Boosters in academic discourse: contrastive analysis concerning their use in theses from the fields of social sciences and natural sciences

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EN Abstract: In this paper, a corpus linguistics study is performed to analyse the metadiscursive function as boosters of three adverbials, namely *absolutely, highly* and *strongly*, in two subcorpora of doctoral dissertations. These dissertations are written in English and were submitted to Spanish universities between the years 2011-2021. The corpus contains more than ten million words overall, with one subcorpus corresponding to the field of the natural sciences and the other to the social sciences. The goals of the present study are twofold. On the one hand, from a quantitative perspective, we aim to determine the number of cases in which these three adverbials play the role of boosters and compare the results of the two subcorpora. On the other hand, we analyse the function of these adverbs as boosters by considering the linguistic elements that co-occur with them and that affect this function, either to reinforce or to mitigate content.
Keywords: boosters, academic discourse, metadiscourse, corpus linguistics.

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1. Introduction

The analysis presented in this article addresses a gap in the existing literature by investigating the syntactic positions and metadiscursive functions of the adverbials *absolutely*, *highly*, and *strongly* in doctoral dissertations from the fields of natural sciences and social sciences. The choice of these specific adverbials stems from their relevance in academic writing and their potential to function as intensifiers, as they show a high frequency in academic writing, as will be explained in this paper. In the present work, we interrogate two subcorpora of 110 doctoral dissertations, amounting to nearly 11 million words, to analyse samples of text containing the adverbials *absolutely*, *highly* and *strongly*. We aim to examine the positions occupied by these adverbs in the sentences in which they are embedded in these texts and to appraise their metadiscursive function as so-called boosters, working either to mitigate or to strengthen content. The ultimate goal is to examine the variation in the way these forms are deployed in each of the registers considered.

The need for this cross-disciplinary perspective arises from the recognition that academic writing conventions can vary across fields of study. By encompassing both natural sciences and social sciences, the analysis provides a comprehensive understanding of the adverbial usage patterns and their metadiscursive functions in diverse academic contexts, including L2 texts. This broader perspective not only enriches our knowledge of adverbial positioning but also sheds light on potential disciplinary variations in language use, contributing to a more nuanced understanding of academic writing practices in intercultural contexts.

By establishing the rationale for analysing these specific adverbials, exploring the variation within and across disciplines, and considering the broader context of academic writing, this study aims to deepen our

understanding of how adverbials function as boosters and their impact on the communicative effectiveness of academic texts. Through this research, we seek to provide valuable insights for professionals and students engaged in academic writing, enabling them to enhance their rhetorical strategies and adapt their writing style to meet the expectations of their respective disciplines.

The article is organised as follows. After this brief introduction, we present a theoretical framework in which different reputable linguistic theories about the grammatical category of adverbs, their characteristics and their taxonomy are presented. We next focus on the concept of metadiscourse and its two main dimensions: the interactive and the interactional. We further define the categories into which the different metadiscursive elements are classified within each of the main dimensions. Subsequently, a brief description of our corpus and the research methodology is provided. In the next section, we present the analysis and discussion of the cases found in our corpus. Finally, we outline the conclusions drawn from the present research.

2. Theoretical framework

2.1 Adverbial devices

Since adverbs are frequently considered a heterogeneous part of speech, it is difficult to establish a concise, specific and clear definition of the term. This becomes clear when observing the multiple definitions of this grammatical category and the attributes that are ascribed to it. Haspelmath (2001) defines adverbs as the 'most problematic major word class' (2001: 16543), while van der Auwera (1998: 3) considers the category 'elusive' and Eisenberg (2013: 212) refers to it as 'confusing'. In fact, the lack of conceptual unity among linguists regarding the definition and scope of the term has resulted in its widespread use as an umbrella concept covering a number of terms whose classification is not entirely clear.

From a morphological perspective, English adverbs are either simple, derived or compound (Downing 2015: 444). The fact that certain words can function as either adverbs or adjectives without changing their spelling is often one of the most confusing issues for learners of English as a foreign language. Moreover, some adverbs can be formed from adjectives through the addition of the suffix *-ly*; however, there also exist adjectives that 'already have the *-ly* suffix (*friendly, likely, princely, daily, weekly, monthly, annually*), and this form is also that of the adverb' (Downing 2015: 445).

Regarding the possible taxonomies of adverbs, Greenbaum's (1969) studies on adverbials establish three main categories: adjuncts, disjuncts and conjuncts. This terminology has also been applied by other linguists in their research; for example, Quirk et al. (1972, 1985). However, this is not the only taxonomy used; in fact, there are other very popular and widely recognised terminologies, such as that of Biber et al. (2021)*,* who use circumstance, stance, and linking adverbials as the corresponding terms. Likewise, within Systemic Functional Linguistics, Halliday (2004: 123ff) establishes a similar system also comprising three categories, namely circumstantial, modal, and conjunctive adjuncts, which can be briefly described as follows:

- Adjuncts or circumstantial adverbials are those contributing to referential meaning.
- Conjuncts or conjunctive/linking adverbials are those fulfilling connective and text-organising functions.
- Disjuncts or modal adverbials are those conveying the speaker's evaluation of the propositional information.

For the present work, the relevance lies in those adverbs that express some evaluation of the propositional information. Greenbaum (1969: 43) identifies a category of adverbs that provide a 'comment about the truth-value of what is said', distinguishing them from those that 'merely express shades of doubt or certainty' and those that 'in addition refer to the observation or perception of a state of affairs'. In turn, Quirk et al. (1985) distinguish between adverbs that 'express conviction' and adverbs that 'express some degree of doubt'; in the same line, Biber and Finegan (1988, 1989) discuss 'surely-adverbials' and 'maybe-adverbials'. Biber et al. (1999), in contrast, include all these adverbials under the label of epistemic stance adverbs conveying doubt or certainty.

