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Analyzing Words of Caution and Confidence in ES and KS Dissertations

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ABSTRACT

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Academic writing frequently utilizes hedges and boosters to convey caution and confidence and eventually enhance credibility in scholarly communication. Previous research has mainly focused on the frequency of these devices in journal articles, with limited attention to their usage in doctoral dissertations, particularly written by ESL/EFL authors. This study aims to examine how English-speaking (ES) and Korean-speaking (KS) authors in the fields of English Education (EE) and Biology (BIO) use hedges and boosters in their dissertation discussions, with a special focus on the contexts in which these devices are employed. Using a mixed-methods approach, we first conducted a descriptive analysis of 120 dissertations, equally divided between ES and KS authors across two disciplines and then identified top 10 most frequently used hedges and boosters in each group. A subsequent qualitative analysis explored the contexts in which the key devices were employed, revealing cross-linguistic, cultural, and disciplinary patterns. The findings showed that ES authors tend to emphasize possibility and open interpretation, which reflects a Western academic preference for acknowledging alternative perspectives. Conversely, KS authors prefer to deliver their findings directly and cautiously, highlighting the Korean cultural norms that favor both authoritative and humble statements. Regarding boosters, ES authors underscore notable results or unexpected findings, often in a narrative style that invites readers' engagement, while KS authors employ boosters in contexts that require careful assertion of results, which is associated with the cultural values that emphasize modesty and reduce self-responsibility. After all, this study offers insights into how linguistic, cultural, and disciplinary factors shape those rhetorical strategies in dissertation writing, implying the need for specialized dissertation writing instruction, particularly for L2 writers, to address these contextual subtleties effectively.

KEYWORDS

boosters, caution, confidence, cross-linguistic, dissertation, hedges, inter-disciplinary, qualitative analysis

1. Introduction

Hedging, which is a rhetorical strategy to soften speakers' or writers' statements, has been a significant topic in linguistics since Lakoff's (1973) work, which highlighted the inherent ambiguity and indecisiveness of natural language. Hence, traditionally, hedging devices[1] were simply assumed to be rare in formal writing genres like scientific journal articles, which prioritize clarity and precision. However, empirical studies by a group of scholars such as Hinkel (1997, 2002, 2005), Hyland (1996), Myers (1992), and Salager-Meyer (1994, 2011) have shown that hedges are indeed widely used in these contexts, challenging the earlier assumption. Myers (1992), in particular, suggests that the authors of scientific articles intentionally use those hedges of uncertainty and tentativeness to politely persuade the reviewers and colleagues (cf. Brown and Levinson 1987), even if this strategy contradicts the principle of being clear and concise.

However, this explanation has been criticized for its Western-centric bias, leading to a call for cross-linguistic comparisons (cf. Blum-Kulka 1987). Furthermore, such studies on the use of hedges in scientific writings have so far focused on comparing the frequency of these devices quantitatively, with few examining their specific types and contexts qualitatively across different groups. In addition, while dissertations are recognized as a distinct genre of academic writing, particularly within the field of second language (L2) writing research (Paltridge and Starfield 2020, Paré 2019), there remains a significant gap in understanding how dissertation authors from various linguistic and disciplinary backgrounds express modesty and assertiveness through such rhetorical devices like hedges and boosters. Our study seeks to address these gaps by examining how English-speaking (ES) and Korean-speaking (KS) authors in the fields of English Education (EE) and Biology (BIO) use hedges and boosters in their dissertation discussions. Specifically, this study aims to answer two key questions in need of qualitative (as well as quantitative) analysis: (RQ1) What are the top 10 most frequently used hedges and boosters in dissertations written by ES and KS authors in EE and BIO? (RQ2) How do the contexts and patterns of using these dominant hedges and boosters differ between ES and KS authors across these disciplines? By analyzing the top 10 most frequently used hedges and boosters qualitatively, we aim to uncover the rhetorical strategies that ES and KS dissertation writers use, considering both linguistic and disciplinary influences.

Dissertations are unique in that they require authors to present arguments in a balanced manner, appealing both politely and confidently to their committee members and the academic community (Anderson et al. 2020, Holbrook et al. 2004, Paltridge 2002, 2013, Paltridge and Starfield 2020, Paré 2019).[2] However, unlike scientific journal articles, dissertations have been less studied regarding how these rhetorical strategies are employed, particularly in the discussion sections. Besides, discipline-specific writing conventions add another layer of complexity for L2 writers. Scholars such as Durrant (2014), Hu and Cao (2015), and Wharton (2012) have emphasized that adherence to specific disciplinary conventions can pose additional challenges for L2 writers. These difficulties become more serious when L2 writing conventions conflict with those of the L1 culture (Hyland and Milton 1997, Shim 2005).

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[1] The term *hedging devices* is broadly used in this study to encompass both hedges and boosters: hedges mitigate certainty or soften a claim while boosters convey confidence and amplify the strength of a statement.

[2] Uunlike journal articles, which often adopt a more authoritative tone to assert their findings concisely and effectively within fairly limited pages, dissertations, as a unique academic genre, require their authors to maintain a careful balance between presenting novel contributions and demonstrating modesty in relation to existing scholarship. For example, while boosters are generally employed to assert confidence, their use in dissertations is often more restrained than journal articles, where the emphasis is more on persuading readers of the findings' immediate impact. Dissertators must present their work as significant, but they should do so by framing it within a more extensive, ongoing research process rather than as a definitive conclusion.

By focusing on hedging strategies of dissertation writing across linguistic and disciplinary dimensions, this study aims to shed light on the rhetorical strategies employed by Korean dissertators compared to those adopted by their American counterparts. Understanding the different patterns is not only crucial for advancing professional research in academic discourse but also provides practical insight for L2 writing instruction. Specifically, this study offers valuable lessons for L2 learners in grasping the use of hedges and boosters, helping them to become more proficient dissertation writers and successfully compromise the complex demands of dissertation writing.

2. Previous Studies

2.1 Cross-cultural and Inter-disciplinary Comparisons

The socio-pragmatic role of hedges has been the subject of extensive study since Lakoff's (1973) pioneering research. The inherently skeptical and speculative nature of scientific discourse, in particular, necessitates the use of hedges, allowing researchers to present their findings with appropriate caution and uncertainty, thus gaining peer approval. Several researchers like Hyland (1996), Myers (1992), and Salager-Meyer (1994) have underscored the importance of hedging in gaining acceptance for novel ideas within the scientific community. And those researchers from various cultural and linguistic backgrounds, who study hedging in scientific writing, have uncovered notable differences.

Specifically, Korean academic writing, shaped by hierarchical social structures, employs formal language and indirect quotations to convey respect and deference (Eggington 1987, Hinkel 1997, Holtgraves 1997, Hyland 2001, Kim et al. 2014, Kim and Lim 2015, Park 2007). While Confucian values emphasize modesty, leading to the assumption that Asian students and scholars use more hedges, as noticed in Korean academic writing, studies by Hinkel (2005) and Hu and Cao (2011) discovered that Chinese academic writing frequently uses fewer hedges and more assertive language, indicative of authoritative academic cultures.

Disciplinary writing conventions have also received significant attention, particularly among L2 writers. Scholars such as Becher and Trowler (2001) argue that each scientific discipline has its own unique writing conventions. To clarify these discipline-specific writing patterns and help L2 writers master the diverse conventions of each field, Hyland (2005) examines eight different disciplines, revealing that hedges are more common in the humanities due to the fields' tendency to express less certainty about colleagues' agreements. McGrath and Kuteeva's (2012) study of mathematics compared with Hyland's (2005) cross-disciplinary findings also confirms such significant disciplinary variation.

In contrast, Li and Wharton's (2012) study, which examines disciplinary and contextual factors within the institutions in China and the UK using four Chinese groups, reveals that contextual factors have a stronger impact than disciplinary ones. This finding highlights the need for a more detailed exploration of hedges and boosters within the disciplines to ensure precise articulation of claims. Shen et al. (2019) also reports this need, particularly emphasizing the context of both native and L2 dissertation writers.

