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Quantifying the Gradient of Doubt: Framework for Epistemic Uncertainty in Linguistic Hedges

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ABSTRACT
Nuanced communication heavily relies on hedges, which are linguistic strategies that convey ambiguity or uncertainty. In many computational tasks, such as sentiment analysis and natural language processing, it is crucial to assess the degree of uncertainty introduced by a hedge accurately. This paper outlines a technique for extracting hedges. It provides a detailed examination of one of their features, specifically the level of fuzziness associated with them, thereby facilitating more efficient information retrieval. Additionally, it aims to lay the groundwork for a "Fuzziness Score" for hedges by investigating key factors, potential methodologies, and associated challenges.

General Terms
Corpus-based approach, Natural Language Processing, Linguistic Analysis, Trigrams, Hedge extraction.

Keywords
Hedges, Information retrieval, Hedge-Qualifiers, Degree of association, Nuanced communication.

1. INTRODUCTION
Hedges are linguistic devices used to reduce the strength or certainty of a statement and are a common aspect of human communication, especially in academic discourse and scientific writing. The use of hedges enables writers to articulate propositions with accuracy, caution, and humility, thus significantly contributing to the acceptance of claims by readers and the management of potential objections [8]. Hedges appear in both spoken and written communication, with scientific authors employing them to present claims in a manner that aligns with the expectations of their discourse community [13]. Hedges convey a writer's attitude toward the truth of their statements, serving as a rhetorical tool to promote acceptance and show respect for the inherently tentative nature of scientific knowledge [8,13]. Hedging enables the articulation of possibility instead of certainty, a practice particularly beneficial in scientific writing, where definitive assertions may be met with skepticism [8]. The concept of hedging has received significant attention in linguistics and discourse analysis; however, the quantification of the "fuzziness" introduced by these hedges is still a relatively underexplored area [8,11]. The creation of a "fuzziness score" for hedges may enhance comprehension of their influence on the interpretation and acceptance of statements, yielding important insights into communication dynamics across diverse fields.

The use of hedges strategically is critical in academic writing for expressing complex ideas and encouraging readers to think critically [8]. An excellent writing strategy that allows for debate and divergent viewpoints is the usage of hedges [3]. By presenting claims as tentative or probabilistic rather than final, hedges help to reduce the likelihood of objections to these claims [8]. This stands in sharp contrast to "boosters," which convey conviction, assurance, and certainty but might not be suitable for scientific writing that values hesitancy and caution [13]. In situations like debates, where results are often provided with some doubt until they are confirmed by the larger scientific community, they function as rhetorical devices that enable writers to convey new assertions about knowledge [11] gently. Expertly utilizing hedges allows researchers to skilfully traverse the intricate interplay between claiming new discoveries and recognizing the fundamental constraints of scientific investigation. By utilizing hedges, writers may show that their statements aren't perfect and encourage readers to engage in discussion.

Measuring the ambiguity of hedges could enhance both theoretical and practical applications. A fuzziness score could standardize comparisons of hedging device strength, facilitating a more nuanced assessment of their semantic impact on claims. Researchers can analyze extensive text corpora using this standardized measure to identify patterns of hedging across various genres, fields, and contexts. In education, students may use such a number to adjust the certainty of their arguments and improve their academic writing. In contexts characterized by intricate language and subjective viewpoints, fuzziness scores may enhance sentiment analysis and opinion mining within automated text analysis systems.

2. LITERATURE REVIEW
An essential aspect of academic writing, particularly in research articles, is the use of hedging devices, which pose challenges for non-native writers. Hedging, as defined by Lakoff [9], refers to “words whose job is to make things more or less fuzzy” (p. 195). This concept encompasses terms such as ‘might’, ‘perhaps’, ‘maybe’, and ‘I think’, which indicate uncertainty. Hedging is a significant linguistic feature in academic genres, with research articles serving as the primary corpus for examining hedging devices. The primary function of hedging is to present the study's findings with caution, enabling readers to derive various interpretations. Precision is fundamental to scientific writing. A scientific writer is expected to present information directly and explicitly. There are several reasons a scientific writer may choose not to be precise regarding a scientific claim, such as concerns about the implications of the claim or uncertainty about its validity. Brown and Levinson assert that precision in scientific claims poses significant threats. Even when the writer is confident in their claims, they may choose not to express them exactly, allowing for some margin of error.

