Epistemic Modality in Academic Writing: A Discipline-Based Analysis

[1] Havva Kurt Taşpınar

[1] Izmir Institute of Technology, Izmir, Turkey / Contact: havvakurt@yahoo.com

Abstract

Hedges and boosters, as significant indicators of epistemic modality, have recently grasped the attention of scholars conducting research to explore the language use in academic discourse. Hence, the study aims to reveal the hedges and boosters that are utilized in academic articles and the frequency of the use of these linguistic devices. The article presents findings from both education and engineering. Twenty-four journal articles retrieved from leading research journals were analysed. The results were in line with the previous studies indicating similarities as well as differences between the selected journals in terms of the use of hedges and boosters.

Keywords

academic writing, boosters, epistemic modality, hedges.

Introduction

Academic writing is a special genre of writing that requires the writer to follow specific rules and conventions. Due to its linguistic discourse, academic writing is objective and impersonal. Another feature of academic writing is that it lacks direct references to the interpretations and judgements of its author (Serholt, 2012). Through the use of rules and conventions of this particular style of writing, researchers aim to define the intellectual boundaries of their disciplines and their areas of expertise. Academic writing involves the use of a formal tone, the third-person perspective, clarity on the focus of the research problem to be investigated, and a precise word choice. As a form of specialist language, academic writing conveys agreed meaning about complex ideas or concepts for a group of scholarly experts.

In this sense, effective academic article writing requires the author to provide the reader with the data that were analysed tentatively enabling the reader to make alternative interpretations. In linguistics, this phenomenon is called epistemic modality which indicates “a speaker’s confidence or lack of confidence in the

propositional information that s/he provides" (Coates, 1987, p. 112). The use of hedges and boosters shows the degree of the author's confidence (Hyland, 2000). Authors use these linguistic devices to persuade their readers of the correctness of the claims they make and to gain community acceptance for their work in terms of disciplinary scholarship and knowledge which is socially negotiated. In brief, expressing doubt and certainty in academic writing is one of the core professional communication skills in the light of a genre-based approach to specialized language and in the development of professional communication skills (Swales, 2004).

Hedges, Boosters, and Epistemic Modality

Writers "tone down uncertain and potentially risky claims, emphasize what they believe to be correct, and convey appropriately collegial attitudes to readers" in academic discourse (Hyland, 2000, p. 179). Hyland defines hedges and boosters as "the items writers use to modify their claims" (p. 179). In other words, the expressions which indicate doubt and certainty are called hedges and boosters (Holmes, 1984, 1990, as cited in Hyland, 2000, p. 179). As communicative strategies, they either increase or reduce the force of statements (Hyland, 1998, p. 349). In this sense, hedges and boosters are authorial judgements, which convey the primary content in a given discourse. Through the use of these linguistic devices in their work, scholars aim to gain acceptance in their academic disciplines. As a result, the use of hedges and boosters plays a central role in academic writing due to their rhetorical and interactive nature.

Hedges are utilized in order to reduce the strength (force) of an expression since they express tentativeness and possibility (Hyland, 1996a, 1996b, 2000). Through an explicit qualification of the writer's commitment, hedges are used to express a weakening of a claim (Serholt, 2012). This may be to show doubt and indicate that information is presented as opinion, not as accredited fact, or it may be to convey deference, humility, and respect for colleagues' views. On the other hand, boosting devices emphasize or intensify the force, for they express conviction. That is to say, through boosters, writers assert a proposition with confidence (Hyland, 1998). By using boosters, writers are able to express conviction and assert a proposition with confidence. Using boosters enables writers to represent a strong claim about a state of affairs. In terms of their affective function, boosters are also used to mark

involvement and solidarity with an audience, to stress shared information, group membership, and direct engagement with readers.

Plus, hedges and boosters are required to make scientific statements in social contexts. These devices are accuracy-oriented, writer-oriented, and reader-oriented. Hence, hedges and boosters are referred to as textual strategies of using linguistic means in a certain speech act, and they are used for specific communicative purposes. With their pragmatic aspects, these linguistic devices are related to epistemic modality which reflects a speaker's/writer's attitude toward the truth-value or factual status of a proposition and towards the propositional content. Through the use of these devices, both epistemic and affective meanings are conveyed (Hyland, 1998). Epistemic modality involves expressions regarding speculation, deduction, and assumption, which overlap with hedging and boosting (Takimoto, 2015). They are used to indicate the writer's degree of confidence in the truth of a proposition and their attitude to the audience (Hyland, 1998). In a nutshell, by using hedges and boosters, the writer aims at a balance among objective information, subjective evaluation, and interpersonal negotiation as this balance can be a powerful persuasive factor in gaining acceptance for claims (Hyland, 2000). In the next part, the studies that investigated the use of hedges and boosters in academic writing will be reviewed.