The cultural and disciplinary differences, which have been primarily identified through frequency-based quantitative analysis, emphasize the need for a deeper qualitative examination of hedging and boosting in scientific writing. While quantitative studies offer valuable insights, they often fail to capture the sophisticated ways these rhetorical devices are used. A qualitative analysis can uncover the specific types and contexts of hedges and boosters used by writers from different linguistic and disciplinary backgrounds.

Our study addresses this gap in qualitative analysis by comparing the use of hedges and boosters in doctoral

dissertations from two disciplines, EE and BIO, written by two language groups, ES and KS. By focusing on the top 10 most frequently used tokens, we eventually aim to reveal the qualitative differences in rhetorical strategies, providing a deeper understanding of how these devices are utilized in dissertations. This approach will offer valuable insights for L2 writing instruction and contribute to a deeper understanding of academic writing practices across cultures and disciplines.

2.2 Cultural Influences on Hedge Practices in Korean Academic Writing

Previous studies of Korean hedging expressions have laid a valuable foundation for the development of such rhetorical devices in Korean, which provides significant pedagogical implications for Korean EFL teachers and learners (Kim and Lim 2015, Kim et al. 2020, Lee 2012, Park 2007, Shim 2005, Shin 2011). Nevertheless, only a few studies have seriously addressed the cultural factors influencing Korean speakers' use of hedges in academic writing conventions (Hinkel, 1997, 2005, Shim, 2005). Hinkel's (1997, 2005) comparative study, for example, reveals that Korean academic writing is characterized by a high degree of indirectness and politeness, which is significantly influenced by the hierarchical structure of Korean society and Confucian cultural norms that emphasize respect for hierarchy, deference to authority, and modesty. That is, Korean academic writers frequently use honorifics and indirect language to soften statements and avoid confrontation. They often avoid making direct claims and assertions, but prefer using such hedging devices as may, might, perhaps, and seem to express possibility and maintain a non-assertive tone. This reflects the hierarchical nature of Korean academic society.

Similarly, drawing on 20 published research articles in the field of applied linguistics, Shim (2005) compares the hedging expressions in the introduction sections of English journal articles by Korean and English writers. To better understand L1 Korean writers, Shim (2005) additionally investigates the use of hedges in the introduction sections of journal articles (n=10) written in Korean. However, the findings suggest that Korean writers tend to be direct and assertive in their academic writing, differently from Hinkel's (1995) conclusion. Shim (2005) reports that Korean writers prefer using a non-hedged statement with the verbal ending *-issta* 'be' to a hedged statement in journal articles, to avoid uncertainty or doubtfulness. By focusing on Korean writers' rhetorical strategies that a passive indirect quotation marker *-ko hata* 'be said that' is commonly employed in Korean academic writing, Shim (2005) continues to claim that Korean writers' avoiding of a direct presentation of opinions not only protects their own personal positions with anonymous references but also makes their claims more objective.

Building on these previous insights into Korean academic writers' rhetorical strategies, this study further investigates how the use of hedges and boosters in dissertation writing is shaped by disciplinary conventions and cultural contexts. Ultimately, in this study, we aim to uncover how dissertation authors from diverse linguistic and disciplinary backgrounds pursue the balance between modesty and confidence, contributing to a deeper understanding of effective dissertation writing. To achieve this, we address the following research questions:

Q1. How do the top 10 most frequently used hedges and boosters differ between ES dissertations and KS dissertators in EE and BIO?

Q2. How do the contexts and patterns of using those dominant hedges and boosters differ between ES and KS authors in EE and BIO dissertations?

3. Methodology

To conduct a thorough cross-linguistic and cross-disciplinary analysis, we selected a balanced sample of 120 doctoral dissertations: 60 authored by native English speakers (ES) and 60 by Korean speakers (KS). We sourced the English dissertations from the ProQuest database, selecting 30 each from the fields of EE and BIO, all of which were published post-2000 by those students from North American universities. For the Korean dissertations, we carefully selected 30 each from EE and BIO from the top five Korean universities that offer instruction in English. To ensure comparability, two native English-speaking instructors independently reviewed the Korean dissertations for both language proficiency and academic quality. Only those dissertations unanimously approved by both reviewers were included in our study. This review process ensured that all selected dissertations met the high standard of academic rigor and language proficiency, essential for a valid and fair comparative analysis.

3.1. Data Collection

To guarantee a focused analysis, we included only the discussion sections of the doctoral dissertations in our corpus since they are where the authors assert their claims and balance their authority with modesty, making them the parts of the dissertation that are most likely to be hedged (Salager-Meyer, 1994, Swales, 1990). All non-textual elements such as tables, figures, graphs, charts, maps, photographs, and drawings were excluded from the corpus. Additionally, any textual elements that did not reflect the authors' voice, such as references, examples, and quotations, were also removed.

The general features of the corpus are summarized in Table 1:

Table 1. General Features of the Corpus

	English Speakers (ES)	Korean Speakers (KS)
Number of Dissertations	30 in EE and 30 in BIO	30 in EE and 30 in BIO
Length of Each 'Discussion'	+/- 3000 words	+/- 3000 words
Total Words	181903	183016

To conduct a functional study of hedges and boosters in dissertations, Salager-Meyer's (1994) taxonomy, which includes shields, approximators, personal involvements, and intensifiers (or boosters in this paper), was adopted as a basic tool in this study. Outlined below are the defining functions of the three hedge sub-categories, along with the booster category, each described with key functions and illustrated with some examples.

A. Shields – They serve to distance the writer from the absolute truth of their statements. They indicate that the information presented is not entirely certain and subject to interpretation. Shields are often used to express probability rather than certainty, as in "The results *may* indicate a trend, but further research is required," where the verb "may" suggests a degree of uncertainty, protecting the writer from potential criticism or disagreement. Therefore, shields help soften claims, making them appear less dogmatic and more open to discussion. Thus, by using shields, writers can suggest that their findings are tentative and subject to further validation.

– Modal verbs expressing possibility (e.g., *may*, *might*, *can*, *could*, *would*, *should*)
– Epistemic verbs assigning degree of authors' self-assurance to an assertion (e.g., *appear to*, *seem to*, *believe*, *assume*, *suggest*)
– Probability adverbs/adjectives showing possibility (e.g., *probable*, *possible*, *perhaps*, *apparently*, *likely*)

B. Approximators – They introduce a degree of vagueness or imprecision to the statement. They modify the strength of the information presented, indicating that the exactness of the data or the statement is not fully guaranteed. Approximators are used to avoid over-precision in statements, as in "The findings are *roughly* consistent with previous studies," where the adverb "roughly" indicates a range, within which a notion is approximated. Thus, they are instrumental in scientific research contexts where the data might have margins of error or where the findings are based on estimates. By using approximators, writers can convey a more honest and cautious representation of their data.

– Stereotyped adaptors and rounders of degree, quantity, frequency and time, expressing heed and humbleness (e.g., *approximately*, *roughly*, *often*, *somewhat*, *somehow*)

C. Personal involvements – They explicitly express the writer's uncertainty or personal involvement in the research process. These hedges are used to indicate that the opinions or conclusions presented are subjective and personal, as in "*I believe* this approach highlights a significant gap in current research," where the main clause "I believe" marks subjectivity. These hedges are therefore used to personalize statements, showing that the author is aware of the potential limitations of their perspective. By acknowledging their own doubts or the subjective nature of their involvement, writers can present their findings as part of an ongoing discourse rather than definitive conclusions.

– Belief expressions (e.g., *I believe*, *to our knowledge*, *it is our view that…*)[3]

D. Boosters (Emotionally charged intensifiers) – They reflect the writer's strong emotional engagement with the subject matter and amplify the force of statements to an absolute degree (cf. Biber et al. 2002, Quirk et al. 1985), as in "The intervention *significantly* improved students' outcomes, demonstrating its efficacy," where the adverb "significantly" highlights the writer's confidence in the claim.

– Maximizers (e.g., *absolutely*, *definitely*, *undoubtedly*)

A lexical analysis method was then employed to examine the use of hedges and boosters in the discussion sections of 120 dissertations.