Hedging helps authors and researchers present their points clearly. Like many scientific ideas, “hedging” has several interpretations. Hedging definitions, taxonomies, and functions differ per author. George Lakoff may have defined “hedging” as "words or phrases whose job is to make things more or less fuzzy" [9]. Hedging allows authors to be cautious about unverified claims. Salager-Meyer identifies two purposes for hedging devices: 1. Uncertainty. The explicit presentation of content may lead to criticism from other writers. 2. Hedging devices help authors get claims right [14]. Hedging may be the most compelling research approach [14].

Hedges refer to words or phrases that convey ambiguity, caution, or indecisiveness regarding a statement [10]. Stating that a restaurant "is the best option" conveys certainty, whereas asserting that it "might be the best option" introduces ambiguity. Stating that one "thinks the service is good" or that "the food is delicious, in one's opinion," indicates a degree of caution.
Early research on hedges primarily originated from studies concerning powerful and powerless language. Anthropologist William O'Barr analysed more than 150 hours of courtroom testimony and observed that individuals of lower status, such as defendants and regular witnesses, exhibited distinct speech patterns compared to judges, expert witnesses, and other high-status individuals. Alongside the use of more formal language, lower status individuals employed filler words (e.g., "uh") and tag questions (e.g., "you know"), as well as an increased frequency of hedges (e.g., "I think" or "might"). Subsequent research has focused on the persuasive impact of language, frequently manipulating hedges alongside other features associated with "powerless" language [6, 15, 2,4,5]. As a result, it is not feasible to ascertain which outcomes were influenced by the hedges themselves. Moreover, the limited studies that have concentrated on hedges have yielded inconsistent findings. O'Barr (1982) posited that hedges diminish credibility and persuasion; conversely, Meyer argued that hedges strengthen a statement [12]. Blankenship and Holtgraves propose that hedges diminish message persuasiveness [1], whereas Hosman and Siltanen (2011) report no significant effect [7]. As a result, the persuasive impact of hedges is not well-defined.

The extraction of hedges does not seem to have been prioritized, as there is minimal to no related activity recorded in the literature. This is significant considering that the primary role of an information retrieval system, particularly a textual information system, is to deliver relevant documents to users according to their needs.

In the present work, an effort is made to extract Hedges from a given sentence using tokenized frequencies, which will further lead to the determination of a crucial concept, i.e., the degree of fuzziness associated with a particular Hedge extracted from the sentence. Each sentence is broken into tokens of three(trigrams), which are removed, and the rest of the sentence, i.e., the sub-sentence, is examined further for the calculation of frequencies, leading to the arrival of Hedge. In the following section, an extensive description of the methodology employed in their extraction is provided. The fourth section deals with the modelling of the problem. In Section 5, a critical discussion on the quantification of features associated with Hedges is provided.

3. METHODOLOGY

3.1 Extraction of trigrams

The current approach extracts trigrams from a provided text.
For example: - *It is not easy to fill the vacuum caused by the departure of a popular and charismatic leader.*
In the above sentence, the consecutive trigrams are:
'It is not', 'is not easy', 'not easy to', 'easy to fill', 'to fill the', 'fill the vacuum', 'the vacuum caused', 'vacuum caused by', 'caused by the', 'by the departure', 'the departure of', 'departure of a', 'of a popular', 'a popular and', 'popular and charismatic', 'and charismatic leader'.
In this way, trigrams are extracted for each of the 100 sentences.

3.2 Enrichment of Corpus

Additional enrichment of the corpus is performed to count frequencies. Some of the open-source corpora that have been merged into the corpus include COCA, COHA, GLOWBE, NOW, Corona, WIKI, TV, movies, and soap.[1]

3.3 Frequency of the original sentence

A set of 100 sentences is being examined, and their frequencies are being counted in the enriched corpus. A non-zero frequency indicates that the original sentence is present in the corpus. For example, if the first sentence is considered, i.e., *We had first met when I was a young law student hired by one of his partners as a summer research intern*, the frequency count of this sentence in the corpus is zero. This clearly indicates its absence in the corpus.

3.4 Removal of Trigrams

All the trigrams extracted in Section 3.1 are now removed from a given sentence, one after another. This process is repeated for each of the 100 sentences.

3.5 Extraction of Hedges

When Hedges are removed from the sentence, the meaning of the sentence remains unchanged. If the remaining sentence still has a non-zero frequency, this implies that it has meaning as it exists in the corpus. After removing each consecutive trigram, the frequency of the remaining part of the sentence is counted by considering one word preceding the first word of the removed trigram and one word immediately after the last word of the removed trigram. Then, the frequency is obtained for the consecutive n-grams of the remaining sentence.

