

Comparison of Hedges Devices in the Writing of Mathematicians

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Abstract: The present work aims at building hedges database allowing scholars to study the applications and timing of hedges in mathematical writing. A Course of Pure Mathematics by the distinguished English mathematician G. H. Hardy is compared to Topics in Algebra by another renowned I. N. Herstein. To make advantage of hedges' roles as language devices, the paradigms proposed by Hyland and Yu are employed in most referenced works to categorize widely used hedges. To find the total frequency, the inquiry was finished utilizing the search functions of the Microsoft Pdf Program. The sample of the study is comparison of two mathematics books and can be utilized elsewhere in literature for comparing which one better.

Keywords: Hedges categories, Hedges, Assignment of weights

Introduction

Since coined the term "words whose job is to make things more or less fuzzy," the idea of hedging has been around. It has since been used to words or phrases like "I think," "perhaps," "might," and "maybe," which we frequently employed to bolster categorical claims. A hedge is therefore any linguistic mean used to indicate either

- a lack of complete commitment to the truth of a proposition, or
- a desire not to express that commitment categorically

Hedges are a useful tool for communicating ambiguity and possibilities in scientific discourse when used appropriately. Hedges are a fascinating occurrence in language that many linguists have studied. In fields that are frequently characterized by quick reinterpretation, hedges first enable writers to articulate propositions with greater accuracy. Here, hedging is a crucial way to verify the level of accuracy or dependability of a claim and to appropriately and cautiously make uncertain facts.

The idea of hedging existed and its coining by Lakoff (1973) [1], Since then, it has come to be used with like "I think," "perhaps," and "maybe," which we commonly employ to provide clarification on categorical claims. Thus, a hedge is any verbal construct that expresses a desire to avoid communicating a conviction in its veracity categorically or a lack of absolute belief in its veracity. It's important to employ hedges appropriately in scientific discourse as they help communicate both potential and uncertainty. Many linguists have developed the intriguing

linguistic phenomena known as hedges. The majority of hedge studies, according to Yu (2009), [2] found to be focused on scientific writing like Economics (Pindi and Bloor 1986 [3]; Channell 1990 [4], medical discourse (Salager-Meyer 1991, 1993, 1994) [5], [6], [7] molecular articles (Myers 1989) [8], and news writing (Zuck 1986, 1987) [9], [10]. Hedgehogs, in the first place, enable writers to clarify concepts more fully in situations where rapid interpretations are common. Hedging is an essential instrument for precisely expressing unclear claims with the proper degree of caution and verifying the level of accuracy or reliability of a claim in this situation. Particularly in the sciences, where the writer aims to transmit knowledge as fully, accurately, and impartially as possible, writing is a balance of fact and opinion. Often, writers would mention that "X may lead to Y" instead of "X leads to Y" in order to make clear the regarding a given topic. Hedges distinguishes between what is known and what is inferred, or between what is actual and hypothetical. He also suggests that a claim is more likely to be backed by reasonable reasoning than by concrete evidence. It is assumed by the reader that the author's claim that it is true is accurate in this particular context. Hedges are employed by authors for a second purpose: to foresee the potential fallout from being proven incorrect and the ultimate refutation of a claim (Salager-Meyer 1994 [11]; Hyland 1998 [12]). Reputation is based on providing , compelling, and contributions of knowledge; consequently, it is crucial to make the strongest claims possible for each piece of evidence. But writers need to be careful not to overdo the effects of exaggeration. Hedges protect authors' reputations, help them escape taking personal responsibility for comments made about them, and lessen the potential harm that comes with making categorical promises. This application aligns with Lakoff's (1973) [13] correlation between hedges and "fuzziness," implying hedges may distinction between a writer and proposition when talking about hypothetical scenarios. By employing hedging, writers can promote audience participation, be receptive to different interpretations of their remarks, and communicate unverified claims with caution. Research into it has important implications in many different fields, and as such, it functions as an important means by which professional scientists affirm their affiliation with research groups. Regretfully, we still don't fully understand how hedging is routinely used across various industries, even though linguists have confirmed its significance. Even though corpus studies frequently concentrate on modal verbs from sources (Coates 1989) [14], a large portion of modality research has been theoretical (Lyons 1977) [15], and both mitigation and expressions of confidence have been studied (Holmes 1988). Research on corpora of academic writing has either focused only on abstract modal verbs or generalized "commentative" elements (Skelton 1997) [16]. [17] (Butler, 1990). We have some new hedging research in addition to the previously mentioned works.