3.2 Data Processing

To establish an initial understanding of hedge and booster usage across the corpus of 120 dissertations, three raters, two English language instructors and one Korean linguist, independently reviewed eight randomly selected texts. Using Salager-Meyer's (1994) taxonomy, they first identified and color-coded all occurrences of hedges and boosters. The identified devices were then categorized into subgroups through a norming session, to validate consistency in classification. Disagreements among the raters were resolved through extensive contextual analysis

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[3] The intensional verb *believe* can function both to distance the author from a claim acting as a shield and to explicitly involve the author's personal perspective acting as a personal involvement hedge. When *believe* is used in a more impersonal or general sense, as in (i), it serves to distance the writer from a definitive claim, indicating that the statement is an interpretation or an assumption rather than an absolute fact. In contrast, when *believe* is used to express the writer's personal opinion or uncertainty, as in (ii), it reflects the writer's own stance or involvement in the statement.

i. It is *believed* that the new treatment could lead to significant improvements.
ii. I *believe* that further research is needed to confirm these findings.

to determine whether the devices in question functioned as hedges or not. For example, the modal expression *can* was not coded as a shield when it indicated ability, as in the sentence "…therefore, students *can* apply the information…." The interrater reliability was calculated as .87 (Cohen's Kappa), indicating a high rate of consistency among the three raters.

After manually calculating the frequency of each hedge and booster across the entire corpus and within each group of dissertations, we ranked them to determine the top 10 most frequently used hedges and boosters for each group. This process involved comparing the top 10 lists of hedges and boosters between the EE and BIO dissertations within each language group and between the ES and KS dissertators within each disciplinary group. The identification of the top 10 most frequently used hedges and boosters served in the next stage as the basis for a more in-depth qualitative analysis of the contexts and situations in which these hedges appeared.

For a qualitative analysis, we closely examined the contexts in which those key dominant hedges and boosters, identified from the top 10 most frequently used tokens, were employed to understand their rhetorical functions, such as presenting findings, discussing limitations, or making assertions. By analyzing these instances, we identified the recurring patterns of such hedges and boosters within each group, allowing for a deeper understanding of how cultural, linguistic and disciplinary factors influence the rhetorical strategies in the dissertations.

4. Results Analysis and Interpretative Discussion

4.1 Descriptive Analysis of Hedges and Boosters

This section highlights the differences in the raw frequency of hedges and boosters between the two language groups across the two disciplinary fields. These findings are essential for identifying the most frequently used hedge and booster tokens in the four groups.

The overall frequency of hedging devices and the total number of words in both corpora of ES and KS dissertations are summarized in Table 2:

Table 2. Overall Frequency of Hedging Devices

	ES		KS	
	EE	BIO	EE	BIO
Hedges & Boosters	2665 (2%)	3162 (3%)	2992 (3%)	2529 (2%)
Total Words	91444	90459	91204	91812

The figures in Table 2 indicate that there is no significant difference in the total use of hedging devices between the two language groups, with the ES authors (3%, 5827/181903) and the KS authors (3%, 5521/183016) using hedges and boosters at comparable rates. This consistency can be attributed to the fact that, as shown in Table 1, the length of the discussion section was standardized to approximately 3,000 words for each dissertation to obtain uniformity across the samples. The only noticeable thing in ES is that the BIO group (3%) used more hedging devices than the EE (2%), but in KS, the opposite was true with the EE group using more hedging devices (3%), demonstrating a reverse pattern in employing hedging devices.

The overall distribution of hedges and boosters across the four groups is presented in Table 3 below:[4]

Table 3. Frequency of Hedges and Boosters Used by ES and KS in EE and BIO

		ES			KS		
		EE	BIO	TOTAL	EE	BIO	TOTAL
Hedges	SH	1814 (68.07%)	2147 (67.90%)	3961 (67.98%)	2083 (69.62%)	1689 (66.79%)	3772 (68.32%)
	APP	630 (23.64%)	623 (19.70%)	1253 (21.50%)	594 (19.85%)	424 (16.77%)	1018 (18.44%)
	PI	23 (0.86%)	109 (3.45%)	132 (2.27%)	4 (0.13%)	115 (4.55%)	119 (2.16%)
TOTAL of Hedges		2467 (92.57%)	2879 (91.05%)	5346 (91.75%)	2681 (89.61%)	2228 (88.10%)	4909 (88.92%)
Boosters		198 (7.43%)	283 (8.95%)	481 (8.25%)	311 (10.39%)	301 (11.90%)	612 (11.08%)
TOTAL of Hedges & Boosters		2665 (100%)	3162 (100%)	5827 (100%)	2992 (100%)	2529 (100%)	5521 (100%)

The data in Table 3, firstly, show a clear preference for hedges over boosters across all groups. The ES-EE dissertations contained 2467 instances of hedges (92.57%) compared to only 198 instances of boosters (7.43%). Similarly, the ES-BIO dissertations featured 2879 hedges (91.05%) while 283 boosters (8.95%). This preference is consistent among the Korean dissertators, with the KS-EE using 2681 hedges (89.61%) over 311 boosters (10.39%) and the KS-BIO employing 2228 hedges (88.10%) compared to 301 boosters (11.90%). This biased tendency indicates a substantial reliance on hedges of caution and uncertainty, approximately ten times more than boosters of confidence, across both language groups. Another notable similarity across all four groups is the predominant use of shields as the most common type of hedge: ES-EE (68.07%), ES-BIO (67.90%), KS-EE (69.62%) and KS-BIO (66.79%). This stable finding supports the previous research (Hyland 1996, 1998, Kim, Yol and Lee 2020), confirming that shields are the most commonly used hedges in academic writing.

When comparing the two language groups, ES consistently used more hedges (5346, 91.75%) than KS (4909, 88.92%). This difference is comprised of all hedge subcategories of caution and uncertainty: shields were more prevalent in ES (3961, 67.98%) compared to KS (3772, 68.32%), approximators were used more frequently by ES (1253, 21.50%) than KS (1018, 18.44%), and personal involvements were also more frequent in ES (132, 2.27%) than KS (119, 2.16%). However, regarding boosters, this tendency of higher frequency is interestingly reversed: KS demonstrated a higher level of frequency (612, 11.08%) compared to ES (481, 8.25%). This suggests that the KS dissertators adopt a more assertive tone in their academic claims than the ES ones.

A closer look at the disciplinary difference within each language group also reveals a distinct pattern. The ES group showed a consistent preference for shields in both EE (1814, 68.07%) and BIO (2147, 67.90%). Approximators are slightly more frequent in EE (630, 23.64%) than in BIO (623, 19.70%), while personal involvements are significantly more frequent in BIO (109, 3.45%) than in EE (23, 0.86%), which indicates a disciplinary inclination towards more personalized engagement in ES scientific discourse. Similarly, the KS dissertations exhibited a higher preference for shields in EE (2083, 69.62%) than in BIO (1689, 66.79%). Approximators are more frequently used in EE (594, 19.85%) than in BIO (424, 16.77%). Personal involvements are predominantly found in BIO (115, 4.55%) compared to EE (4, 0.13%), consistent with the pattern observed in

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[4] We decided not to take such normalization per 1000 words proposed by Biber et al. (2002) since the dataset in our corpus was pre-normalized on the same scale.

the ES dissertations. Boosters were used more in BIO (301, 11.90%) than in EE (311, 10.39%), indicating a stronger assertive tone in scientific claims compared to the humanities.

The overall distribution of hedges and boosters in Table 3 indicates that both the ES and KS authors prefer hedges, particularly shields, highlighting a general tendency for cautious and modest academic writing. However, the ES authors showed a slightly higher use of approximators, which indicates a focus on qualification and variability in English academic style. This is consistent with the claim that English academic discourse often values tentativeness to engage in critical debate and acknowledge multiple perspectives (Hylang1996, 2005, Vold 2006). In contrast, the KS authors used boosters more frequently, especially in BIO, which suggests a cultural inclination in Korean academic writing conventions toward presenting findings authoritatively. This tendency aligns with Eggington (1987), Hinkel (2005) and Hyland and Milton (1997), who highlight that collectivist cultures like Korea's often employ assertive language to reduce personal responsibility and reinforce the group's credibility. Disciplinary differences are also evident: both groups used more approximators in EE than in BIO, reflecting the interpretative nature of humanities research. This corresponds to McGrath and Kuteeva's (2012) conclusion that writing conventions vary significantly between disciplines, with the humanities favoring hedges like approximators to accommodate diverse interpretations. In contrast, sciences including Biology emphasize precision and empirical evidence, resulting in a lower frequency of approximators as scientific discourse presents findings in definite manners to reduce ambiguity. Meanwhile, the higher use of boosters in BIO underscores the importance of asserting scientific significance. These patterns provide a baseline for deeper exploration of the top 10 hedges and boosters (Research Question 1) and their contextual use (Research Question 2).