Literature Review

Hyland (1996a) conducted a detailed contextual analysis of a 75,000 word corpus of 26 articles selected from issues of the six leading journals in the field of cell and molecular biology (SCI, 1993) with the aim of proposing an explanatory framework for scientific hedging which combines sociological, linguistic, and discourse analytic perspectives.

In Hyland's (1998) study, the data consisted of a corpus of 56 published research articles and a series of interviews with members of the relevant discourse communities. One paper from each of seven leading journals in eight disciplines (mechanical engineering, electrical engineering, marketing, philosophy, sociology, applied linguistics, physics and microbiology) was chosen to represent a broad cross-section of academic activity. With an average of 120 occurrences per paper, the quantitative results showed the importance of hedging and boosting in academic writing. The results indicated a general division between philosophy, marketing,

linguistics, and sociology on one hand, and physics and engineering on the other, biology occupied the middle ground. Overall, the humanities/social science papers involved more than 70% of all hedges occurred. The science and engineering papers were underrepresented in terms of the number of boosters. In sum, the results demonstrated major disciplinary differences in the academic writers' rhetorical preferences revealing a clear distinction between the sciences and humanities/social sciences.

Farrokhi and Emami (2008) investigated the use of hedges and boosters in twenty research articles of two disciplines which are Electrical Engineering and Applied Linguistics. The study also examined the native and non-native writers' use of hedges and boosters in these research articles. The researchers calculated the overall rhetorical and categorical distribution of hedges and boosters across four rhetorical sections (Abstract, Introduction, Discussion, and Conclusion) of the research articles. The analysis displayed that the overall distribution of hedges and boosters in Applied Linguistics articles was higher than Electrical Engineering articles. Furthermore, the analysis revealed significant differences between native and non-native writers' use of hedges and boosters.

In her study, Doyuran (2009) examined the role of hedges in Turkish scientific articles by identifying the purposes, distribution and major forms of hedges. The data comprised of 20 published research articles (10 from each discipline) from the fields of geological engineering and linguistics. The analysis demonstrated that the number of hedges in linguistics corpus (12.346) was 275, and it was 196 in geological engineering corpus (10.859) suggesting that the number of hedges in linguistic papers was 1.4 times more than those in geological engineering. The findings confirmed that the conventions of specific disciplines affect the research discourse.

Behnam, Naeimi, and Darvishzade (2012) investigated the frequency, form, and function of hedging in the discussion sections of 100 qualitative and quantitative research articles based on Hyland's (1996) taxonomy. The results revealed a statistically-significant difference between qualitative and quantitative research articles regarding the frequency and form of the employed hedge words.

Based on Hyland's (1996) pragmatic framework of hedging orientations, Kim and Lim (2015) explored the use of hedges in academic writing in their study. The study elicited the specialist informants' insights on the use of hedges in academic writing as

well. The data came from thirty randomly-selected research article discussions which were published between 2010 and 2014, in the Journal of English for Academic Purposes. The analysis demonstrated that a repertoire of lexical signals and hedging strategies was used to realize the different hedging orientations employed in the corpus. Informants, in their responses, stated that socio-cultural factor, classroom instruction, disciplinary culture, and disciplinary appeals led to second language learners' inability to use hedges in their academic prose.

Takimoto (2015) aimed to measure the frequencies and functions of hedges and boosters in research articles from eight academic disciplines in his study. The results revealed that hedges exceeded boosters in the selected research articles. The philosophy articles displayed a significant use of hedges and boosters. The natural science papers, however, were underrepresented in the occurrences of hedges and boosters. In addition, the results indicated that the writers' choices were mostly determined by the discourse norms and rhetorical styles of the disciplines reflecting the nature of different disciplinary characteristics. The results of the study confirmed that the humanities and social sciences were more interpretative and less abstract. In other words, the style in these disciplines required more hedges and boosters and opted for subjectivity while natural sciences were more fact-oriented and more impersonal. As a result, they were accompanied by fewer hedges and boosters and opted for objectivity. The further analysis showed that the relative incidence of hedges of the possibility/probability category in adjectives and adverbs was the highest in humanities and the lowest in natural sciences.