The frequency pattern is being observed. A non-zero frequency indicates the token is present in the corpus even after the trigram is removed, whereas a zero frequency indicates its absence. The frequency of the consecutive tokens follows a pattern in which, after a specific interval, it becomes zero, and once it becomes zero, the subsequent tokens also have a zero frequency.

The phrase with a non-zero frequency is considered, and the corresponding trigram, which is removed, serves as a Hedge. The last phrase with a non-zero frequency, along with the trigram, serves as a Hedge-Qualifier.

As an illustration, consider one of the sentences from the 100 sentences i.e.

[1] The link for the corpus used is:
https://www.corpusdata.org/formats.asp

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We had first met when I was a young law student hired by one of his partners as a summer research intern.

If the trigrams 'of his partners', 'his partners as' and 'partners as a' are removed from this sentence, then the frequencies of the tokens of the remaining part of the sentence is being calculated according to the above-mentioned method in the following manner:

Table 1. Frequencies of the various tokens after removal of trigrams

S. No	Sentence	Trigram Removed (Identified as Hedges)	Remaining Sentence tokens	Degree of Association
01.	*We had first met when I was a young law student hired by one of his partners as a summer research intern.*	*of his partners*	*one as | Frequency: 26 one as a | Frequency: 1 one as a summer | Frequency: 0 one as a summer research | Frequency: 0 one as a summer research intern | Frequency: 0*	2
		His partners as	*of a | Frequency: 1652 of a summer | Frequency: 3 of a summer research | Frequency: 0 of a summer research intern*	2
		partners as a	*his summer | Frequency: 5 his summer research | Frequency: 0 his summer research intern | Frequency: 0 of a summer research intern | Frequency: 0*	1

3.6 Degree of Association

As illustrated above, for the sentence 'We had first met when I was a young law student hired by one of his partners as a summer research intern.', according to Table 1, the trigrams 'of his partners', 'his partners as', and 'partners as a' serve as Hedges because their removal results in a non-zero frequency of the tokens in the remaining part of the sentence, and their corresponding phrases, including the removed trigrams, act as Hedge-Qualifiers.

The above frequency values also indicate the degree of belongingness of a particular trigram (acting as a hedge) with a particular portion of a sentence (acting as a Hedge-Qualifier). This degree of belongingness of a specific hedge to a phrase leads to the concept of the degree of association of that hedge.

For example:- Degree of association for the hedges 'of his partners' and 'his partners as' is 2 while it is 1 for the hedge 'partners as a'.

This technique is used to extract hedges along with their degree of association for each of the 100 sentences. First five sentences along with their degree of association are given in Appendix A.1. The same procedure is followed for the rest of the 95 sentences also.

4. EXPERIMENTAL DESIGN AND RESULTS

Step I: A variable n is defined as a trigram, and n_i indicates where the trigram appears in a sentence. For instance, n_1 represents a sentence's first trigram, n_2 its second, and so on. n_{ij} represents corresponding elements of the trigram, where 'j' indicates the position of the words of the trigram. Thus, a trigram, which is composed of three words can be expressed as $n_{ij}n_{i(j+1)}n_{i(j+2)}$.

Step II: Now, in the next step, we take $n_{i(j-1)}$ and $n_{i(j+3)}$ from the sentence and find its frequency count in the corpus.

Step III: After that, we find the frequency of $n_{i(j-1)}n_{i(j+3)}n_{i(j+4)}$ from the corpus. In this way, the whole sentence is covered by taking each word successively. It is observed that after a specific interval of time, the frequencies become zero. This marks the end of the process.

5. RESULTS AND DISCUSSION

In the process illustrated above, the main idea is that a sub-sentence is also a sentence (just as a subset is also a set). Thus, parts of the sentence are considered, and their presence in the corpus is examined after removing a particular trigram. The associated sub-sentence remains in the corpus (as evidenced by a non-zero frequency) even after a specific trigram is eliminated, which is used in this instance. This renders the eliminated trigram a hedge, whereas the sentence's final non-zero frequency portion (including the eliminated trigram) is regarded as a Hedge-Qualifier with a certain level of association. These findings further demonstrate the ambiguity of hedges, as a certain trigram can be a hedge for one sub-sentence but not for another.