4.2 Ranks of Hedges and Boosters Across Four Groups

This section provides a comparative analysis of the top 10 most frequently used hedges and boosters in the doctoral dissertations written by two language groups, ES and KS, in EE and BIO.

First, the hedging device of shields is crucial in academic writing as they help soften claims, making them appear less dogmatic and more open to discussion. Below are the top 10 lists of shields most frequently used by the four groups:

Table 4. Top 10 Most Frequently Used Tokens of Shields by Four Groups

Rank	ES-EE		KS-EE		ES-BIO		KS-BIO	
	Tokens	Freq	Tokens	Freq	Tokens	Freq	Tokens	Freq
1	may	249	show	305	may	350	show	276
2	show	164	can	175	show	185	can	204
3	can	158	may	137	suggest	178	may	161
4	would	128	suggest	125	could	164	indicate	150
5	could	114	could	116	can	162	suggest	136
6	suggest	85	consider	97	would	114	know	107
7	indicate	82	seem	87	likely	105	Could	95
8	seem	66	likely	78	possible	97	might	68
9	might	56	would	71	appear	75	should	59
10	consider	52	indicate	71	indicate	73	possible	47

The dominant use of the modal verb "may" in both academic fields immediately stands out in ES, highlighting

its significance among the ES authors in expressing possibility. Conversely, the same verb ranks third in KS of both fields, indicating a slightly less prominent role among the KS authors. The token "show" also holds the top position in KS but is ranked second in ES, which indicates a stronger preference for explicitly presenting findings in both disciplines of KS. In contrast, the modal verbs "would" and "could" are placed in the middle positions in ES but appeared less frequently in KS, highlighting a difference in how conditionality and possibility are expressed in two different language groups.

Another eye-catching token in shields is the ability modal verb "can," which appears consistently within the top three ranks except for ES-BIO, signifying its universal role in indicating capability or potential. This exception of ES-BIO might be reduced to the authors' tendency to prefer other shields like "may" or "suggest" to express uncertainty and tentativeness than the modal verb "can," which implies mere potentiality or broad capability. The verb "suggest" also shows a consistent presence, ranking sixth in ES-EE, fourth in KS-EE, third in ES-BIO and fifth in KS-BIO, reflecting its common use in implying recommendations or possibilities across both language groups. However, the token "indicate," which has a similar meaning to "suggest," is generally in the lower rankings: fourth in KS-BIO, tenth in KS-EE, seventh in ES-EE and tenth in ES-BIO. This is because the former carries a stronger, more direct correlation based on evidence than the latter, which implies a tentative interpretation, possibility, or hypothesis. In dissertation writing, choosing between these two verbs seems to depend on how strongly the data supports the author's claim.

There is one token to be mentioned for an inter-disciplinary difference, irrespective of language backgrounds. The hedging verb of uncertainty "seem" is ranked eighth and seventh in the humanities of ES and KS, but it entirely disappears from the list of BIO for both language groups, highlighting a divergent way of expressing uncertainty between the humanities and the hard sciences.

The ranks in Table 5 present the top 10 key tokens of approximators, which introduce a degree of vagueness or imprecision to the statement:

Table 5. Top 10 Most Frequently Used Tokens of Approximators by Four Groups

Rank	ES-EE		KS-EE		ES-BIO		KS-BIO	
	Tokens	Freq	Tokens	Freq	Tokens	Freq	Tokens	Freq
1	some	119	some	96	some	88	several	61
2	many	82	many	43	many	49	some	40
3	often	38	most	35	several	48	overall	35
4	most	36	often	34	most	34	many	34
5	several	29	much	33	significantly	34	relatively	24
6	any	25	frequently	32	overall	32	slightly	23
7	much	24	large	32	little	24	most	16
8	little	23	general(ly)	29	any	23	mainly	16
9	least	19	relatively	20	much	23	about	15
10	general(ly)	19	overall	19	generally	21	almost(all)	14

The consistent top ranking of "some" across three of the four groups highlights its universal role in introducing vagueness or imprecision in academic writing. The quantifier "many" is another frequently used token, consistently appearing in the top three ranks in all groups except KS-BIO. "Often" and "most" are also common in both EE and BIO, indicating their widespread use to avoid over-precision. In contrast, the token "relatively" appears in the list of KS, but not in the list of ES, indicating a stronger emphasis on comparative statements in KS,

while such negative polarity items as "any" and "little" are employed only for ES, regardless of the disciplines.

Disciplinary differences are also evident in that "frequently" and "large" are among the top 10 for KS-EE but not for any other groups, which highlights a preference for these tokens, especially in the humanities of KS. Korean education research might place a stronger emphasis on the measurable aspects of their studies, which could explain the common use of "large" to describe educational phenomena (e.g., "a large number of students"). "Frequently" might also be used to describe recurring patterns or behaviors observed in educational settings, highlighting the regularity of certain teaching practices or learning outcomes. This contrasts with other groups that may avoid these terms to maintain a more tentative or focused description of their research findings. Conversely, "overall" is ranked relatively high in BIO of both language groups, suggesting its importance in summarizing findings in the scientific field. In addition, "significantly" is unique to ES-BIO and does not appear in the lists of the other groups, which may reflect a discipline-specific preference within ES-BIO, possibly due to its association in meaning with statistical or substantial differences. That is, approximators like "significantly" in ES-BIO and "mainly" in KS-BIO suggest that those authors in BIO might be dealing with statistical data or discussing predominance in their discourse, which requires them to approximate to a lesser extent, but with a hint of precision.

The top 10 tokens of personal involvements in Table 6, which explicitly express the writer's subjective or personal involvement in the research process, also reveal a distinct pattern across linguistic and disciplinary boundaries:

Table 6. Top 10 Most Frequently Used Tokens of Personal Involvements by Four Groups

Rank	ES-EE		KS-EE		ES-BIO		KS-BIO	
	Tokens	Freq	Tokens	Freq	Tokens	Freq	Tokens	Freq
1	I believe	4	We found	2	We find	40	We find	24
2	I know	3	I attempt	1	I/We observe	24	I/We observe	23
3	I/We observe	3	I offer	1	We hypothesize	11	I find	16
4	I define	2			We believe	6	We propose	9
5	I feel	2			We examine	4	I show	7
6	We know	2			We know	3	To our knowledge	3
7	I offer	1					We hypothesize	2
8	I wonder	1					We know	1

The cross-linguistic difference noticed in Table 6 is that the ES authors are in favor of singular first-person pronouns ("I believe," "I know," "I observe," "I define," "I feel," "I offer," and "I wonder"), especially in EE, highlighting a more individualistic stance in their academic argumentation. In contrast, the KS authors showed a preference for plural forms ("We find," "We observe," "We propose," "We hypothesize," and "We know"), even in EE, indicating a focus on collaborative findings and attempts rather than individual opinions. In BIO of both language groups, "We find" and "I/We observe" hold the top positions, demonstrating a shared priority in presenting research results. However, ES-BIO used "We believe" and "We examine" frequently, while KS-BIO do not, which indicates a difference in how personal involvement is expressed or the presence of a team in research work.

From an interdisciplinary perspective, personal involvement terms such as "I believe" and "I know" top the list in ES-EE, reflecting a more individualistic, subjective stance in EE, while plural terms such as "We find" and "We observe" are most common in ES-BIO, reflecting an objective and collaborative style in BIO. This shift from

personal engagement in EE to a focus on reporting and observation in BIO highlights the different rhetorical demands of each discipline. The KS authors also showed a transition from personal assertions in EE to more collaborative terms in BIO, with "We find," "We observe," "We propose," "We know," and "We hypothesize."