Despite the importance of hedges and boosters in academic writing, the studies conducted on their use in different disciplines and genres are limited (Farrokhi & Emami, 2008). Therefore, this study aims to explore the comparative use of hedges and boosters in research articles.

Aim of the Study and Research Questions

This study aims to examine two scholarly journals from different disciplines in terms of the epistemic modality use (i.e. hedges and boosters) to reveal the discipline-specific language use. With regard to this aim, the study seeks answers for the following research questions:

(1) How do the use of hedges compare to the use of boosters in a scholarly education journal?

(2) How do the use of hedges compare to the use of boosters in a scholarly engineering journal?

(3) How do the use of hedges in a scholarly education journal compare to the use of hedges in a scholarly engineering journal?

(4) How do the use of boosters in a scholarly education journal compare to the use of boosters in a scholarly engineering journal?

(5) What are the most frequently used hedges in a scholarly education journal?

(6) What are the most frequently used hedges in a scholarly engineering journal?

(7) What are the most frequently used boosters in a scholarly education journal?

(8) What are the most frequently used boosters in a scholarly engineering journal?

(9) How do the most frequently used hedges in a scholarly education journal compare to the most frequently used hedges in a scholarly engineering journal?

(10) How do the most frequently used boosters in a scholarly education journal compare to the most frequently used boosters in a scholarly engineering journal?

Method

The categorization of hedges and boosters in the study was derived from Hyland's linguistic model which involved the most common hedges and boosters "found in a 500,000 word corpus of academic research articles from eight disciplines" (Hyland, 2000, pp.182-183). The modal verb *will* was excluded as its function varies in different contexts (Toolan, 1996, p. 49, as cited in Serholt, 2012).

Data sources

A corpus of published research articles provides the data for the present study. Data were retrieved from two scholarly journals accessed through SCIENCEDIRECT, which provides full-text articles regarding scientific, technical, and medical research. In order to compare the discipline-specific use of hedges and boosters, *International Journal of Educational Research* (IJER) and *International Journal of Engineering Science* (IJES) were selected by the researcher since both journals included articles on different subject areas in the regarding fields and had high impact factors (IJER:

0.930, IJES: 4.261) within the related fields. The former journal was chosen to analyse the use of hedges and boosters in social sciences. The latter was selected to reveal the use of hedges and boosters in natural sciences. Articles were retrieved from IJES -Volume 109: December 2016- which was the most recent volume including 13 articles. One of the articles was excluded since it was a letter to the editor. As twelve articles were chosen from IJES, the first twelve articles out of 18 articles from IJER -Volume 80: Latest Volume released in 2016- were included in the study. The data came from 24 articles which were 401 pages in total, IJER: 149 pages and IJES: 252 pages.

Data analysis

The target linguistic devices in the selected articles were manually counted throughout the documents using the built-in search function in Adobe Acrobat Professional. Each article was analysed individually. Although the initial analysis of the linguistic devices included *hypothesize/hypothesise* in the category of hedges, it was then omitted as it was not used in any of the articles analysed. Table 1 specifies the hedges and boosters used in the study:

Table 1. Linguistic devices used in the study.

	Hedges	**Boosters**
	Appear	Always
	Assume	Certain
	Believe	Certainly
	Could	Clear
	Indicate	Clearly
	Likely	Definite
	May	Definitely
	Might	Demonstrate
	Possible	Fact that
	Possibly	Obviously show
	Probable	Show that
	Probably	Substantially
	Seem	
	Seemingly	
	Speculate	
	Suggest	
Total	**16**	**12**

The target linguistic devices in the analysis involved 16 hedges and 12 boosters in total.

Results

The results of the study will be presented in the order of the research questions used for the investigation.

RQ 1: The comparison of the use of hedges and boosters in a scholarly education journal

The first research question investigated the use of hedges and boosters in IJER. Table 2 shows the overall number of hedges and boosters employed.

Table 2. Use of hedges and boosters in IJER.