Development Of Hedging Database

For this kind of hedging, we build a database. Yu (2009) offered a taxonomy that is used to classify the various kinds of hedges. The other four classes into which hedges have been classified are modal hedges, mental hedges, pragmatic-marker hedges, quantificational hedges, and tag questions, subjunctives, and depersonalization. The most widely hedges publications have been used to determine which hedges are most common for various categories (see Appendix). These publications include Holmes 1984, [18], 1988 [19]; Hyland 1994 [20], 1996a [21], 1996b [22],

1998[23]; Hyland and Milton 1997[24]; and Yu 2009. The two works that are being considered are attempting to aggregate the frequencies of various hedges . A Course in Pure Mathematics by eminent mathematician G. H. Hardy is contrasted. We have assigned a weight to each category of hedges so that the analysis yields findings that are proportionate. The weights are computed by dividing the total number of hedges in a category by the frequency of those hedges. In our database, for example, the Pragmatic-Marker category includes 105 hedges. The total frequency of these 105 hedges is found to be 4219 in A Course of Pure Mathematics. Therefore, the weight for pragmatic-marker hedges is 40.18 when 4219 is divided by 105. Therefore, the weight determination appropriate ratio of the hedges . It doesn't follow that hedges in a particular category with a higher number will necessarily be given more weight. Table 1 makes clear, for example, that while 82 Quantificational Hedges weigh only 1.4, 32 Modal Hedges weigh 38.34.

Table 1: Weights calculated for types of Hedges in A Course of Pure Mathematics

S.No.	Hedges category	No. of Hedges	Total Frequency	weight
1.	Modal	32	1227	38.34
2.	Mental	19	225	11.84
3.	Pragmatic-Marker	105	4219	40.18
4.	Quantificational	82	56	1.4
5.	Tag questions, Subjunctives and Depersonalization	8	25	3.12

Experimental Design And Results

A database of hedge is developed, and are select used hedges for different categories. The analysis is carried out using Microsoft Pdf Program's searching tools to count the total frequency of all hedges in two higher mathematics books, "Topics in Algebra" and "A Course of Pure Mathematics". We then create system using frequencies as a basis. The trial data for the various hedge categories and subcategories used by both authors are shown in Tables 1-4. In the accompanying figures, we compare the weights that were determined for different hedge categories and subcategories. We have calculated weights for each category of hedges and displayed them in a bar diagram in Figure 1 above. Although the red blocks belong to Topics in Algebra, the blue blocks are from A Course of Pure Mathematics of the Rights of Woman.

The usage of more hedges by author G. H. Hardy in A Course of Pure Mathematics in comparison to I. N. Herstein in Topics in Algebra is clear from tables 1 and 2. It is also evident that the authors' usage patterns are nearly identical.

S.No.	Hedges category	No. of Hedges	Total Frequency	Weight
1.	Modal	32	1527	47.71
2.	Mental	19	527	27.73
3.	Pragmatic-Marker	105	5216	49.67
4.	Quantificational	82	1106	13.48
5.	Tag questions, Subjunctives and Depersonalization	8	75	9.3

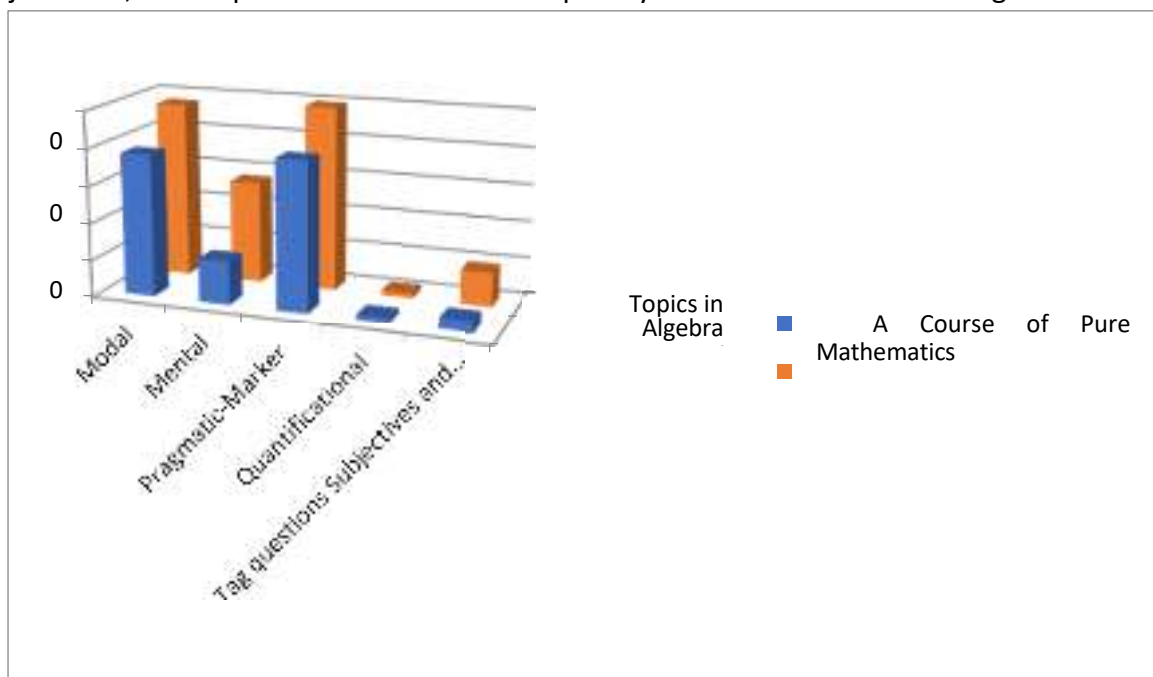
Table 3: Weights calculated for types of Hedges in Topics in Algebra