For example: In Table 1, 'of his partners' is a hedge for 'one of his partners as' and 'one of his partners as a', but not for 'one of his partners as a summer', etc.

6. CONCLUSION AND FUTURE SCOPE

The fuzziness associated with hedges, which are simple words or phrases, has been addressed by the current model. The proposed model paved the way for further identification and presentation of crucial hedging devices in oral and written discourse.

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8. APPENDIX A.1

S.No.	SENTENCES	TRIGRAMS REMOVED (serving as Hedge)	DEGREE OF ASSOCIATION	HEDGES EXTRACTED
01.	We had first met when I was a young law student hired by one of his partners as a summer research intern.	Trigram #1 Removed: [We had first] met | Frequency: 1108 met when | Frequency: 0 met when I | Frequency: 0 met when I was | Frequency: 0 Trigram #2 Removed: [had first met] We when | Frequency: 2 We when I | Frequency: 1 We when I was | Frequency: 0 We when I was a | Frequency: 0 Trigram #3 Removed: [first met when] had I | Frequency: 136 had I was | Frequency: 0 had I was a | Frequency: 0 Trigram #4 Removed: [met when I] first was | Frequency: 2 first was a | Frequency: 0 first was a young | Frequency: 0 Trigram #5 Removed: [when I was] met a | Frequency: 17 met a young | Frequency: 0 met a young law | Frequency: 0 Trigram #6 Removed: [I was a] when young | Frequency: 1 when young law | Frequency: 0 when young law	0 2 1 1 1	Had first met, first met when, met when I, when I was, I was a, young law student, hired by one, of his partners, his partners as, partners as a

<table>
<tr><td></td><td></td><td>student
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #7 Removed:
[was a young]

I law
| Frequency: 0

I law student
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #8 Removed:
[a young law]

was student
| Frequency: 0

was student hired
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #9 Removed:
[young law student]

a hired
| Frequency: 3

a hired by
| Frequency: 0

a hired by one
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #10 Removed:
[law student hired]

young by
| Frequency: 0

young by one
| Frequency: 0

young by one of
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #11 Removed:
[student hired by]

law one
| Frequency: 0

law one of
| Frequency: 0

law one of his
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #12 Removed:
[hired by one]

student of
| Frequency: 4

student of his
| Frequency: 0

student of his partners
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #13 Removed:
[by one of]

hired his
| Frequency: 0

hired his partners
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #14 Removed:
[one of his]

by partners
| Frequency: 0

by partners as
| Frequency: 0

by partners as a
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #15 Removed:
[of his partners]

one as
| Frequency: 26

one as a
| Frequency: 1

one as a summer
| Frequency: 0</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #16 Removed:
[his partners as]

of a
| Frequency: 1652

of a summer
| Frequency: 3

of a summer research
| Frequency: 0</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #17 Removed:
[partners as a]

his summer
| Frequency: 5

his summer research
| Frequency: 0

his summer research intern
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #18 Removed:</td><td></td><td></td></tr>
</table>

		[as a summer] partners research | Frequency: 0 partners research intern | Frequency: 0 Trigram #19 Removed: [a summer research] as intern | Frequency: 0 Trigram #20 Removed: [summer research intern] a | Frequency: 4999	0 0 0	
02.	The rich and famous flocked to his side whenever they needed a superb legal tactician with an aggressive edge.	Trigram #1 Removed: [The rich and] famous | Frequency: 32 famous flocked | Frequency: 0 famous flocked to | Frequency: 0 Trigram #2 Removed: [rich and famous] The flocked | Frequency: 0 The flocked to | Frequency: 0 The flocked to his | Frequency: 0 Trigram #3 Removed: [and famous flocked] rich to | Frequency: 1 rich to his | Frequency: 0 rich to his side | Frequency: 0 Trigram #4 Removed: [famous flocked to] and his	0 0 1	And famous flocked, famous flocked to, whenever they needed, superb legal tactician

		| Frequency: 337 and his side | Frequency: 0 and his side whenever | Frequency: 0 Trigram #5 Removed: [flocked to his] famous side | Frequency: 0 famous side whenever | Frequency: 0 famous side whenever they | Frequency: 0 famous side whenever they needed | Frequency: 0 Trigram #6 Removed: [to his side] flocked whenever | Frequency: 0 flocked whenever they | Frequency: 0 flocked whenever they needed | Frequency: 0 Trigram #7 Removed: [his side whenever] to they | Frequency: 0 to they needed | Frequency: 0 to they needed a | Frequency: 0 Trigram #8 Removed: [side whenever they] his needed | Frequency: 0 his needed a | Frequency: 0 his needed a superb | Frequency: 0 Trigram #9 Removed: [whenever they needed] side a	1 0 0 0 0	