According to Downing (2015), adverbs can express five broad sorts of meaning in clauses and groups: (1) circumstantial, (2) stance, (3) degree, (4) focusing, and (5) connective. Within each of these categories, which are organised according to their meaning, adverbs can be further organised according to their function and type. Table 2 presents the classification in detail alongside examples provided by Downing (2015). In addition,

> the meaning of a particular adverb must be seen together with its function in context. The literal meaning of many adverbs can become figurative, or completely different, when used as an intensifier. So, although *far* is listed in section A (below) as meaning distance, *Don't go too far*, it expresses degree in *Prices won't go down very far*. When it functions as an intensifier it takes on a meaning similar to *much*: *far too short, a far nicer place*, while *so far* expresses time, similar to *up to now*. (Downing 2015: 445)

In the present article, we focus on the analysis of adverbs that would be included by their meaning in the stance category and by their function in the category of certainty/doubt. It should be noted that the 'expressions of certainty are flexible and either weaken their force to express uncertainty or come to strengthen the force of the proposition' (Simon-Vandenbergen & Aijmer 2007: 259) and concerning their position within a given sentence, '[a]dverbs are very flexible and can occur almost anywhere in the clause' (Simon-Vandenbergen & Aijmer 2007: 281). However, before discussing the occurrences found in the corpus of adverbs that serve this function, the following section introduces the term *metadiscourse*, as it is directly related to our topic of study.

Table 1. Classification of adverbs and examples according to Downing (2015: 446-447).

Meaning	Function	Type	Examples
Circumstantial	Space	Position	Put the chairs *here/ outside/ upstairs.*
		Direction	Push it *inwards/ down/ through/ out/ away.*
		Distance	Don't go too *far/ near/ close.*
	Time	Moment	They will be coming *tomorrow/ sometime/ then/ soon/ later.*
		Frequency	The doctor came *once/ daily/ frequently/ now and again.*
		Duration	We didn't stay *long*. We spoke *briefly*.
		Relation	The taxi will arrive *soon*. It isn't *here yet*.
		Sequence	*first, second, next, then, last, finally.*
	Manner		Hold it *carefully*.
	Domain		The concert was a success *artistically* but not *financially*.
Stance	Certainty, doubt		You are *certainly* right. *Perhaps* I'm wrong.
	Evidential		*Apparently*, they emigrated to Australia.
	Viewpoint		We are in good shape *financially*, and *healthwise*, too.
	Emphasis		He is *plainly just* a creep. *Indeed* he is.
	Judgement		The Minister has *wisely* resigned.
	Attitude		*Thankfully*, it didn't rain. *Hopefully*, it will be fine tomorrow.
Degree	Comparison		This is the *most*/the *least* efficient scanner we've had so far.
	Intensification		He lives *all* alone but seems *quite/ fairly/ pretty* happy.
	Attenuation		It was *kind of* strange to see her again.
	Approximation		There were *about/roughly/more or less* 20 people there.
	Sufficiency		Is the water hot *enough*?
	Excess		Well, actually, it's *too* hot.
Focusing	Restriction		That is *merely* a detail. He is *just* interested in money.
	Reinforcement		The hotel had everything, *even* a fitness centre.
Connective	Sequence		*First*, we have no money, and *second*, we have no time.
	Reinforcement		The house is small and *besides/furthermore* has no garden.
	Conclusion		It was a tiring trip, but *altogether* very interesting.
	Restating		We've got two pets, *namely* a rabbit and a canary.
	Reason		I couldn't find you, *so* I left.
	Condition		Take an umbrella; *otherwise* (= if not), you'll get wet.
	Clarification		He wants to live abroad, *or rather* anywhere away from home.
	Contrast		They accept his invitations, *yet* they run him down.
	Alternation		There's no tea. Would you like a cup of coffee *instead*?
	Concession		What you said was true; *still* it was unkind.
	Attention-seeking		*Now*, you listen to me! *Now then*, what's all this about?

2.2. Metadiscourse

In 1959, Harris first used the term *metadiscourse* to refer to 'a way of understanding language in use, representing a writer's or speaker's attempts to guide a receiver's perception of a text' (Hyland 2005: 3). From that point on, and especially from the 1980s onwards, numerous studies on this topic have been successively published, thus proving the interest of the scientific community in this concept and its relevance within the field of applied linguistics. The publications listed below are but a small sample that reflect the relevance and interest aroused by this topic within the scientific community over the last four decades. In the 1980s:

Schiffrin (1980); Williams (1981); Vande Kopple (1985); Crismore (1989). In the 1990s: Crismore et al. (1993); Mauranen (1993); Intraprawat and Steffensen (1995); Steffensen and Cheng (1996). In the 2000s: Hyland (2004, 2005, 2007); Ädel (2006); Caffi (2006). In the 2010s: Hyland (2010, 2012); Alonso-Almeida (2012; 2015); Correia (2013); Lee and Subtirelu (2015); Zhang (2016); Álvarez-Gil and Bondi (2021); Álvarez-Gil (2017; 2023; 2024), among many others.

