hedging forms and functions in the discussion sections of qualitative, quantitative and mixed methods research articles. The findings showed that hedging forms in the discussion sections of quantitative Applied Linguistics articles have the highest frequency, followed by mixed methods and qualitative articles. Also, *full verbs*, *auxiliaries* and *adverbs* were the most frequent categories of hedging. In this regard, the results of the Chi square test proved the significance of observed differences. It follows that the observed differences have been related to the epistemological and axiological differences among the three research methods. The nature of the data collected can also be influential; that is to say the statistical data in quantitative research demand a more objective discourse, whereas the constructionist in-depth data in the qualitative studies pave the way for a more subjective and less hedged language.

As mentioned earlier, the results did not show a great variation in general patterns of hedging use and all the differences observed were related to frequency. Another general finding of this study was the similarity of hedging patterns in quantitative and mixed methods studies. As for the functions of hedges, reliability hedges had the highest frequency, followed by writer oriented hedges, attribute hedges, and reader oriented hedges, respectively. The results of Chi square test proved the significance of observed differences.

As argued by a number of researchers, metadiscourse markers like hedges are teachable and even explicit teaching of this text feature "can be a great help for them in reading, translating or writing" (Alibabaee & Shahzamani, 2013, p. 9). On the other hand, limited knowledge of hedges can be considered as a sign of not being an accepted member of "professional discourse community" (Hyland, 1994, p. 244) and may lead to the rejection of authors' scientific contributions because of established norms of communication in each discipline. The results of this study may have implications for the writing courses and the ESP courses in the field of TEFL.

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