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		| Frequency: 60 side a superb | Frequency: 0 side a superb legal | Frequency: 0 side a superb legal tactician | Frequency: 0 Trigram #10 Removed: [they needed a] whenever superb | Frequency: 0 whenever superb legal | Frequency: 0 whenever superb legal tactician | Frequency: 0 Trigram #11 Removed: [needed a superb] they legal | Frequency: 0 they legal tactician | Frequency: 0 they legal tactician with | Frequency: 0 Trigram #12 Removed: [a superb legal] needed tactician | Frequency: 0 needed tactician with | Frequency: 0 needed tactician with an | Frequency: 0 Trigram #13 Removed: [superb legal tactician] a with | Frequency: 30 a with an | Frequency: 2 a with an aggressive | Frequency: 0 a with an aggressive edge | Frequency: 0 Trigram #14 Removed:	1 0 0 0 2	

		[legal tactician with] superb an | Frequency: 0 superb an aggressive | Frequency: 0 superb an aggressive edge | Frequency: 0 Trigram #15 Removed: [tactician with an] legal aggressive | Frequency: 0 legal aggressive edge | Frequency: 0 Trigram #16 Removed: [with an aggressive] tactician edge | Frequency: 0 Trigram #17 Removed: [an aggressive edge] with | Frequency: 3878	0 0 0 0	
03.	Though I had graduated from Harvard Law School, his alma mater, I certainly wasn't the brightest intern at the firm, and my family pedigree reflected no blue blood.	Trigram #1 Removed: [Though I had] graduated | Frequency: 5 graduated from | Frequency: 0 graduated from Harvard | Frequency: 0 graduated from Harvard Law | Frequency: 0 graduated from Harvard Law School | Frequency: 0 Trigram #2 Removed: [I had graduated] Though from | Frequency: 1 Though from Harvard	0	I had graduated, Harvard Law school, his alma matter, alma matter I, brightest intern at, the firm and, firm and my, family pedigree reflected

<table>
<tr><td></td><td></td><td>| Frequency: 0</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Though from Harvard Law
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #3 Removed: [had graduated from]

I Harvard
| Frequency: 0

I Harvard Law
| Frequency: 0

I Harvard Law School
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #4 Removed: [graduated from Harvard]

had Law
| Frequency: 0

had Law School
| Frequency: 0

had Law School his
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #5 Removed: [from Harvard Law]

graduated School
| Frequency: 0

graduated School his
| Frequency: 0

graduated School his alma
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #6 Removed: [Harvard Law School]

from his
| Frequency: 197

from his alma
| Frequency: 0

from his alma mater
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #7 Removed: [Law School his]

Harvard alma
| Frequency: 0

Harvard alma mater
| Frequency: 0

Harvard alma mater I
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #8 Removed: [School his alma]

Law mater
| Frequency: 0

Law mater I
| Frequency: 0

Law mater I certainly
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #9 Removed: [his alma mater]

School I
| Frequency: 4

School I certainly
| Frequency: 0

School I certainly wasn't
| Frequency: 0

School I certainly wasn't the
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #10 Removed: [alma mater I]

his certainly
| Frequency: 1

his certainly wasn't
| Frequency: 0

his certainly wasn't the
| Frequency: 0</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #11 Removed: [mater I certainly]

alma wasn't
| Frequency: 0

alma wasn't the
| Frequency: 0

alma wasn't the brightest
| Frequency: 0</td><td>0</td><td></td></tr>
<tr><td></td><td></td><td>Trigram #12 Removed: [I certainly wasn't]

mater the
| Frequency: 0

mater the brightest
| Frequency: 0

mater the brightest intern</td><td></td><td></td></tr>
</table>

		| Frequency: 0	0	
		Trigram #13 Removed: [certainly wasn't the] I brightest | Frequency: 0 I brightest intern | Frequency: 0 I brightest intern at | Frequency: 0	0	
		Trigram #14 Removed: [wasn't the brightest] certainly intern | Frequency: 0 certainly intern at | Frequency: 0 certainly intern at the | Frequency: 0 certainly intern at the firm | Frequency: 0	0	
		Trigram #15 Removed: [the brightest intern] wasn't at | Frequency: 0 wasn't at the | Frequency: 0 wasn't at the firm | Frequency: 0	0	
		Trigram #16 Removed: [brightest intern at] the the | Frequency: 45 the the firm | Frequency: 0 the the firm and | Frequency: 0	1	
		Trigram #17 Removed: [intern at the] brightest firm | Frequency: 0 brightest firm and | Frequency: 0 brightest firm and my | Frequency: 0	0	