Lastly, the ranks in Table 7 provide the top 10 most frequently used tokens of boosters, which express the author's authenticity and confidence, across four groups:

Table 7. Top 10 Most Frequently Used Tokens of Boosters by Four Groups

Rank	ES-EE		KS-EE		ES-BIO		KS-BIO	
	Tokens	Freq	Tokens	Freq	Tokens	Freq	Tokens	Freq
1	significantly	17	significantly	62	significantly	45	significantly	50
2	surprising	12	extremely	16	interestingly	34	interestingly	24
3	clearly	12	interestingly	8	particularly	22	clearly	12
4	indeed	9	importantly	8	notably	20	particularly	10
5	typically	8	actually	8	indeed	17	notably	10
6	necessarily	7	necessarily	5	surprising	15	surprisingly	8
7	extremely	5	greatly	5	importantly	9	indeed	7
8	certainly	5	clearly	4	unfortunately	8	dramatically	6
9	interestingly	5	surprising	4	typically	7	unfortunately	6
10	compelling	3	typically	4	surprisingly	6	importantly	3

The booster "significantly" holds the top rank across all four groups,[5] demonstrating a shared emphasis on its universal role in emphasizing research findings. The emotional expressions "interestingly" and "surprising(ly)" also emerge as prominent boosters in both language groups of BIO, which points to a shared strategy across the two language groups to draw attention to intriguing findings and highlight novel or unexpected results in scientific research.

Interestingly, the rankings of boosters by ES in the humanities exhibit a nearly opposite pattern to those in KS, with the notable exception of "significantly." In other words, those boosters (e.g., "surprising," "clearly," "indeed," and "typically") that appear at the top of the rankings in ES-EE tend to occupy the lower positions in KS-EE, and those boosters (e.g., "extremely" and "interestingly") that show up at the lower rankings in ES-EE tend to hold the higher rankings in KS-EE. This reversed ranking pattern of booster usage between ES and KS, especially in the humanities, likely stems from different cultural norms in academic writing. English academic discourse often values directness and assertiveness, explaining why such strong boosters like "surprising," "clearly," and "indeed," which help highlight key findings and assert the author's stance, rank higher in ES-EE. Conversely, Korean academic writing tends to use less overtly assertive boosters, preferring instead a more measured tone to show respect for different interpretations, which aligns with Confucian values. This leads the KS authors in the humanities to avoid bold claims or assertions with strong boosters, resulting in the reversed ranking patterns observed.

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[5] The adverb *significantly* is ambiguously interpreted both as an approximator and as a booster. As an approximator, it softens boundaries between experiential categories, indicating limitation (e.g., "She seems to have grown *significantly*"). As a booster, it emphasizes the importance of a fact, increasing commitment to the proposition (e.g., "*Significantly*, they demonstrate a link between family background and educational achievement"). This ambiguity necessitates contextual analysis to determine its precise function in our analysis.

The findings in this section reveal a significant difference in the use of hedges and boosters across the four groups. This variation can be attributed to the interplay between linguistic, cultural and disciplinary influences. First, concerning the ranks in shields, the results show that the modal verb "may" is dominant in both ES-EE and ES-BIO, suggesting that the ES authors prefer this modal verb to introduce possibility or degree of certainty, reflecting a cautious stance typical of English academic writing (Hyland 1996, Hyland and Jiang 2016, Vold 2006). In contrast, the KS authors favored the verb "show" as their top shield, especially in KS-EE. This indicates a preference for a more explicit presentation of findings, which may be rooted in Korean cultural norms that value preciseness and authority (Connor et al. 2008, Hinkel 2002, Hyland 2005). The ES authors' choice to use "would" and "could" more frequently than the KS authors, further highlights different ways of expressing conditionality and possibility across these linguistic groups. The lower prominence of "seem" in BIO, compared to its rank in EE, might reflect the different rhetorical demands of each discipline, with scientific writing relying more on certainty and accuracy.

Second, for the ranks of approximators, the frequent use of "some" across most groups underscores its universal role in introducing vagueness in academic discourse. However, the appearance of "relatively" in the top ranks of KS, but not in ES, points to the KS authors' stronger emphasis on comparative or compromising statements. Additionally, the usage of "frequently" and "large" in KS-EE may stem from the recent contexts of Korean educational research that focus on measurable outcomes (Seth 2002, Youn 2018), contrasting with the preference for more tentative descriptions observed in other groups.

Third, the ES authors in EE predominantly employed personal statements with singular first-person pronouns like "I believe" and "I know," suggesting a more individualistic approach to academic argumentation. This supports Hofstede's (2001) cultural dimensions theory, which identifies individualism as a dominant characteristic in Western societies, where self-expression and independent argumentation are valued. In contrast, the KS authors favored plural pronouns such as "we find" and "we observe," even in EE, reflecting a cultural inclination toward collectivism and collaborative work (Eggington 1987, Gudykunst et al. 1996. Hinkel 2005, Hofstede 2001, Holtgraves 1997, Matsumoto et al. 1998). In BIO, both groups used plural forms, indicating a shift in rhetorical style to emphasize objective and collaborative, research-focused findings.

Fourth, the adverb "significantly" was the most common booster across all four groups, reflecting its universal function of emphasizing research findings. However, the reversed ranking patterns of other boosters, particularly in the humanities (e.g., "surprising," "clearly," and "indeed" ranking high in ES-EE but low in KS-EE), suggest cultural differences in expressing certainty and assertiveness. That is, English academic writing tends to be more direct and personal, whereas Korean writing, influenced by Confucian values, prefers group-oriented expressions to demonstrate respect for others (Eggington 1987, Hinkel 1997, Holtgraves 1997, Hyland 2001, Kim et al. 2014, Liu 2018, Merkin 2009, Ryu 2006).

These tendencies, which highlight the unique nature of dissertation writing, often reflecting a blend of personal stance and academic accuracy, set the stage for our subsequent exploration into how those dominant hedges and boosters in the rankings were contextually and strategically employed in the discussions of the dissertations across the linguistic and disciplinary boundaries.

4.3 Contexts and Patterns of Hedges and Boosters in ES and KS Dissertations

In this qualitative analysis, we randomly extracted sentences containing the contextually significant and dominant hedging devices in the rankings from the four groups. This analysis provides a deeper understanding of how ES and KS employ those rhetorical devices differently in two academic fields, EE and BIO.

4.3.1 Shields

The contexts where the modal verb "may" was dominantly used as a shield are exemplified in (1) to highlight its role in indicating potential outcomes and allowing for a degree of uncertainty in the authors' claims.

(1) a. "Though critics will undoubtedly take issue with my approach, I encourage other critical researchers to question both how we can use mixed and quantitative methods in a transformative paradigm to explore critical ideas and issues. Through such exploration, we *may* counteract the traditional notions regarding quantitative research as well as further the ideas within the critical field." (ES-EE: 01)

   b. "They consider these turn transition relevance places (TRPs) to be marked by the completion or projected completion of a syntactical unit in the current speaker's talk. Such units *may* be syntactic, intonational and pragmatic in nature, and involve transition between speakers with split-second timing." (KS-EE: 33)

   c. "Yet the apoptosis inhibitor seemed quite effective at preventing cell death at 9 days cold storage (Figure 8). One possible interpretation of these data is that the cells that die through necrosis *may* proceed through an apoptotic sequence first to enter the necrosis pathway." (ES-BIO: 03)

   d. "Strategic combinations of gene modifications that work against these anti-viral factors *may* provide a synergic effect and will provide a chance to develop highly permissive and versatile cell lines." (KS-BIO: 03)

In the excerpt from ES-EE, (1a), the verb "may" was employed to present a potential outcome or implication of the proposed research approach. The phrase "we may counteract the traditional notions regarding quantitative research" reflects a cautious stance that acknowledges the possibility but not certainty of achieving such an outcome. In this context, the use of "may" aligns well with Western academic cultures, particularly within the humanities and social sciences, presenting ideas tentatively to encourage debate and prevent overgeneralization. In the example of KS-EE, (1b), where "may" was used to describe the types of units that could be classified as transition relevance places (TRPs), the modal verb expresses the possibility of categorizing TRPs as syntactic, intonational and pragmatic in nature, without asserting an absolute definition. The KS-EE authors' use of "may" can be interpreted to demonstrate deference to established theories. The scientific context of ES-BIO, (1c), where "may" was used to suggest a possible biological mechanism, demonstrates that avoiding the impression of certainty is essential when the data does not fully support a definitive claim. Similarly, in KS-BIO, (1d), the author used "may" to express potential outcomes while remaining open to alternative results. However, the cautious tone might also be shaped by a cultural tendency toward humility and deference in scholarly work.