Category	Total
Hedges	516
Boosters	134
Total	**650**

As the table shows, in *International Journal of Educational Research*, not only hedges but also boosters were frequently used. However, hedges exceeded boosters. The number of overall hedges utilized in the articles was 516 while the number of boosters used was 134 in 12 articles. In brief, almost four times more hedges were used in the education articles.

RQ 2: The comparison of the use of hedges and boosters in a scholarly engineering journal

The second research question was about the use of hedges and boosters in IJES. Table 3 presents information regarding the total number of hedges and boosters used in the journal.

Table 3. Use of hedges and boosters in IJES.

Category	Total
Hedges	153
Boosters	75
Total	**228**

In *International Journal of Engineering Sciences*, on the other hand, the total number of hedges was only 153. It almost doubled the number of boosters used in the articles. Similar to IJER, the number of hedges used was more than the number of boosters used in the articles related to engineering sciences. Overall, in both of the selected journals, more hedges were used in the articles compared to boosters.

RQ 3: The overall frequency of hedges

In Figure 1, the number of hedges used in IJER and IJES has been compared.

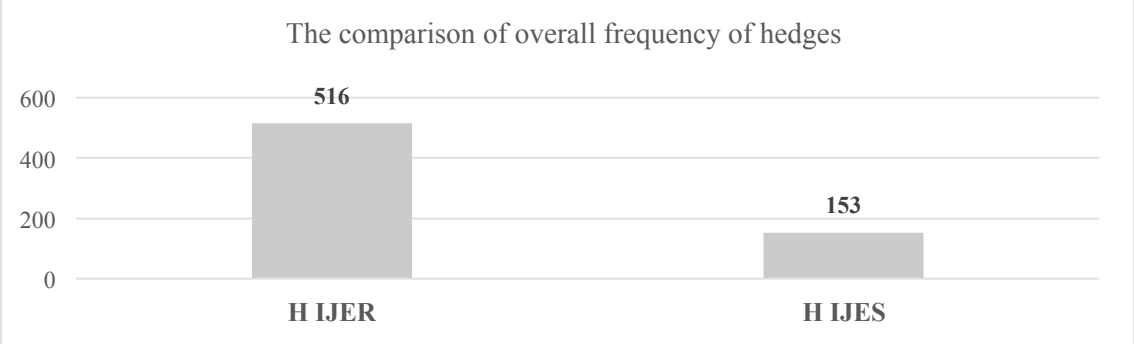

Figure 1. The overall frequency of hedges.

In terms of the total number of hedges used in the target journals, IJER included more hedges than IJES. The number of hedges in the former journal was 516. However, only 153 hedges were used in the latter journal. Although the overall number of the pages analysed was 252 in IJES and 149 in IJER, the occurrences of hedges in IJES were lower.

RQ 4: The overall frequency of boosters

Figure 2 presents information on the overall number of boosters employed in IJER and IJES.