		Trigram #18 Removed: [at the firm] intern and | Frequency: 0 intern and my | Frequency: 0 intern and my family | Frequency: 0	0	
		Trigram #19 Removed: [the firm and] at my | Frequency: 167 at my family | Frequency: 0 at my family pedigree | Frequency: 0	1	
		Trigram #20 Removed: [firm and my] the family | Frequency: 38 the family pedigree | Frequency: 0 the family pedigree reflected | Frequency: 0	1	
		Trigram #21 Removed: [and my family] firm pedigree | Frequency: 0 firm pedigree reflected | Frequency: 0	0	
		Trigram #22 Removed: [my family pedigree] and reflected | Frequency: 0 and reflected no | Frequency: 0	0	
		Trigram #23 Removed: [family pedigree reflected] my no | Frequency: 17 my no blue | Frequency: 0		

		my no blue blood | Frequency: 0 Trigram #24 Removed: [pedigree reflected no] family blue | Frequency: 0 family blue blood | Frequency: 0 Trigram #25 Removed: [reflected no blue] pedigree blood | Frequency: 0 Trigram #26 Removed: [no blue blood] reflected | Frequency: 39	1 0 0 0	
04.	No matter how busy he was, he would always ask about Jenny, the woman I still call "my bride" even though we were married before I went to law school.	Trigram #1 Removed: [No matter how] busy | Frequency: 55 busy he | Frequency: 2 busy he was | Frequency: 0 busy he was he | Frequency: 0 Trigram #2 Removed: [matter how busy] No he | Frequency: 16 No he was | Frequency: 0 No he was he | Frequency: 0 Trigram #3 Removed: [how busy he] matter was | Frequency: 7 matter was he | Frequency: 0 matter was he would	1 1 1	No matter how, matter how busy, how busy he, busy he was, was he would, he would always, would always ask, ask about Jenny, Jenny the woman, woman I still, call my bride, my bride even, bride even though, were married before, before I went

		| Frequency: 0 matter was he would always | Frequency: 0 Trigram #4 Removed: [busy he was] how he | Frequency: 75 how he would | Frequency: 6 how he would always | Frequency: 0 Trigram #5 Removed: [he was he] busy would | Frequency: 0 busy would always | Frequency: 0 busy would always ask | Frequency: 0 busy would always ask about | Frequency: 0 Trigram #6 Removed: [was he would] he always | Frequency: 35 he always ask | Frequency: 0 he always ask about | Frequency: 0 he always ask about Jenny | Frequency: 0 Trigram #7 Removed: [he would always] was ask | Frequency: 6 was ask about | Frequency: 0 was ask about Jenny | Frequency: 0 was ask about Jenny the | Frequency: 0 Trigram #8 Removed:	2 0 1 1	

		[would always ask] he about | Frequency: 1 he about Jenny | Frequency: 0 he about Jenny the | Frequency: 0 he about Jenny the woman | Frequency: 0	1	
		Trigram #9 Removed: [always ask about] would Jenny | Frequency: 0 would Jenny the | Frequency: 0 would Jenny the woman | Frequency: 0	0	
		Trigram #10 Removed: [ask about Jenny] always the | Frequency: 16 always the woman | Frequency: 0 always the woman I | Frequency: 0 always the woman I still | Frequency: 0 always the woman I still call | Frequency: 0	1	
		Trigram #11 Removed: [about Jenny the] ask woman | Frequency: 0 ask woman I | Frequency: 0 ask woman I still | Frequency: 0 ask woman I still call | Frequency: 0	0	
		Trigram #12 Removed: [Jenny the woman] about I | Frequency: 187		