Despite the vast number of studies related to this concept, however, its scope and boundaries are still not fully clear. This lack of consensus on certain aspects related to the concept of metadiscourse has led to the development of diverse definitions of the term, which are not always compatible, but which have in some cases been nurtured by each other. Some of the most widespread, as indicated by Álvarez-Gil (2018), are the following:

a) Williams (1981: 121-122), for instance, defined metadiscourse as 'writing about writing, whatever does not refer to the subject matter being addressed'.

b) Crismore (1984: 282) indicates that:

> Metadiscourse functions on a referential, informational plane when it serves to direct readers how to understand the author's purposes and goals, and the primary message by referring to its content and structure. The referring can be on a global or local level. Metadiscourse functions on an expressive or attitudinal plane when it serves to direct readers how to 'take' the author, that is, how to understand the author's perspective or stance toward the content or the structure of the primary discourse.

c) Mauranen (1993) identifies two main trends in metadiscourse studies: the integrative and the non-integrative approach. The former takes the textual interaction between writer and reader as a defining feature, while the latter approach considers metadiscourse as a narrower concept that only examines reflexivity, i.e. the capacity of language to comment on language itself (Ädel 2010: 70). Non-integrative approaches tend to define metadiscourse as 'reflexive linguistic expressions referring to the evolving text per se or its linguistic form, including references to the writer persona and the imagined reader qua reader and the reader of the current text' (Ädel 2005: 154).

d) Vande Kopple (1985: 87) claims that textual metadiscourse shows 'how we link and relate individual propositions so that they form a cohesive and coherent text and how individual elements of those propositions make sense in conjunction with other elements of the text'. As for interpersonal metadiscourse, it 'helps to express our personalities and our reactions to the propositional content of our texts and characterises the interaction we would like to have with our readers about that content' (Vande Kopple 1985: 87). In the taxonomy proposed by Vande Kopple (1985), textual metadiscourse comprises four categories: (i) text connectives, (ii) code glosses, (iii) validity markers, and (iv) narrators. Moreover, interpersonal metadiscourse includes three types of devices: (i) illocution markers, (ii) attitude markers, and (iii) commentaries.

The relevance of the model proposed by Vande Kopple (1985) is undeniable, as it is considered by many linguists to be the first attempt at systematising the analysis of metadiscourse devices. Nevertheless, as noted by some scholars including Hyland (2005: 32), the functional overlap among some categories makes it difficult to render satisfactory analyses.

e) According to Hyland (2017: 1), the concept of metadiscourse has to do with 'the ways in which writers and speakers interact through their use of language with readers and listeners'. The revision of the term makes clear the organising and content-evaluating functions of metadiscourse in contrast with propositional discourse that reports on "what we *talk about*" (Hyland 2017: 18).

In the present study, for our analysis of the occurrences found in the compiled dissertation corpus, we will follow the theory on metadiscourse presented in Hyland (2005), which utilises the taxonomy outlined below.

2.2.1. Interactive and interactional metadiscourse

Concerning its distinct categories, according to Hyland (2005: 49), metadiscourse can be divided into two main dimensions: interactive and interactional. The category of interactive metadiscourse includes code glosses, endophoric markers, evidentials, frame markers and transition markers, while the interactional category includes attitude markers, boosters, engagement markers, hedges and self-mention. Obviously, the implied presence of the reader is a key element of academic writing, and authors are responsible for trying to promote and guide interaction with these readers. We can accordingly argue that the inclusion of interactive metadiscourse devices in written academic texts is crucial for writers hoping to effectively interact with their potential readers. Mur-Dueñas (2011: 3069) explains this division between the two dimensions in the following way:

> both interactive metadiscourse features (intended to organise and shape the material in the light of the readers' likely needs and expectations) and interactional metadiscourse features (aimed at portraying the scholars as authors and at binding writer and reader together) are a response to the interpersonal component of writing.

In this study, we will focus on the interactional dimension, since the category we intend to analyse is the one corresponding to boosters, which are included in this group. The interactional dimension covers the strategies used by authors to interact with their potential readers and comment on the content transmitted. By using the type of elements included in this category, writers seek to express their point of view and to involve their readers. In the specific case of academic texts, authors generally also employ interactional elements to construct their texts with readers, which occurs less frequently in other kinds of writing.

As Hyland (2005: 80) indicates, such devices 'help control the level of personality in a text as writers acknowledge and connect to others, pulling them along with their argument, focusing their attention, acknowledging their uncertainties and guiding them to interpretations'. The interactional metadiscourse devices can be organised into five broad categories (Mur-Dueñas 2011: 3070):

a) Boosters: features that highlight the writer's certainty and conviction about a proposition, and which may be the result of certain pragmatic conventions in academic writing.
b) Attitude markers: items that show the writer's affective evaluation of given parameters or entities.
c) Engagement markers: elements used by scholars to bring readers into the text, involving them in the negotiation of academic knowledge. These include personal pronouns, question forms, directives and asides.
d) Hedges: features that limit the writer's full commitment to what is stated in a proposition, and which may be the result of certain pragmatic conventions in academic writing.
e) Self-mentions: explicit signals of the authorial persona of the scholar(s). These include self-references and self-citations.

3. Corpus description and methodology

The present corpus contains the text of 220 theses written in English and submitted to Spanish universities between the years 2011 and 2021. The corpus is divided into two subcorpora: the first includes texts from the domain of the natural sciences, while the second comprises those from the social and legal sciences. Ten theses per year from each area of knowledge have been compiled. The time span covers the years 2011 to 2021, both inclusive.