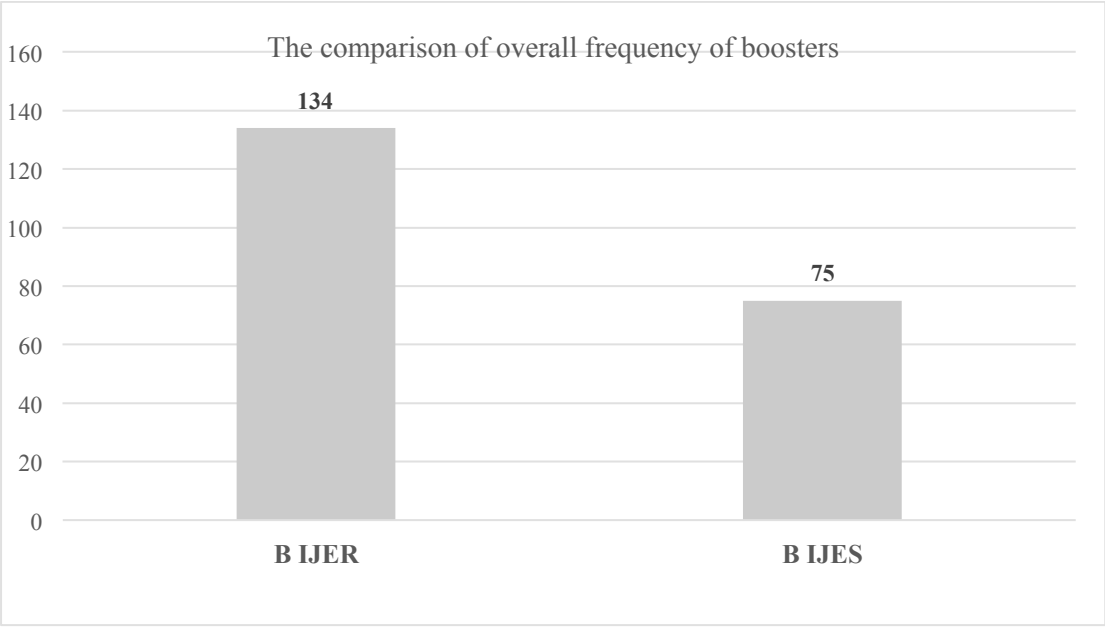

Figure 2. The overall frequency of boosters.

As in the analysis of hedges, the number of boosters used in IJER was higher than the number in IJES. However, the discrepancy between the numbers of boosters used in the two journals was not as high as the discrepancy between the numbers of hedges used.

RQ 5: The overall frequency of specific hedges in IJER

The fifth research question explored the use of specific hedges in the articles retrieved from IJER. Table 4 presents detailed information on the frequency of hedges.

Table 4. Overall frequency of specific hedges in IJER.

Hedges	**N**
Appear	17
Assume	7
Believe	5
Could	78
Indicate	76
Likely	17
May	114
Might	58
Possible	33
Possibly	1
Probable	0
Probably	4
Seem	39
Seemingly	1
Speculate	1
Suggest	65
Total	**516**

The table shows that certain hedges were more commonly used than others. *May* was the most frequently used (22%) hedge. *Could* (15.11%), *indicate* (14.72%), *suggest* (12.59%), and *might* (11.24%) were also frequently used in the articles regarding educational research as a marker of uncertainty. *Assume* (1.35%) and *believe* (0.96%); however, were not used very frequently. The least frequently used hedges were *seemingly* (0.19%), *possibly* (0.19%), and *speculate* (0.19%). Lastly, *probable* was not used in any of the articles.

RQ 6: The overall frequency of specific hedges in IJES

Research question 6 investigated the hedges used in IJES. Table 5 presents detailed information on the use of hedges.

Table 5. Overall frequency of specific hedges in IJES.

Hedges	N
Appear	16
Assume	69
Believe	0
Could	8
Indicate	17
Likely	1
May	23
Might	0
Possible	12
Possibly	1
Probable	0
Probably	1
Seem	0
Seemingly	0
Speculate	0
Suggest	5
Total	**153**

Apparently, *assume* (45.09%) was the most frequently used hedge in IJES. The analysis also revealed that *may* (15.03%) *indicate* (11.11%), and *appear* (10.45%) were also preferred as hedges in the engineering journal. The least frequently used hedges were *likely* (0.65%), *possibly* (0.65%), and *probably* (0.65%). *Seem, seemingly, might, speculate, believe, probable,* and *probably* were not used in any of the journals analysed.

RQ 7: The overall frequency of specific boosters in IJER

Research question 7 aimed to explore the overall frequency of the individual boosters involved in the analysis in IJER. In Table 6, frequencies have been presented.

Table 6. Overall frequency of specific boosters in IJER.

Boosters	N
Always	21
Certain	22
Certainly	4
Clear	24
Clearly	22
Definite	0
Definitely	0
Demonstrate	16
Fact that	3
Obviously show	0
Show that	22
Substantially	0
Total	**134**

Except for four boosters (*substantially, definite, definitely,* and *obviously show*), all the boosters were used in the IJER articles. As shown in Table 5, *clear* (17.91%) was the most frequently-used booster followed by *show that, certain,* and *clearly*, all of which had the same frequency (16.41%). *Demonstrate* (11.94%) was also used as one of the boosters in the selected articles. *Substantially, definite, definitely,* and *obviously show* were not used in any of the IJER articles.

RQ 8: The overall frequency of specific boosters in IJES

In research question 8, the overall frequency of specific boosters in IJES was computed. Table 7 presents the detailed analysis.

Table 7. Overall frequency of specific boosters in IJES.