Table 4: Weights calculated for subcategory of Hedges in Topics in Algebra

S. No.	Hedges subcategory	Hedges category	No. of Hedges	Total Frequency	Weight
1.	Epistemic	Modal	15	516	34.4
2.	Deontic		3	395	31.66
3.	Dynamic		3	345	115
4.	Evidential	Quantificational	11	77	7
5.	Simple Quantificational		47	3223	68.57
6.	Polar Positions		26	221	8.5
7.	Negation and Intensifier		9	37	4.11

In the following figures, we compare the weights computed for different hedge categories and subcategories.

We display the weights for each category of hedges in the form of a bar diagram in Figure 1 above. The orange blocks are from Topics in Algebra, while the blue blocks are from A Course of Pure Mathematics. Figure 1 makes it clear that G. H. Hardy A Course of Pure Mathematics uses more hedges than Topics in Algebra by I. N. Herstein. It's also possible to see that both authors use the same pattern of usage. The sole distinction is that G.H. Hardy uses Tag Questions, Subjunctives, and Depersonalization more frequently than Quantificational hedges.

**Figure 1:** Weight comparison of five primary types of Hedges

Even though A Course of Pure Mathematics has smaller blocks in Figure 1, the authors' use of pragmatic-marker and quantificational hedges differs noticeably. A Course of Pure Mathematics' pragmatic-marker hedges have a weight of 40.18 only, whereas Topics in Algebra's have a weight of 49.67. Similarly, in Topics in Algebra, the weight of Quantificational hedges is 13.48, while in A Course of Pure Mathematics, it is 1.4. Modal Hedges are second most frequent used hedges by both the authors. In Figure 2 below, we present the bar diagram of various subcategories of Modal hedges.

According to Yu (2009), model hedges can be further divided into evidential, deontic, dynamic, and epistemic types. As Figure 2 above makes clear, both authors employed the same hedge patterns for the modal hedge subcategories. Compared to the orange blocks that represent Topics in Algebra, the blue blocks that represent A Course of Pure Mathematics are smaller. The block diagram for each of the different Quantificational hedge subcategories is shown in the following figure.