The theses compiled are available via open access from the institutional repositories of eleven Spanish universities. In order to obtain as varied a sample as possible, institutions from several different regions have been selected. Specifically, the compiled theses were defended at the following higher education institutions: the University of Barcelona, Polytechnic University of Valencia, Complutense University of Madrid, University of Salamanca, University of Seville, University of Santiago de Compostela, University of Las Palmas de Gran Canaria, University of the Basque Country, Autonomous University of Madrid, and Carlos III University.

During the compilation process, it was determined that, compared to other European countries, the percentage of theses written in English continues to be low in Spain; although it is true that an increase can be detected from the beginning to the end of the decade under study, the language of writing par excellence in this type of research remains the Spanish language. One possible reason for the increase in the number of theses written in English is the recent possibility for doctoral theses to be presented in the form of a compendium of published research articles, which, in order to favour more widespread dissemination of research results, are usually written in English, since this is considered the lingua franca for academia. During the compilation process, this practice has been detected especially frequently in the domain of the sciences, and has been opted for more frequently in recent years.

Table 2 below presents the distribution of the 220 theses in our corpus and the exact number of words per subcorpus, ca. 5.5 million each.

Table 2. The number of words and texts distributed per corpora.

Subcorpus	Number of texts	Number of words
Natural sciences	110	5,328,102
Social sciences	110	5,605,840
	Total number of texts	**Total number of words**
	220	10,933,942

Therefore, the total number of words amounts to almost 11 million. This word count includes only those sections of the theses that are relevant to the present study; thus, the documents have been cleaned by eliminating the sections with no relevance to this study, such as the tables of contents, acknowledgements or dedications, sections devoted to describing the authors' various publications, the list of references, etc.

As previously indicated in this paper, the relevance of the notion of stance is undeniable, since 'it seems to be the motivation for variation and change in language from both a sociolinguistic and a diachronic perspective' (Alonso-Almeida 2015: 2). The merits of using corpora to analyse the occurrences of diverse linguistic phenomena such as boosters in the present paper are evident, as it gives us the opportunity to scrutinise

their occurrences in real contexts. However, the most problematic aspect of using a corpus methodology to analyse these types of linguistic phenomena has to do with the pragmatic dimension, as it is necessary to assess the context in order to disambiguate meanings and functions. Hence, our methodology based on the computer processing of the texts is accompanied by a meticulous visual examination of the occurrences in their contexts.

To interrogate the texts, we performed searches using *AntConc*, a corpus linguistics software tool, to find all instances of adverbials in the corpus. Once the list is complete, a detailed visual analysis of the cases is required to detect those that function as boosters and determine whether there is variation between the two scrutinised subcorpora. In order to facilitate comparison, the relative frequency with respect to a standardised base of 10,000 cases has been computed. The analysis of the data has been conducted employing the aforementioned computer tool, which has yielded concordance lines encompassing an adequate context for facilitating the visual examination of adverbs. This process enables the categorisation of adverbs according to the previously outlined terms described in section 2.

4. Results and discussion

4.1. General results

In this paper, due to space limitations, we have selected three adverbs frequently used by authors in academic texts for analysis as to the frequency of their use in our corpus; moreover, we also analyse specific examples that illustrate the booster function fulfilled by these adverbs in the specific linguistic contexts in which they are employed. Within the natural sciences subcorpus, a total of 6,118 linguistic elements functioning as boosters have been detected, while in the social sciences subcorpus, 5,914 such elements were identified. This implies that the three adverbs we have selected for analysis in this study, namely *absolutely, highly* and *strongly*, represent 18.63% of the total number of boosters (12,032 occurrences) found in both subcorpora.

Table 3. The number of occurrences and frequency of each of the three adverbs in the corpora.

Adverbs	Social sciences			Natural sciences		
	Absolute frequency	Relative frequency	Functioning as boosters	Absolute frequency	Relative frequency	Functioning as boosters
absolutely	53	0.09	53 (100%)	62	0.12	62 (100%)
highly	723	1.29	714 (98.75%)	560	1.05	560 (100%)
strongly	386	0.69	379 (98.2%)	478	0.90	473 (98.95%)
Total	1162	2.07	1146	1100	2.07	1095

As can be seen from Table 3, although the number of occurrences of each adverb varies between the two subcorpora, the summed frequencies of the adverbs selected in both subcorpora are exactly the same: 2.07. Likewise, as the results show, the main function of any of these three adverbs is undoubtedly the booster function, since in almost 100% of the occurrences found in our corpus, the adverbs *absolutely, highly* and *strongly* perform this metadiscursive function.

Table 4 lists the number of occurrences of each of these three adverbs functioning as boosters within the two subcorpora, considering the position occupied by these forms within the sentence, namely initial, medial, or final.

Table 4. Position of *absolutely*, *highly* and *strongly* within a sentence.

Placement of the three adverbs functioning as boosters within the studied sentences						
Adverb	**Natural sciences subcorpus**			**Social sciences subcorpus**		
	Initial	Medial	Final	Initial	Medial	Final
absolutely	0	62	0	3	49	1
highly	5	555	0	1	709	4
strongly	6	458	9	1	372	6
TOTAL	11	1075	9	5	1130	11

According to the data included in the previous table, it would appear that the most flexible adverb regarding its position within a given sentence in both subcorpora is *strongly*. With regard to *highly* and *absolutely*, their position seems to be more flexible in the social sciences subcorpus; this is especially true in the case of *absolutely,* since this adverb occupies a medial position exclusively in the natural sciences subcorpus.