Boosters	**N**
Always	5
Certain	2
Certainly	3
Clear	8
Clearly	16
Definite	3
Definitely	0
Demonstrate	10
Fact that	14
Obviously show	0
Show that	12
Substantially	2
Total	**75**

The analysis of the frequency of the boosters utilized in IJES indicated that *clearly* had the highest frequency (21.33%). It was followed by *fact that* (18.66%). Besides these boosters, *show that* (16%), *demonstrate* (13.33%), and *clear* (10.66%) were used as well. The least frequently boosters involved *definite* (4%), *certainly* (4%), *substantially* (2.6%), and *certain* (2.6%). However, none of the articles included the use of the boosters *definitely* and *obviously show.*

RQ 9: The Discipline-Based Comparison of Hedges

The ninth research question explored the discipline-based similarities and differences in the frequency of the hedges used. Table 8 presents the comparison of the frequencies of specific hedges in both of the selected journals.

Table 8. Discipline-based comparison of hedges.

Hedges	IJER (N)	IJES (N)
Appear	17	16
Assume	7	69
Believe	5	0
Could	78	8
Indicate	76	17
Likely	17	1
May	114	23
Might	58	0
Possible	33	12
Possibly	1	1
Probable	0	0
Probably	4	1
Seem	39	0
Seemingly	1	0
Speculate	1	0
Suggest	65	5
Total	**516**	**153**

Although *may* was the hedge that had the highest frequency in the articles regarding education, it was one of the least frequently used hedge in the engineering articles. Similarly, the use of *could, might, assume* and *indicate* had a high discrepancy. Except for *assume*, all these hedges were more frequently used in IJER. With regard to the similarities, the analysis indicated that in both journals, the frequencies of the hedges including s*eemingly, appear, possibly, speculate, believe, probable and probably* were low, or they were not even used in any of the selected articles.

RQ 10: The Discipline-based Comparison of Boosters

The final research question explored the discipline-based similarities and differences in terms of the frequencies of boosters used in the journals analysed as shown below.

Table 9. Discipline-based comparison of boosters.

Boosters	IJER (N)	IJES (N)
Always	21	5
Certain	22	2
Certainly	4	3
Clear	24	8
Clearly	22	16
Definite	0	3
Definitely	0	0
Demonstrate	16	10
Fact that	3	14
Obviously show	0	0
Show that	22	12
Substantially	0	2
Total	**134**	**75**

In education articles, while *always, demonstrate, certain,* and *clear* were preferred to be used frequently, these boosters were not frequently used in the engineering articles. However, a similar trend was observed for the boosters including *substantially, definite, definitely, certainly,* and *obviously show.* That is to say, these boosters were not widely used in the articles retrieved from both of the selected journals. The only booster that was used more frequently in the IJES compared to IJER was *fact that*.

Discussion and Conclusion

To conclude, the overall number of hedges and boosters employed in the research articles retrieved from IJER was 650. The frequency of hedges in IJER was 79.38%, whereas the frequency of boosters was 20.61%. The results demonstrated that hedges were employed more than the boosters in the education journal. In contrast, the total number of hedges and boosters used in the engineering articles was 228, less than half of the overall number of the target linguistic devices in education articles. The authors' choices in IJES showed a tendency for the hedges (67.10%) as well. Boosters constituted only 32.89% of the overall use of hedges and boosters. However, this percentage was higher than the percentage in education journals suggesting that scholars who conducted research on engineering used more boosters than scholars that conducted research on education. The analysis showed that the use of hedges was preferred more than the use of boosters. Not only in IJER articles but also in IJES articles, the hedges were utilized more frequently with a total number of 669. 77.13% of overall hedges were used in IJER, whereas only 22.86% of the hedges were used in IJES. The total number of boosters, on the other hand, was much lower than this number: 209. 64.11% of these boosters were employed in IJER while 35.88% was used in IJES. In sum, IJER articles constituted the 74.03% and IJES articles constituted the 25.96% of the overall use of hedges and boosters in the selected journals.