The following passages unveil the distinct contexts the capability modal verb "can" was used as a shield, which introduces possibilities or potentialities without asserting them as definite.

(2) a. "Findings showed that Rose elicited more deeply personal or sensitive stories from students in Years 2 and 3 of the memoir unit than in Year 3. Whether this *can* be accounted for based on differences in student groups each year cannot be known." (ES-EE: 04)

   b. "What specific practices are required for them to be flexible and competent readers? It *can* be argued that the balanced instruction between language skills and CL practices played a major role in helping the students grow as flexible and competent readers." (KS-EE: 36)

  c. "One hypothesis for AMD pathogenesis includes the early loss of endothelial cells that make up the choriocapillaris159,34,77. Upon major loss of vasculature, the surrounding tissue *can* become hypoxic, leading to increased ICAM-1 expression on the remaining endothelial cells154,155, as well as elevated levels of VEGF in the choriocapillaris160,161." (ES-BIO: 02)

  d. "On the basis of this finding and the previous study that G93A localizes to the juxtanuclear quality control compartment (JUNQ), we *can* infer that Aβ exist along with G93A in the JUNQ [9]." (KS-BIO: 01)

In the example of ES-EE, (2a), the author carefully suggests that there could be various explanations for the observed differences, without committing to a specific one, by adding the phrase "can be accounted for." This creates a balance between proposing a hypothesis and acknowledging its speculative nature, which is common in educational research where multiple variables can influence outcomes. On the other hand, the context in (2b) with the phrase "can be argued," extracted from KS-EE is evaluative, where the author discusses educational practices and their impact. The phrase "can be argued" acts as a softener, showing deference to alternative perspectives, which aligns with the Korean cultural norms reduced to Confucian values that often value modesty, politeness and respect for others' opinions (Hinkel 1997, 2005, Hofstede 2001). In (2c), where the ES-BIO author used "can" as a shield within the phrase "can become hypoxic" to explore a hypothesis related to AMD, the context is scientific and explanatory. Here, "can" is strategic in that it aligns with the scientific discourse norm that often requires cautious language to acknowledge the complexity of biological systems and the variability in experimental or observational findings. By using "can," the author indicates that hypoxia is one possible consequence of vascular loss without asserting it as a necessary outcome. Similarly, in passage (2d), taken from KS-BIO, where the modal verb "can" used in "we can infer that Aβ exist along with G93A in the JUNQ" presents an interpretation based on existing findings. Here, "can" functions as a cautious hedge, allowing the author to introduce a conclusion drawn from the data without asserting it as an absolute fact. This use of "can" reflects a common practice in Korean academic contexts, where authors often use hedges to show respect for alternative viewpoints and avoid making extremely decisive claims.

Overall, these shields help the authors manage the strength of their claims, invite further inquiry and avoid too decisive claims. From the viewpoint of disciplinary comparison, in EE, shields are more focused on fostering debate and inviting alternative interpretations, while in BIO, they are used to carefully present hypotheses and tentative findings that require further validation. KS authors, from the viewpoint of cross-cultural comparison, generally employ shields with greater caution and conservative tendency, reflecting such cultural values that prioritize modesty and respect for academic hierarchy. In contrast, ES authors tend to use shields to comply with the Western academic norms of scholarly debate and critical engagement, which may allow for more direct argumentation (Hinkel 1997, 2005, Hofstede 2001, Hyland 2005).

4.3.2 Approximators

The following passages in (3) illustrate in what specific contexts the approximator "some" was used as hedge in the dissertations across the four groups.

(3) a. "They verbalized their representations in concrete forms, thus making use of codifications, to explain their situations and stand for themselves. *Some* examples are Victoria's question "What does a Cuban look like?," Fátima's explanation of "the beauty of being Latina," and Séneca's reading of the term "Hispanic" as a tool for "manipulation."" (ES-EE: 11)

     b. "For example, Ms. Sun's instructional actions of giving lectures, covering the textbook and controlling the learning cannot be fully understood without considering the orientation of the activity, 'to teach grammar to the test'. In a similar vein, Mr. Hyun's actions of adhering to TEE, utilizing fun materials, engaging the students in class and relinquishing *some* of his control to his students can be justly evaluated when the direction of the activity, 'to motivate to develop language skills', is taken into consideration." (KS-EE: 01)

     c. "This may provide an explanation behind the dual action phenomenon of salubrinal where its anti-apoptotic effect may result in a higher cell survival under *some* conditions whereas conversely by blocking apoptosis in other instances of greater cell stress may push cells towards molecular driven necrotic demise." (ES-BIO: 11)

     d. "To delineate the mechanisms underlying the decrease of ATP-dependent GLP-1 secretion by CRTC2 knockdown, I assessed the integrity of mitochondria and the activity of the glycolysis and oxidative phosphorylation in GLUTag cells. Depletion of CRTC2 decreased intracellular ATP levels, accompanied with the decrease in both mitochondrial and *some* glycolytic genes, as well as protein levels, as seen with RNA-seq or western blot analysis." (KS-BIO: 12)

In ES-EE (3a), "some examples" is used to acknowledge that the examples provided (Victoria's question, Fátima's explanation and Séneca's reading) represent only a subset of a larger set of instances. This usage serves to highlight a key point without suggesting an exhaustive list, allowing the author to present only typical cases while leaving further room for other, unmentioned examples. This approach is consistent with general academic conventions in educational research, where exemplifying a few representative cases helps to ground arguments without overgeneralizing (Hyland 2005, Swales 1990). In KS-EE (3b), "some" describes the degree to which Mr. Hyun relinquishes control to his students, indicating a partial transfer of control and emphasizing the complicated nature of the teaching method. "Some" in this context reflects a characteristic cautiousness, which suggests respect in Korean educational discourse for the complex interplay between traditional teacher authority and modern pedagogical methods. In ES-BIO (3c), "some" is employed in the context that involves a complex biological phenomenon where cellular responses to salubrinal vary depending on the environment or stress level. "Some," in this instance, introduces an element of variability and caution, suggesting that these effects are dependent on certain factors. This seems to comply with the scientific convention of acknowledging uncertainty and the limits of experimental findings, emphasizing the need for more accurate conditions to validate the results. In KS-BIO (3d), "some" is used to specify that only certain glycolytic genes are affected by the depletion of CRTC2, indicating a partial effect rather than a comprehensive one. The context here is a detailed scientific investigation into cellular mechanisms, where not all glycolytic genes are impacted uniformly. Here, the choice of "some" indicates the variability and specificity in the biological response, adhering to the scientific norm of attaining careful interpretation of the experimental data and avoiding overgeneralization.

The examples in (4) below give us a closer look at how the quantifier "many" was used to highlight the frequency or significance of certain points in the dissertations.