The following graph plots the use of these three adverbs as a booster in the natural sciences subcorpus:

Figure 1. Occurrences per year of each adverb functioning as a booster in the natural sciences subcorpus.
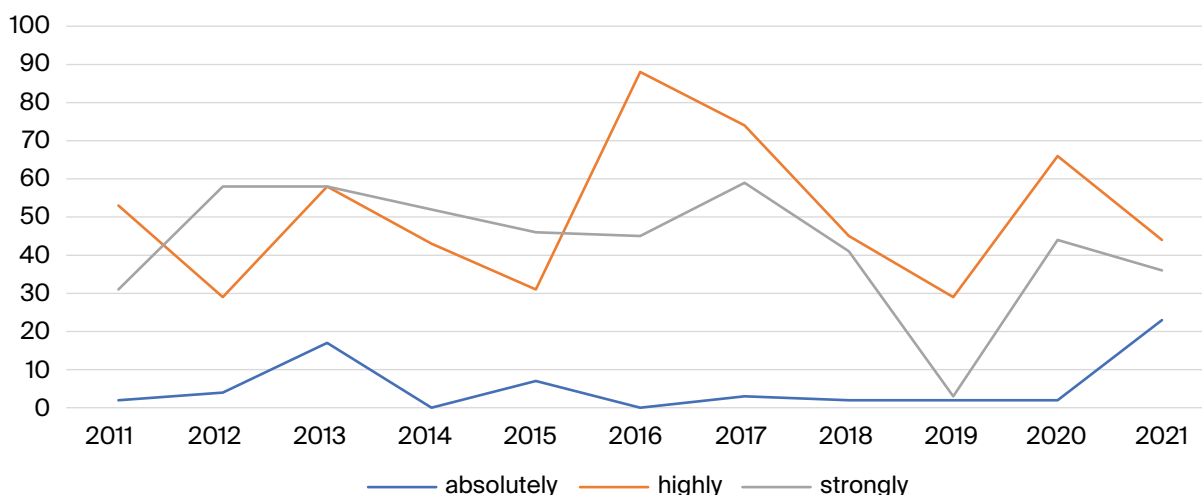
From Figure 1, the number of occurrences per year of each of the three analysed adverbs can be compared. As the figure clearly shows, the frequency of *absolutely* is much lower compared with that of *highly* and *strongly*. As can further be seen, there is some fluctuation in the frequency of use of the three adverbials; however, it should be noted that by 2021, the three frequencies begin to converge, since the frequency of *absolutely* increased while the number of occurrences of *highly* and *strongly* declined. This could imply less repetition in the boosters employed by the authors to reinforce their claims in their doctoral dissertations and, thus, greater variety in the linguistic elements functioning as boosters. It would be a very interesting avenue for future work to compile and compare these results with dissertations published in 2022 to determine whether this tendency is continuing or simply the result of chance.

Figure 2. Occurrences per year of each adverb functioning as a booster in the social sciences subcorpus.
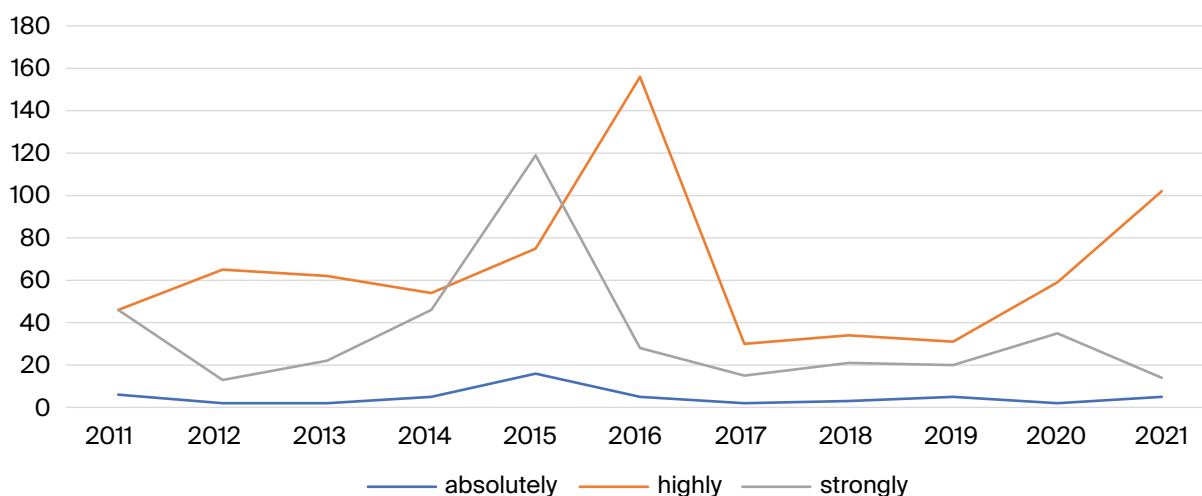
The frequencies of use of these three adverbs within the social sciences subcorpus are plotted in Figure 2. Again, fluctuations in the frequency of use can be observed. However, in the dissertations presented in 2017, 2018 and 2019, the frequency of these adverbs functioning as boosters was drastically reduced. In the case of this subcorpus, in contrast to the natural sciences subcorpus in 2021, the frequency of use of *absolutely* and *strongly* tends to equalise, while that of *highly* increased drastically.

In the case of both subcorpora, the frequency of *highly* reached its peak in 2016. This is an interesting observation, as these fields of knowledge convey vastly dissimilar types of content. Nevertheless, the authors of the compiled dissertations mostly opted for the use of *highly* as a booster in their works that year, despite the apparent lack of any specific reason for this. It is also worth noting that in the year 2020, variation in the frequency of use of the three adverbials functioning as boosters, either upward or downward, can be observed in both subcorpora.