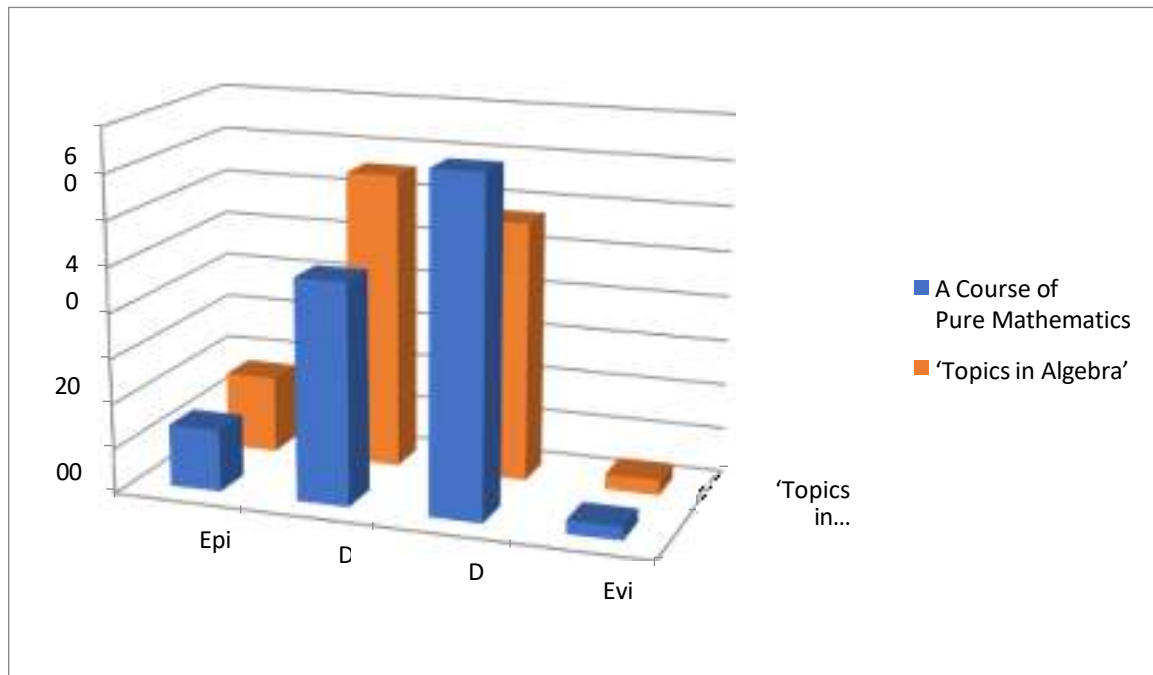


Figure 2: Weight comparison of subcategories of Modal Hedges

According to Yu (2009), there are additional categories for quantificational hedges: Simple Quantificational, Polar Positions, Negations, and Intensifiers. The block diagram for the different Quantificational hedge subcategories is shown in Figure 3 below. Once more, the blue blocks in this instance are smaller than the red blocks, with the exception of the negation and intensifiers.

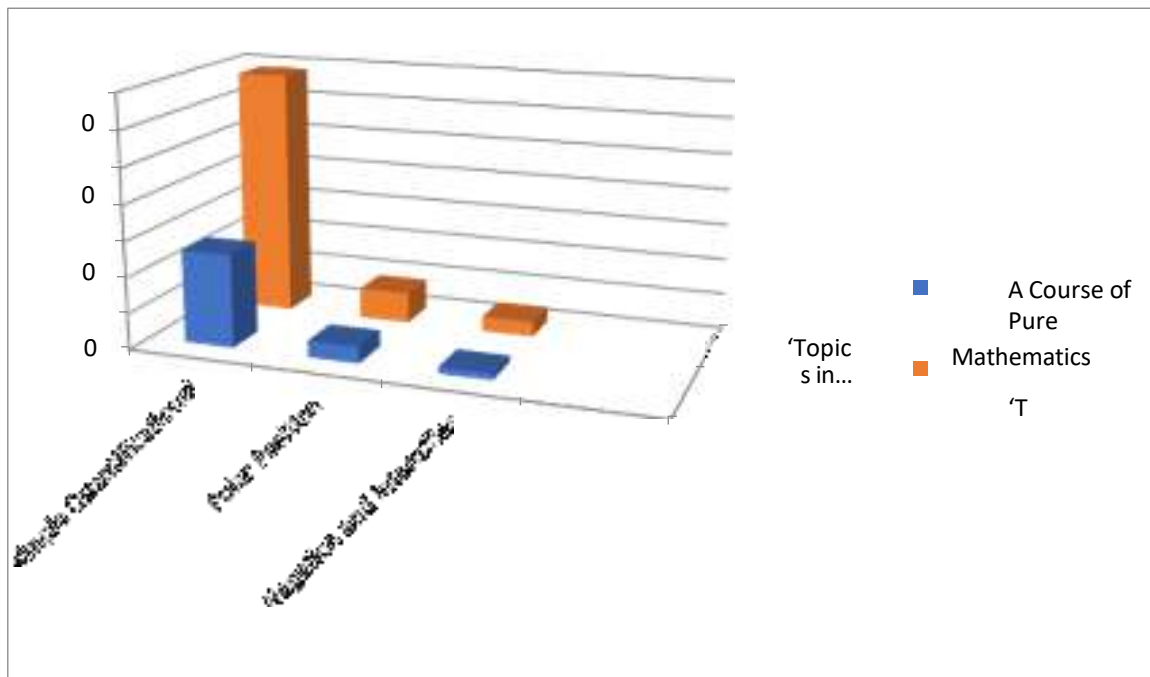


Figure 3: Comparing the weights of Quantificational Hedges' subcategories.

Conclusions

While comparing the work A course of pure mathematics with Topics in Algebra, It is discovered that both writers essentially used the same sequence when using hedges. It has been discovered that all categories and subcategories of hedges When comparing the two books, it is discovered that the authors almost exactly used the same order for the conjunctions. It has been discovered that Book 1 has heavier weights for all conjunction categories and subcategories than Book 2. Additionally, the nearly identical conjunction usage (based on weights) implies that both authors chose to write in a similar style. The conjunction that is most frequently used in both books is model (1227 in Book 1 and 1527 in Book 2). The utilization In Book 1 and Book 2, there is a pragmatic marker of frequent (4219 and 5216, respectively). Quantificational conjunctions, which are used most frequently in both books—1223 in Book 1 and 3223 in Book 2—are the other extensive words that are frequently used by both. The mathematical terms used in both books are clarified by these conjunctions. The book writing process benefits from these findings as well since they enable other mathematicians to write more clearly and succinctly.

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