(4) a. "For instance, to confidently make statements about the broader population of ISs in higher education, I would need to have worked with a much larger sample of international and English-dominant students from *many* different classes, and to make causal inferences would have required an experimental design." (ES-EE: 13)

     b. "Regardless of proficiency levels, most students who chose subtitles as the most efficient mode for

listening in CALL pointed out the simultaneous presentation of the subtitles with the speech and their familiarity with the subtitles as enabling them to be more interested in listening. *Many* of them referred to the distraction caused by the transcript which induced 'reading temptation' as demonstrated by Pujolá (2002)." (KS-EE: 15)

c. "Current research into the role of unc45a in cancer implicates the important function of unc45a in cytokinesis and cell-motility as it applies to increased growth and metastasis [70]. These aspects of cancer biology are shared by *many* normal cell types and are targeted in many chemo-therapeutics such as the vinca alkaloid derivatives." (ES-BIO: 20)

d. "Those data suggested the necessity to investigate the functional roles of the interplay between EGFR and CD in HCC. Although EGFR overexpression is frequently observed in HCC as well as in *many* other types of cancers. EGFR mutation is rarely detected in HCC (19, 26)." (KS-BIO: 14)

The approximator "many" in (4a) used by the ES-EE author involves a discussion about research limitations, specifically the need for a larger sample size to make a more robust conclusion about international and English-dominant students in higher education. The careful use of "many" in this context indicates a thoughtful awareness of the study's constraints and emphasizes the complexities inherent in educational research. In KS-EE (4b), "many" is used in the author's discussion of students' learning experiences in Computer-Assisted Language Learning (CALL) and their responses to different modes of input. Using "many" as an approximator, the author acknowledges the general prevalence of the distraction problem without overgeneralizing to all students, reflecting a careful balance between specificity and generalization. The ES author in BIO (4c) uses "many" as an approximator to discuss the role of the unc45a protein in cancer biology, highlighting its commonalities across diverse cellular processes and therapeutic interventions. In this context, the approximator suggests that the findings are not isolated or rare but have broad applicability, reinforcing the significance of unc45a's role in both normal cellular mechanisms and cancer treatment strategies. This usage reflects a typical pattern in biological research, where approximators like "many" convey the generalizability of observations while acknowledging the complexity and diversity within biological systems. Likewise, in KS-BIO (4d), the noun phrase "many (other types of cancer)" is used to underscore the prevalence of EGFR overexpression across various cancer types. The context here highlights a commonality in cancer biology, suggesting that while EGFR mutation is rare in HCC, its overexpression is a widespread phenomenon in numerous other cancers. This kind of generalization is typical in biological discourse, where researchers aim to identify patterns that could have broader implications for understanding disease mechanisms and treatment strategies. For these scientific discourse norms, Hyland (2005) also highlights that approximators are crucial in conveying the applicability of findings across broader contexts, ensuring cautious yet significant claims in scientific writing.

After all, the use of such dominant approximators shows a distinct pattern influenced by both cross-linguistic and disciplinary factors. For ES-EE, "some" is used to introduce specific instances that support an argument while avoiding overgeneralization. In KS-EE, "some" indicates partiality and reflects a cautious tone aligned with the Korean educational norms that value respect for complexity and tradition, which roots in Confucian traditions, in accordance with Hinkel (1997, 2005) and Hyland (2005). On the other hand, "some" in ES-BIO is employed to discuss variability in scientific phenomena, adhering to the scientific convention of acknowledging the limitations and variability of findings. And KS-BIO uses "some" to refer to partial effects in scientific processes, which indicates a careful interpretation that is aligned with the cultural preference for humbleness in Korean academic writing.

Regarding "many," ES-EE uses it to acknowledge the complexities and scope of educational research, often to

emphasize research limitations and the need for broader exploration. In contrast, KS-EE uses "many" to highlight student responses and experiences while carefully avoiding overstatement, which conforms to the Korean cultural norms of cautious generalization. In ES-BIO, "many" underscores the generalizability of scientific observations across various biological processes, emphasizing a broader relevance while recognizing the diversity within biological systems. Meanwhile, as expected in Korean scientific discourse, KS-BIO uses "many" to indicate commonalities in cancer biology, placing specific findings within a larger biomedical context while maintaining a somewhat conservative stance.

4.3.3 Personal involvements

The qualitative analysis in this section explores the contexts in which dominant personal involvements such as "I believe" and "we find/found" were used in the dissertations by the ES and KS authors in EE and BIO.

First, note the way the ES author used the personal involvement of "I believe" in EE.

(5) "However, because this research was done over the course of 2 months, is comprised of ten interviews for each participant, both within and outside their content-area partnership, and data was triangulated with blog posts, artifact submission and member checking, *I believe* that my findings would be similar with other groups of teachers." (ES-EE: 14)

In this example, the hedge of personal involvement "I believe" conveys a subjective interpretation while recognizing the potential limitations of the study, such as the short duration and the small sample size. Using "I believe" introduces a level of tentativeness through a personal viewpoint rather than a definitive claim. The use of "I believe" in this case aligns with the Western academic tradition of personal engagement in scholarly argumentation, where researchers are encouraged to take a personal stance and be open to critique.

In contrast, the plural subject of "we find/found" in (6) from the KS authors presents the study's results and highlights the collaborative nature of the research process.

(6) a. "In Study II, *we found* no significant correlations between individual working memory capacity and the strength of island effects for both the native speakers and a large proportion of the L2 learners." (KS-EE: 35)

  b. "Based on the evolutionary conservation of telomere sequences and functions, the functional homology between STEP1 and other RBD-containing proteins raises the interesting possibility that STEP1 may be the important component of protective capping structure associated with telomere function in plants. *We find* that the binding of STEP1 protects a single-stranded telomeric substrate against activity of endonuclease. (KS-BIO: 06)

In the KS-EE (6a), the phrase "we found" presents the study's findings, highlighting the researchers' active role in the process while maintaining an objective tone. This phrasing emphasizes the collective nature of research in Korean academic contexts where scholarly writing often emphasizes group effort and shared responsibility (Choi and Choi 1994, Guo 2020, Hofstede 2001, Holtgraves 1997, Matsumoto et al. 1998, Gudykunst et al. 1996). By opting for "we" instead of "I," the author(s) convey humility and align their work within the broader academic community, demonstrating deference to the cultural norms that value collaboration and collective knowledge-building. In KS-BIO (6b), "we find" is used to introduce a finding on STEP1's protective role in telomere function

while emphasizing the author(s)' active participation in the discovery process and the collaborative nature of their research. The context is an evidence-based discussion in evolutionary biology, asserting the importance of their contribution while adhering to the cautious, data-driven norms of scientific discourse. This expression thus complies with both the scientific convention of directly stating findings and the Korean academic practice of emphasizing teamwork.

The hedges of "I believe" and "we find/found" were used in distinctive ways by the different groups, reflecting cross-cultural, cross-linguistic and disciplinary conventions. In ES-EE, "I believe" is often employed to convey personal involvement and subjective interpretation, which highlight the author's individual stance within the research. This usage reflects the Western academic norms that encourage scholars to express their viewpoints while also leaving room for debate and further investigation (Hofstede 2001, Hyland 2005). In contrast, the KS authors prefer "we find/found" across both EE and BIO fields, which indicates a collective research approach in Korean academic culture (Choi and Choi 1994, Hinkel 1997). In KS-EE, "we found" is used to objectively present findings while subtly acknowledging the shared responsibility and collaborative effort typical in Korean scholarly writing. Similarly, in KS-BIO, "we find" is often used to present precise scientific results, reflecting the empirical and cautious nature of scientific discourse in Korea. The usage across these groups underscores the cultural values that demonstrate the Korean preference for modesty and teamwork.

4.3.4 Boosters

In contrast to hedges, the dominant boosters chosen for expressing confidence by the four groups of dissertations are mostly adverbs such as "significantly" and "interestingly."

The following examples of "significantly" in (7) illustrate how and where such boosters are used in the dissertation to show the authors' confidence in their research outcomes.