However, linguistically speaking, as stated by Simon-Vandenbergen and Aijmer (2007: 80-81), there is more than one reason why one adverb may be used less frequently than another. These reasons are related, as the authors indicate, to three different dimensions:

- Semantics: it is possible that the semantic meaning of an item is one that speakers frequently choose to express.

- Pragmatics: these have to do with the development of the rhetorical functions associated with some adverbs. The development of some adverbs into discourse markers is another example of a pragmatic development that accounts for frequency. The more functions an adverb has developed, the more polysemous it is, and the more likely it is to have a high frequency of occurrence.
- Stylistics: some adverbs are more stylistically marked than others. In general, the more formal an item, the lower its frequency.

4.2. Discussion of findings

4.2.1. Occurrences from the social sciences subcorpus

Examining the occurrences of any of the three adverbs in both subcorpora, it is evident that the most frequent combination regarding their placement and co-occurrence within the utterances is verb + adverb + adjective. In these cases, the adverbs *absolutely, highly* and *strongly* are generally used to reinforce the meaning of the adjective that comes after them, such as in the following examples:

1. However, her calculation methodology implies a share of labour that is **absolutely** marginal and is not adequate for our objective. Willball, 2011.
2. In some regions, the implementation was **strongly** oriented towards enforcing citizens as consumers [...]. Cuadrado Ballesteros, 2012.
3. To the extent possible, any additional specific procedural rules for antitrust cases should therefore only be adopted if they prove **absolutely** necessary. Leskinen, 2014.

Other combinations, though less frequently used, have also been detected in our corpus, such as the adverb + adjective structure without a verb form placed immediately before the adverb (i.e. examples 4, 5, 6, and 7), or combinations in which the adverb is placed before the verb to reinforce its nature (as in examples 8 and 9):

4. The difficulty in the organization of UIIs arises from the **highly** uncertain and non-codifiable nature of scientific know-how, which results in high transaction costs and systemic failures in the market for this know-how. García Estévez, 2012.
5. Recognizing the importance of destination brands in differentiating and in the creation of unique propositions in a **highly** competitive tourism destination Marketplace [...]. Igreja da Costa e Silva, 2019.
6. This characterization of financial markets makes the dynamic updating and reevaluation of previously established knowledge **absolutely** essential to ensure the best possible understanding of the topic of interest at the time of the analysis. Hernández Florindo, 2021.
7. In this case, a **highly** stressful situation of an intrauterine death becomes exacerbated and **highly** conflictive. Cassidy, 2021.
8. The Spanish expert does not reveal his position in this regard, which is instead very clear in the words of the representative of SAE, who **strongly** disagrees with the concept of 'obligation' and promotes the concept of 'voluntary' of taking part in the process of activation [...]. Bonechi, 2015.
9. Anyway, we have to admit that this is one of the limitations in our research due to the lack of data, but we **strongly** believe that it has been addressed properly and that our conclusions are solid. Rodríguez de Rivera Cremades, 2015.

After having reviewed the positions of all occurrences of the adverbials under consideration, it can be observed that there is a greater flexibility regarding the position of the adverbial in the social sciences subcorpus, although in all cases, the middle position is indisputably the most frequent by far; there are some examples of these three adverbials in the initial and final positions, but only in the social sciences theses. These adverbs are used to achieve epistemic strengthening. Nonetheless, in the natural sciences corpus, the syntactic position of adverbs is less flexible. In the case of *absolutely*, this adverb is placed in the intermediate position in one hundred percent of the cases in order to highlight the authors' perspective. For its part, *highly* does appear in the initial position in some sentences, but never in the final position. Finally, *strongly* is the most flexible, as there are various examples of this adverb in the initial, middle and final position. As mentioned above, however, the vast majority of these adverbs occupy the mid-position; in fact, 98.18% of the occurrences in the natural sciences subcorpus and 97.25% in the social sciences subcorpus are placed in the median position.

In examples 10 to 14, the adverbs placed at the end of each sentence reinforce the verb form, such as in 10 and 11, where *highly* affects *value* in example 10 and *regard* in example 11:

10. All MPs argued that they valued this work **highly,** but held contradictory views on what the implication of this position was. Peterson, 2011.
11. However, when we consider the fact that Spanish firms regard environmental issues **highly**, it is not surprising. Kunapatarawong, 2014.
12. In the U.S. the weight in GDP of the three sectors, in which Chinese competition rises **strongly**, is lower than in the three previous regions. Zhou, 2015.
13. The fall of wages at the lower end of the income distribution was particularly severe. As a result, the low-wage sector expanded **strongly**, and it is currently one of the largest among advanced economies. Herrero Alba, 2020.

14. The Soviet Union was able to enforce the leading ideology in its territories **strongly**. Pronkina, 2021.

In addition to the position occupied by these adverbial devices within the sentences under study, co-occurrence with other elements that serve to reinforce or mitigate their function as boosters has also been detected, as can be seen in the following examples:

15. It becomes clear and more than just a coincidence that after the Methanex case — the award that stands as the antinomy to the Metalclad "effects test"—that the public purpose doctrine appears as the determinative principle that tips the pendulum almost **absolutely** in favor of regulatory host-State sovereignty. Martínez-Fraga, 2013.
16. For firms that are doing CSR, 94% reported that they are **highly** likely to continue with their CSR projects, 79% are satisfied with their CSR results, and 85% have financial resources allocated for CSR projects. Kunapatarawong, 2014.