The detailed analysis of the specific use of hedges and boosters revealed both similar and different trends in the target disciplines. The most frequently used hedge in education articles was *may.* The least frequently used hedges were *seemingly, possibly,* and *speculate*. *Probable* was not used in any of the articles. In IJES articles, on the other hand, the most commonly preferred hedge was *assume*. The least frequently used hedges were *likely, possibly,* and *probably*. *Seem, seemingly, might,*

speculate, believe, probable, and *probably* were not used in any of the journals analysed. As for the boosters, *clear* was the most frequently employed booster in IJER articles. In a similar vein, in IJES, the most widely used booster was *clearly*. *Substantially, definite, definitely,* and *obviously show* were not used in any of the IJER articles. Similarly, none of the IJES articles included the use of the boosters *definitely* and *obviously show.*

On the whole, the findings of the present study were in line with the previous studies (see Hyland, 1998; Farrokhi and Emami, 2008; Doyuran, 2009; Takimoto, 2015). 74.03% of all hedges and boosters were found in the education journal. Also, the authors' choices seem to be constrained by the discourse norms and rhetorical styles of their disciplines and reflect the nature of disciplinary characteristics. In this regard, humanities and social sciences are more interpretative and less abstract requiring more hedges and boosters and opting for subjectivity, whereas natural sciences are typically more fact-oriented and more impersonal, accompanied by fewer hedges and boosters and opting for objectivity. The further analysis of hedges shows that the relative incidence of hedges of the possibility/probability category in adjectives and adverbs was the highest in humanities and the lowest in natural sciences (Takimoto, 2015). However, regardless of discipline, hedges and boosters work together to balance subjective evaluation and objective information with anticipated reactions from readers and aim to persuade readers to accept their claims.

Hedges and boosters play a critical role in gaining ratification for claims from a powerful peer group in science by providing writers with the opportunity to present statements with appropriate accuracy, caution, and humility (Hyland, 1998). Through the use of hedges, the perspective from which conclusions are accepted can be negotiated (Hyland, 1996a). Therefore, more studies in the future should be conducted with regard to the discipline-specific use of these linguistic devices. Language teaching curriculum should be redesigned in the light of these findings since a more genre-based and discipline-based pedagogy lead to more effective language learning processes.

Notes on the contributor

Havva Kurt Taşpınar (MA) is an instructor at School of Foreign Languages, IZTECH, Izmir, Turkey. She is currently a Ph.D. student at Graduate School of Education, Dokuz Eylul University, Izmir. Her research interests include linguistics, psycholinguistics, (critical) discourse analysis, critical literacy, and genre-based reading instruction.

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Appendix 1: Article Corpus

International Journal of Educational Research (Volume 80, 2016)

Aburizaizah, S., Kim, Y., & Fuller, B. (2016). Diverse schools and uneven principal leadership in Saudi Arabia. *International Journal of Educational Research*, *80*, 37-48.

Gelderblom, G., Schildkamp, K., Pieters, J., & Ehren, M. (2016). Data-based decision making for instructional improvement in primary education. *International Journal of Educational Research*, *80*, 1-14.

Jesson, R. & Rosedale, N. (2016). How teachers might open dialogic spaces in writing instruction. *International Journal of Educational Research*, *80*,164-176.

Love, K. & Sandiford, C. (2016). Teachers' and students' meta-reflections on writing choices: An Australian case study. *International Journal of Educational Research*, *80*, 204-216.

Matre, S., & Solheim, R. (2016). Opening dialogic spaces: Teachers' metatalk on writing assessment. *International Journal of Educational Research*, *80*, 188-203.

Milicevic, A., Milton, I., & O'Loughlin, C. (2016). Experiential reflective learning as a foundation for emotional resilience: An evaluation of contemplative emotional training in mental health workers. *International Journal of Educational Research*, *80*, 25-36.

Mulholland, S., & Cumming, T. M. (2016). Investigating teacher attitudes of disability using a non-traditional theoretical framework of attitude. *International Journal of Educational Research*, *80*, 93-100.

Myhill, D., & Newman, R. (2016). Metatalk: Enabling metalinguistic discussion about writing. *International Journal of Educational Research*, *80*, 177-187.

Schallert, D. L., Song, K., Jordan, M. E., Lee, S. A., Park, Y., Kim, T., Cheng, A. C. J., Chu, H. N. R., Vogler, J. S. & Lee, J. E. (2016). Shifts in trajectories in thought communities and "wobbly" identities enacted in computer-mediated classroom discussions. *International Journal of Educational Research*, *80*, 49-59.

Sebastian, J., & Huang, H. (2016). Examining the relationship of a survey based measure of math creativity with math achievement: Cross-national evidence from PISA 2012. *International Journal of Educational Research*, *80*, 74-92.

Townend, G., & Brown, R. (2016). Exploring a sociocultural approach to understanding academic self-concept in twice-exceptional students. *International Journal of Educational Research*, *80*, 15-24.

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