		about I still | Frequency: 0 about I still call | Frequency: 0	1	
		Trigram #13 Removed: [the woman I] Jenny still | Frequency: 0 Jenny still call | Frequency: 0 Jenny still call my | Frequency: 0	0	
		Trigram #14 Removed: [woman I still] the call | Frequency: 6 the call my | Frequency: 0 the call my bride | Frequency: 0	1	
		Trigram #15 Removed: [I still call] woman my | Frequency: 0 woman my bride | Frequency: 0 woman my bride even | Frequency: 0	0	
		Trigram #16 Removed: [still call my] I bride | Frequency: 0 I bride even | Frequency: 0 I bride even though | Frequency: 0 I bride even though we | Frequency: 0	0	
		Trigram #17 Removed: [call my bride] still even | Frequency: 1 still even though | Frequency: 0 still even though we		

		| Frequency: 0		
		Trigram #18 Removed: [my bride even] call though | Frequency: 2 call though we | Frequency: 0 call though we were | Frequency: 0	1	
		Trigram #19 Removed: [bride even though] my we | Frequency: 13 my we were | Frequency: 0 my we were married | Frequency: 0	1	
		Trigram #20 Removed: [even though we] bride were | Frequency: 0 bride were married | Frequency: 0	1	
		Trigram #21 Removed: [though we were] even married | Frequency: 0 even married before | Frequency: 0 even married before I | Frequency: 0	0	
			0	
		Trigram #22 Removed: [we were married] though before | Frequency: 0 though before I | Frequency: 0 though before I went | Frequency: 0		
		Trigram #23 Removed: [were married before] we I | Frequency: 15	0	

		we I went | Frequency: 0 we I went to | Frequency: 0 we I went to law | Frequency: 0 we I went to law school | Frequency: 0	1	
		Trigram #24 Removed: [married before I] were went | Frequency: 0 were went to | Frequency: 0 were went to law | Frequency: 0 were went to law school | Frequency: 0	0	
		Trigram #25 Removed: [before I went] married to | Frequency: 14 married to law | Frequency: 0 married to law school | Frequency: 0		
		Trigram #26 Removed: [I went to] before law | Frequency: 0 before law school | Frequency: 0	1	
		Trigram #27 Removed: [went to law] I school | Frequency: 0	0	
		Trigram #28 Removed: [to law school] went | Frequency: 664	0	

			0	
05.	For the first few years he justified his long hours by saying that he was "doing it for the good of the firm", and that he planned to take a month off and go to the Caymans "next winter for sure."	Trigram #1 Removed: [For the first] few | Frequency: 442 few years | Frequency: 13 few years he | Frequency: 0 Trigram #2 Removed: [the first few] For years | Frequency: 40 For years he | Frequency: 0 For years he justified | Frequency: 0 Trigram #3 Removed: [first few years] the he | Frequency: 377 the he justified | Frequency: 0 the he justified his | Frequency: 0 Trigram #4 Removed: [few years he] first justified | Frequency: 0 first justified his | Frequency: 0 first justified his long | Frequency: 0 Trigram #5 Removed: [years he justified] few his | Frequency: 0 few his long | Frequency: 0 few his long hours | Frequency: 0 Trigram #6 Removed: [he justified his] years long | Frequency: 0 years long hours | Frequency: 0 years long hours by | Frequency: 0 Trigram #7 Removed: [justified his long] he hours | Frequency: 12 he hours by | Frequency: 0 he hours by saying | Frequency: 0 Trigram #8 Removed: [his long hours] justified by | Frequency: 0 justified by saying | Frequency: 0 justified by saying that | Frequency: 0 Trigram #9 Removed: [long hours by] his saying | Frequency: 0 his saying that | Frequency: 0 his saying that he | Frequency: 0 Trigram #10 Removed: [hours by saying] long that | Frequency: 6 long that he | Frequency: 1 long that he was | Frequency: 0 Trigram #11 Removed: [by saying that]	2 1 1 0 0 0 1 0 0 2	For the first, the first few, first few years, justified his long, hours by saying, by saying that, saying that he, he was doing, was doing it, doing it for, it for the, for the good, the good of, good of the, of the firm, the firm and, firm and that, that he planned, he planned to, planned to take, take a month, a month off, month off and, off and go, and go to, to the Caymans, Caymans next winter

		hours he | Frequency: 2 hours he was | Frequency: 0 hours he was doing | Frequency: 0		
		Trigram #12 Removed: [saying that he] by was | Frequency: 3 by was doing | Frequency: 0 by was doing it | Frequency: 0	1	
		Trigram #13 Removed: [that he was] saying doing | Frequency: 0 saying doing it | Frequency: 0 saying doing it for | Frequency: 0 saying doing it for the | Frequency: 0	1	
		Trigram #14 Removed: [he was doing] that it | Frequency: 242 that it for | Frequency: 0 that it for the | Frequency: 0	0	
		Trigram #15 Removed: [was doing it] he for | Frequency: 178 he for the | Frequency: 0 he for the good | Frequency: 0	1	
		Trigram #16 Removed: [doing it for] was the | Frequency: 587 was the good	1	