In example 15, the inclusion of the adverb *almost* before *absolutely* softens the strength of the second adverb, indicating that the position in favour of regulatory host — State sovereignty is majoritarian but that not every party opts for that position. In example 16, the addition of the adjective *likely* after the adverb *highly*, conveying that it is probable that the firms mentioned will 'continue with their CSR projects', also softens the illocutionary force of the adverb, indicating that this is an action that will most probably take place in the future, but that the level of certainty is not absolute. This mitigating function is also played by the negation of the verb placed just before the adverb, such as in example 17.

17. An important problem in analyzing the impact of economic policies is the simultaneity and connections between distinctive policies given that they are not **absolutely** independent and are many often implemented simultaneously with others. Vedia Jerez, 2012.

On the other hand, as can be seen in examples 18 and 19, the adverbs *more* and *even* are sometimes placed before the adverbial *strongly* to emphasise its function as a booster. In the specific case of example 20, the metadiscursive function of the adverbial device is reinforced by the addition of the expression *at odds* following the adverb in the sentence.

18. It seems that Orthodox Protestants responded to growing labor competition by relying more **strongly** on their family background. Brik, 2017.
19. This positive shock wave in the terms of trade continued even more **strongly** during Peron's first presidency, growing another 26.5% to reach a level of 129.5. Bercoff, 2019.
20. As we can see, the empirical evidence is **strongly** at odds with this interpretation. Lo Bello, 2018.

4.2.2. Occurrences from the natural sciences subcorpus

Concerning the syntactic position of *absolutely, highly* and *strongly* in the social sciences subcorpus, the flexibility of *absolutely* is more restricted than the position of the other two adverbs, with the position of *strongly* again being the most flexible. In most of the occurrences of *absolutely* functioning as a booster in our corpus, the adverb is placed after the verb and before the adjective, thereby strengthening the meaning of the latter to unambiguously demonstrate the author's stance, as in 21. This explicit indication of the author's perspective may be seen as an imposition to the readers in the sense outlined by Culpeper (2011) and Alonso-Almeida and Álvarez-Gil (2021).

21. To gather evidence of radiation effect on the JEM-EUSO electronics, especially on the PMTs, is **absolutely** necessary as they are the main and most critical elements of the instrument. Prieto Alfonso, 2017.

In the case of *highly,* it almost always occupies this 'standard' position after a verbal phrase and before an adjective, as in example 22. Nonetheless, in some cases, additional elements are included between the verb and the adverb, as in 23. These elements, such as the modal verb *could* or the adverb *so*, serve to modulate the illocutionary force of *highly*.

22. All carrier phase outliers below this level will not be detected and therefore a post-fit residual screening is **highly** recommended and even mandatory when undifferenced observations are used (in PPP). Moreno Monge, 2012.
23. [...] throughout the continental U.S. and most of Alaska in July 2003. Until then, no other navigation system could provide so **highly** precise horizontal and vertical navigation. The plans for WAAS development continue to improve the coverage. Moreno Monge, 2012.

In the case of the adverb *strongly*, there is greater flexibility in terms of its position within sentences, a pattern already observed in the examples obtained from the social sciences subcorpus. As the following examples show, *strongly* can be placed at the end of a sentence, in the initial position or mid-position, with the latter being the most frequent, and does not necessarily have to precede or follow the verb in the sentence.

24. The participating modes are wave functions whose density may overlap **strongly**. Heimsoth, 2013.
25. [...] non-gravitational systems could be dual to higher dimensional black holes. **Strongly** interacting systems could be studied using their duals as black hole solutions. Blazquez Salcedo, 2014.
26. It is **strongly** influenced by [17-22]: i) the physicochemical properties of the membrane surface (i.e. pore size and its geometry, charge density, roughness, hydrophilicity, chemical composition. Arribas Fernández, 2020.

In the natural sciences subcorpus, the function of the three adverbials as boosters is often somewhat mitigated by combining them with modal verbs such as *can*, *could*, *should* or *may*, as can be seen in examples 27 to 32.

27. The latter property further implies that these solids should be **highly** crystalline, an important criterion for the precise establishment of structure-properties relationships. Platero Prats, 2011.
28. The participating modes are wave functions whose density may overlap **strongly**. Heimsoth, 2013.
29. Sato et al. (1994) pointed out that the error in the correction for the ocean tide effects could **strongly** affect the estimated FCN parameters when using SG data. García Maroto, 2015.
30. If the information of the time interval at which the maximum value of the emitted signal appears is not used, the TOF could be **strongly** overestimated. Pérez Lila, 2017.
31. The best way to apply this is to use additional Lagrange multipliers, which in the continuous realm may look **absolutely** unnecessary. Martín de Almagro, 2019.
32. we aim to demonstrate in this Chapter that the combination of fluorescence spectroscopy and energy transfer events, in addition to other optical spectroscopic techniques (such as absorption and CD), can be a **highly** valuable strategy to extract supplementary information on complex supramolecular systems involving several equilibria. Serrano Molina, 2021.

Despite being the elements most frequently used to attenuate the metadiscursive booster function of the three adverbs under study, the authors of the doctoral theses in our corpus also employ elements other than modal verbs to carry out this mitigating function, such as the structure *seem to* (*be*) + adverb, as in examples 33 and 34 below. Another option is the use of negation of the verb placed before the adverb, such as in instances 35 and 36. Finally, the authors also resort to the use of other adverbs, such as *unlikely* and *relatively* in examples 37 and 38, respectively, that serve to mitigate the pragmatic function of the adverbs analysed in this study.