(7) a. "H1: Critical thinking and writing preparedness of those in the teacher education program at Lei University will be *significantly* and measurably enhanced by means of participating in 8-week skills and dispositions improvement plan." (ES-EE: 05)
b. "It should be also noted that the significant mean increase for ungrammatical sentences occurred between the immediate posttest and the delayed posttest, which means that the learners' ability to identify ASC-related errors *significantly* improved during the four-week interval." (KS-EE: 14)
c. "Table 7 shows a *significantly* different distribution of tetrads containing 4, 3, 2, 1 or 0 viable spores and a higher frequency of zero spore viable tetrads for nbs1-2 as compared to wild type, indicating meiosis I non-disjunction for this strain." (ES-BIO: 28)
d. "As expected, multi-organ metabolomics revealed that the glucose levels were *significantly* decreased in kidney, liver, and muscle tissues of the DR group (see Figure 17), consistent with the results of serum biochemistry, since glucose is transported from these tissues to the bloodstream." (KS-BIO: 02)

In the ES-EE example (7a), which presents a hypothesis (H1) that projects a measurable and meaningful outcome from the educational intervention, "significantly" conveys confidence in the intervention's effectiveness – 8-week skills and dispositions improvement plan. In this context, the adverb "significantly" strengthens the claim's validity, consistent with the educational field's emphasis on the practical impacts of research findings. The booster "significantly" in KS-EE (7b) emphasizes the marked improvement in learners' ability to identify ASC-related errors over four weeks. This self-assured use of "significantly" conveys confidence in the intervention's

effectiveness. Culturally, it reflects the KS author's intent to present their results as credible and impactful, reflecting the Korean academic practices that value authoritative presentation of findings. Hinkel (2005) points out that assertive language is often used in Korean academic writing to convey reliability and respect. This practice also corresponds with Hofstede's (2001) cultural dimensions, which identify hierarchical societies like Korea as emphasizing authoritative expressions to maintain academic credibility and maintain traditional scholarly norms. In ES-BIO (7c), "significantly" emphasizes a statistical difference in tetrad distribution between the nbs1-2 strain and the wild type. In biology, particularly in ES contexts, self-assured boosters such as "significantly" are crucial in reporting scientific results as they convey the statistical validity of the findings. In the context of KS-BIO, (7d), "significantly" emphasizes the statistical validity of the findings and highlights a meaningful decrease in glucose levels across various tissues in the DR group. This usage underscores the author's effort to present the research as credible and rigorous.

The examples below in (8) show how the adverb "interestingly" was used as a booster in three different groups.

(8) a. "Learners mentioned repeatedly, and in different ways, that they believed the combination of modes (images, text, audio, video) supported individual and group contemplation of content context, which in turn supported vocabulary understanding and memorization. *Interestingly*, learners advised they recognized soon into the TEKS2 experience that content could be used in a self-directed way that made it possible to self-correct comprehension." (ES-EE: 17)

b. "Among them, an average number of words has been used to assess how well developed each organizational element is by an automatic essay scoring program entitled E-rater (Burstein et al., 2003), and its robustness as indicator has been proven in previous studies (Choi, 2012; Weigle, 2013). *Interestingly*, in the current study targeting a low proficiency group of EFL writers, this long-established indicator also proved to be a reliable variable to confirm how many details or examples are introduced in text." (KS-EE: 11)

c. "This makes the possibility that KifC3 functions as a motor for Exocyst-dependent vesicle trafficking to desmosomes unlikely. *Interestingly*, the majority of Sec3 and KifC3 were not present in a complex as determined by rate- zonal centrifugation suggesting Sec3-KifC3 interaction is transient." (ES-BIO: 30)

d. "As a transcription factor, XBP-1S plays a role in anti-viral activity by augmenting cytokine- or apoptosis-related genes upon infection of RNA viruses. *Interestingly*, XBP-1-deficient cells show enhanced viral replication of human hepatitis C virus with reduced apoptosis. (KS-BIO: 03)

In the ES-EE example (8a), the adverb "interestingly" is used as a booster to highlight an unexpected finding: learners quickly recognized the potential for using content in a self-directed way for self-correction. This usage draws attention to the surprising nature of the observation, according to Hyland (2005) and Swales (1990), reflecting a Western academic style where uncovering and emphasizing unexpected outcomes is a crucial part of scholarly debate. In KS-EE, (8b), "interestingly" highlights an unexpected yet noteworthy finding: the reliability of a well-established indicator, E-rater, even when applied to a low-proficiency group of EFL writers. The context here involves the confirmation of a tool's robustness in a new research setting, suggesting that despite initial assumptions about its limitations, the indicator maintained its reliability. The ES-BIO example in (8c) uses "interestingly" to emphasize a surprising finding: the lack of a stable complex between Sec3 and KifC3, which was revealed through rate-zonal centrifugation. The author's use of "interestingly" in this BIO context signals a deviated outcome from what might be expected; while the initial hypothesis considered a stable interaction, the data suggest that the Sec3-KifC3 interaction is transient. This use of "interestingly" reflects a typical strategy in

scientific writing, where unexpected results are highlighted to draw attention to their significance.

In KS-BIO, (8d), the adverb "interestingly" highlights an unexpected finding regarding XBP-1-deficient cells. The passage discusses how XBP-1S, known for its role in anti-viral activity, behaves unexpectedly when XBP-1 is deficient. The use of "interestingly" in this scientific context signals an unexpected result that may challenge existing assumptions or prompt new lines of inquiry, and it complies with the academic convention of exploring novel or counterintuitive findings in biomedical research.

To summarize, the qualitative analysis reveals a distinct disciplinary influence on the use of hedges and boosters between EE and BIO. In EE, hedges such as modal verbs (*may*, *might*) are frequently employed to encourage interpretive openness to other perspectives, reflecting the discipline's focus on theoretical exploration and human behavior. Conversely, BIO shows a higher reliance on more specific shields (*can*, *indicate*) and boosters (*significantly*), emphasizing empirical evidence and statistical validity inherent in scientific discourse. Additionally, EE dissertations often utilize personal involvements like *I believe* to comply with individualistic argumentation, whereas BIO favors collective phrases like *we find*, underscoring the collaborative and objective nature of scientific research. These patterns demonstrate how disciplinary conventions shape rhetorical strategies, reflecting the distinct epistemological goals and audience expectations in each field.

Similarly, the comparison between two language groups reveals how cultural values of L1 shape rhetorical strategies in dissertation writing. ES writers tend to adopt a more individualistic approach, frequently using first-person expressions such as *I believe* to assert their personal stance and engage in critical debate. This reflects the Western academic norms that value directness and the individual scholar's voice. In contrast, KS writers demonstrate a collectivist orientation, favoring plural pronouns like *we find* to emphasize collaboration and shared responsibility, conforming to the Confucian values of hierarchy and harmony. Additionally, KS authors use hedges more cautiously, reflecting a cultural preference for modesty and deference, while ES authors employ hedges to encourage open interpretation and debate. These differences underscore the profound influence of L1 cultural norms on rhetorical strategies in dissertation writing.

5. Conclusion and Implications

This study explored the use of hedges and boosters in EE and BIO dissertations written by ES and KS authors, aiming to uncover cross-linguistic and cross-disciplinary influences on the use of hedges and boosters in dissertation writing. For this purpose, this study identified the top 10 most frequently used hedges and boosters in ES and KS dissertations and also examined the contexts in which they are employed. The results have revealed distinctive patterns attributed to different cultural and disciplinary conventions, which fulfills our study's primary objective of offering insights into the rhetorical strategies used by the two language groups.

The analysis of the top 10 ranks revealed that hedges were predominantly used across all groups, with shields being the most frequent type. However, the distribution of specific tokens like *may*, *show* and *significantly* varied, reflecting cultural and disciplinary preferences. The qualitative analysis further revealed distinctive contexts for using these hedges and boosters, showing apparent differences in how ES and KS authors present their arguments and claims in dissertations. For instance, the KS authors tended to use such boosters as *significantly* and *interestingly* more cautiously, reflecting the cultural norms that value humility and indirectness. Meanwhile, the ES authors used them more freely to emphasize clarity and directness in their arguments.

These findings contribute to the existing body of research by offering a comprehensive comparison of hedge and booster usage in dissertations, a genre that remains underexplored compared to academic journal articles.

Nevertheless, this study has some limitations. One arises from the ambiguity of certain lexical items that can function as hedges in some contexts but not in others, which may lead to potential inconsistencies in categorization. Additionally, it remains a question whether EE and BIO can adequately represent the broader fields of the humanities and natural sciences. By focusing solely on these two fields, this study may overlook variations in hedge and booster usage in other subfields. Future research could overcome these limitations by analyzing a wider variety of rhetorical devices and incorporating more diverse samples.

Overall, what we have found implies that academic writing instruction, especially for L2 writers, should address the cultural and disciplinary subtleties in hedge and booster usage. Theoretically, this research adds depth to our understanding of how linguistic and cultural factors influence academic discourse, particularly in dissertations. Future research can build on this by exploring hedge and booster usage in other academic genres or among writers from different linguistic backgrounds.

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Examples in: English
Applicable Languages: English
Applicable Level: Tertiary