		| Frequency: 1 was the good of | Frequency: 0 was the good of the | Frequency: 0		
		Trigram #17 Removed: [it for the] doing good | Frequency: 1 doing good of | Frequency: 0 doing good of the | Frequency: 0	2	
		Trigram #18 Removed: [for the good] it of | Frequency: 230 it of the | Frequency: 29 it of the firm | Frequency: 0 it of the firm and | Frequency: 0	1	
		Trigram #19 Removed: [the good of] for the | Frequency: 1058 for the firm | Frequency: 0 for the firm and | Frequency: 0 for the firm and that | Frequency: 0	2	
		Trigram #20 Removed: [good of the] the firm | Frequency: 23 the firm and | Frequency: 0 the firm and that | Frequency: 0 the firm and that he | Frequency: 0	1	
		Trigram #21 Removed:		

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		[of the firm] good and | Frequency: 20 good and that | Frequency: 0 good and that he | Frequency: 0 good and that he planned | Frequency: 0	1	
		Trigram #22 Removed: [the firm and] of that | Frequency: 224 of that he | Frequency: 3 of that he planned | Frequency: 0 of that he planned to | Frequency: 0	1	
		Trigram #23 Removed: [firm and that] the he | Frequency: 377 the he planned | Frequency: 0 the he planned to | Frequency: 0	2	
		Trigram #24 Removed: [and that he] firm planned | Frequency: 0 firm planned to | Frequency: 0 firm planned to take | Frequency: 0	1	
		Trigram #25 Removed: [that he planned] and to | Frequency: 426 and to take | Frequency: 4 and to take a | Frequency: 0 and to take a month | Frequency: 0	0	

		Trigram #26 Removed: [he planned to] that take | Frequency: 4 that take a | Frequency: 0 that take a month | Frequency: 0 that take a month off | Frequency: 0	2	
		Trigram #27 Removed: [planned to take] he a | Frequency: 1742 he a month | Frequency: 0 he a month off | Frequency: 0 he a month off and | Frequency: 0	1	
		Trigram #28 Removed: [to take a] planned month | Frequency: 0 planned month off | Frequency: 0 planned month off and | Frequency: 0 planned month off and go | Frequency: 0	1	
		Trigram #29 Removed: [take a month] to off | Frequency: 31 to off and | Frequency: 0 to off and go | Frequency: 0	0	
		Trigram #30 Removed: [a month off] take and | Frequency: 1 take and go | Frequency: 0	1	

		take and go to | Frequency: 0		
		Trigram #31 Removed: [month off and] a go | Frequency: 305 a go to | Frequency: 0 a go to the | Frequency: 0	1	
		Trigram #32 Removed: [off and go] month to | Frequency: 2 month to the | Frequency: 0 month to the Caymans | Frequency: 0 month to the Caymans next | Frequency: 0	1	
		Trigram #33 Removed: [and go to] off the | Frequency: 78 off the Caymans | Frequency: 0 off the Caymans next | Frequency: 0 off the Caymans next winter | Frequency: 0 off the Caymans next winter for | Frequency: 0 off the Caymans next winter for sure | Frequency: 0	1	
		Trigram #34 Removed: [go to the] and Caymans | Frequency: 0 and Caymans next | Frequency: 0 and Caymans next winter | Frequency: 0	1	

		and Caymans next winter for | Frequency: 0 and Caymans next winter for sure | Frequency: 0		
		Trigram #35 Removed: [to the Caymans] go next | Frequency: 1 go next winter | Frequency: 0 go next winter for | Frequency: 0 go next winter for sure | Frequency: 0	0	
		Trigram #36 Removed: [the Caymans next] to winter | Frequency: 0 to winter for | Frequency: 0 to winter for sure | Frequency: 0	1	
		Trigram #37 Removed: [Caymans next winter] the for | Frequency: 158 the for sure | Frequency: 0		
		Trigram #38 Removed: [next winter for] Caymans sure | Frequency: 0	0	
		Trigram #39 Removed: [winter for sure] next | Frequency: 305		
			1 0 0	