33. Certain types of behaviour are essential for larval survival, such as the escape response, which seems to **strongly** rely on the proper development of central nervous system. Benítez Santana, 2011.
34. For an even number of parties these states can be used to teleport from half of the parties to the other half in a collaborative way. Moreover, these states are in one to one correspondence with quantum secret sharing schemes. Thus, they exhibit genuine multipartite entanglement, and seem to be **highly** entangled in a multipartite way. González Guillén, 2014.
35. As a general rule, when it's not **absolutely** clear from the context the topological operation [...]. Hernández Corbato, 2013.
36. Although the algorithms are not **strongly** affected by noise, it is relevant to limit misleading features that might affect the characterization. Hassan Collado, 2016.
37. Although the Swift observation is mildly absorbed, we consider it to be unobscured because the two NH during the Swift and XMM 1 observation differ by nearly two orders of magnitude, making it **highly** unlikely that the same structure was obscuring partially the Swift observation as well. Agis González, 2017.
38. analysis of the culture medium in contact with the cover glasses coated with nanoMOF and the AgNP@ nanoMOF thin films indicated that the coating is relatively **strongly** attached to the cover glasses, as no nanoMOF particles were detected in the media. Arenas Vivo, 2021.

This number of linguistic elements employed to soften the illocutionary force of these three adverbials contrasts with the number of cases found in the social sciences subcorpus, in which far fewer instances of this phenomenon are identified. The fact that modal verbs and other mitigating elements are used with a far lower frequency in the social sciences corpus compared to the natural sciences corpus can be understood with reference to the level of experimentation involved in both areas of knowledge. In the case of the social sciences, much of the content is related to economic and legal theories built on principles that do not require new experimentation, but are rather based on prior theories that have either already been tested or are not of an experimental nature at all. In the case of the natural sciences, however, the level of experimentation is much higher; while many of the premises involved may be partially valid, the authors are in many cases aware of the limitations of their experiments, meaning that their conclusions are neither definitive nor irrefutable. Authors writing in these fields thus commonly employ more techniques to mitigate their content as a face-saving strategy.

In contrast, and as has already been shown through analysis of the occurrences from the social sciences subcorpus, the adverb *more* in (39) or the intensifying expression *much more* in (40) are placed before the adverb *strongly*, reinforcing the booster function of the latter. It should be noted that this phenomenon is found to occur much less frequently than mitigation. Moreover, it is also remarkable that this reinforcement of the pragmatic function only happens with the adverb *strongly* and not with *absolutely* and *highly*.

39. Besides, most of the SFR occurs in obscured regions by dust clouds. As we have seen in Sect. 2.4.2, shorter wavelengths are more **strongly** affected by dust extinction. Domínguez Sánchez, 2012.
40. Such probability distributions can be correlated much more **strongly** if the state shared by Alice and Bob is entangled than if it is separable, a phenomenon known as nonlocality. Contreras Tejada, 2021.

5. Conclusion

Our analysis of Spanish doctoral dissertations written in English reveals that, as regards the position the adverbs occupy within the sentences, the least flexible of the three analysed adverbs is *absolutely*, whose position is reduced in almost all cases to verb + adverb + adjective. Second, there is *highly,* which, despite occupying basically the same position as *absolutely*, can also be placed at the end of a sentence, or can even accompany an adjective without having to be combined with a verb. Finally, the adverb with the greatest flexibility in terms of its syntactic position is demonstrably *strongly*. This adverb, as we have seen in the examples presented above, can be placed between the verb and the adjective or another adverb, as occurs in most cases; however, we can also find it at the end of sentences, or even in the initial position. It can also be placed both before and after the verb form.

Concerning their pragmatic function as boosters, these adverbs can be combined with numerous elements that mitigate or reinforce their illocutionary force, primarily modal verbs. It is especially noteworthy that, in the field of natural sciences, the use of specific elements to mitigate the illocutionary force co-occurring with the analysed adverbials is much more frequent than in the social sciences, as has been discussed and illustrated above through a selection of samples. This phenomenon can be explained with reference to the differences in the level of experimentality of these two fields of study.

The findings of these studies can have pedagogical implications for professionals and students in academic writing, particularly those involved in writing doctoral dissertations or conducting research across various disciplines. These implications include promoting awareness of adverbial positioning within sentences, which allows educators to emphasise the importance of comprehending and utilising diverse syntactic structures to effectively convey meaning. Students, in turn, can be encouraged to vary their placement of adverbials to enhance the clarity and impact of their academic writing. Furthermore, these findings can form the basis for discussing discipline-specific conventions and expectations in academic writing. By guiding students to understand the rhetorical purposes behind such variations, training activities can assist them in adapting their writing style accordingly. Overall, these may have the potential to support students of specialised domains in becoming more proficient and versatile communicators within their respective fields by using metadiscourse features at their disposal effectively.

Subsequent investigations could involve comparing the outcomes obtained from domain-based subsets of doctoral theses with those derived from diverse academic disciplines. This comparative analysis aims to ascertain whether disparities in the utilisation of boosters are likewise observable, and to explore the potential implications of such variations for the genre. Additionally, it would be of interest to examine other metadiscursive indicators to determine the presence of disciplinary variations or even microdiachronic changes within the same knowledge domain. Another avenue worth exploring could involve investigating the presence of boosters within specific lexicogrammatical patterns in L2 PhD texts, focusing on academic writing.

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