CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

In this section, the writer analyzed the data that have been collected from three different journal websites in form of sixty soft and hard science introduction section research articles to discover the difference of hedges use in both fields of study. The writer used descriptive quantitative method to count the number of hedges found in the data analysis and then interpreted it. To reach another objective, that is to find out the function of hedges used, she also employed qualitative method to analyze the hedges in context.

Based on Hyland (1996), there are four hedges types that are mostly used by academic writers in writing. They are epistemic lexical verb, epistemic adjective, epistemic adverb and modal auxiliary verb. Therefore the writer in this study chose to analyze them but did not include the lexical verb due to the limited time. Thus, there are three hedges types that are used to be analyzed here; epistemic adjective, epistemic adverb and modal auxiliary verb.

After the data had been selected and refined, the researcher then counted the number of hedges found in both disciplines and then tabulated the results. In this process, the writer used a software application named AntConc to help her count the number of hedges used in those introduction sections of research articles.

To ensure the results' validity, the writer did double check by looking on each hedge found in the context to make sure whether they include in the three hedges types aforementioned above. She also asked for an expert's help to make sure if the results are truly valid. Having examined the data and checked its validity, the results obtained are inserted in tables.

The following are the findings that were divided into two parts; the first one is the difference of hedges use in the two corpora and the second one is the function of hedges in the two corpora. Here below are the analyses:

4.1   The frequency distribution of hedges used in soft and hard science

Table 2

The overall number of hedges in the two corpora

Discipline	Frequency	Percentage (%)
Soft Science	180	59,0 %
Hard Science	126	41,0 %
Total	**306**	**100 %**

The table above shows that the number of hedges used in soft science is more than the one used in hard science. Though the difference is not much, which is only fifty four out of three hundred and six items or in percentage is 18 % , but this indicates that soft science uses more hedges in its research articles which caused by various factors. One of the possible reasons is because the nature characteristic of soft science itself is pretty abstract and does not involve precise data such numerical data. Soft science's methods usually use social approaches which do not have any fixed measurement and this causes the writers in this field of study use more hedges. On the contrary hard science has definite research methods by using formulas and numbers that designate the definite measurement. This could be the reason why hard science writers use fewer hedges than in soft science. Similar statement was stated by Vartalla (2001) that the nature of science influences the utilization of hedges.

Table 3

Categorical Distribution of Hedges in the two corpora

Discipline / Hedges Type	Soft Science		Hard Science		Total	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Epistemic Adjective	6	2 %	10	3 %	**16**	**5,0 %**
Epistemic Adverb	10	3 %	6	2 %	**16**	**5,0 %**
Modal Auxiliary Verb	164	54 %	110	36 %	**274**	**90,0 %**
Total	**180**	**59,0 %**	**126**	**41,0 %**	306	**100 %**

From the table of hedges type distribution, we can understand that the most used type of hedges in the introductory section of research articles is obviously modal auxiliary verb. In both fields of study, modal auxiliary verb is strongly dominant as the mostly used hedges with total number 274 items or in percentage is 90 %. Then it is followed by epistemic adverb with so far difference of number found, that is 245 items. The cumulative number of epistemic adverb hedges found in both disciplines is only 16 tokens or in percentage is 5 %, and this number is same to adjective hedge which also has only 16 items or 5%.

The different number of modal auxiliary verbs between soft and hard science in introduction section is 54 items. Soft science utilized more modal auxiliary verbs than hard science, but both numbers of hedges on modal auxiliary

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verb are above a hundred items. Modal auxiliary verb becomes the superior. This may be caused by which its functions or job itself is to modify, assist and give more information on a particular verb it accompanied. This result proves that modal auxiliary verb is indeed the most often used hedge type among other types of hedges (in this study, it is compared to epistemic adjective and adverb) in both soft and hard science in academic writing.

The total number between epistemic adjectives and epistemic adverbs in both soft and hard science are the same. Epistemic adjective has 16 tokens and epistemic adverb also has 16. From another point of view, if we look at the data based on the field of study, we know that hard science has more items on epistemic adjective category, whereas soft science has more items on epistemic adverb and modal auxiliary verb category. This shows that soft science does not always have more number of hedges than hard science. Though the overall number of hedges in soft science is greater than the one in hard science, but if we focus to look only at a certain type of hedge, we find an opposite rate against the overall result number, which in this case, hard science has more hedges. Probably, hard science writers need to give more information to acknowledge the readers about the statements they stated in the introduction part, so they applied more adjective hedges whose job is to modify or describe noun. Later, on the second part of the analysis, this matter will be discussed more clearly because the writer will examine the function of hedges used in both disciplines contextually.

Table 4

Frequency of Epistemic Adjective

Epistemic Adjective	Soft Science	Hard Science
Possible	3	6
Potential	3	2
Likely	0	2
Total	6	10

From the table of epistemic adjective's frequency, we can see that there are total 16 epistemic adjective of hedges in both fields of study. Among the three types of hedges that have been examined in this study, only epistemic adjective has more number of hedges on hard science introduction section rather than on soft science. We can see specifically from the table above what words that the subjects of this study used in the data observed. There are three different words of epistemic adjective appeared in the data analysis with the most number owned by the word *possible*. It has 9 items in total, while the word *potential* has 5 items, and the word *likely* has only 2 items.

The word *possible* shows the opportunity for something to happen but it is not certain. The number of this word on hard and soft science data are 6 and 3. This word has similar meaning to the word *likely*, but *likely* as an adjective, sometimes means good/nice. The difference between the two words is that *possible* is clearly an adjective, while *likely* sometimes can be an adjective or adverb. When the writer used AntConc application to find out how many words *likely* used in the data, she found 12 in total, yet after she sorting them, in fact there are only 2 words applied as epistemic adjective of hedges and those words

are both written on hard science data. From the comparison number between the words *possibly* (9 tokens) and *likely* (2 tokens), it reveals that the writers of the data taken prefer to use *possible* to hedge. Hereunder is one of the results taken from the data analysis:

> *(1) It is therefore <u>likely</u> that several common, widely distributed conifer, seed fern and gnetalean lineages were affected.*

The underline word in the context above shows a possibility that might have happened, but in the same time, it also expresses an uncertainty as well. The function of it is to down tone the claim stated and decrease the responsibility of the writer.

Another word of adjective type, *potential*, as the word *likely* does, has two part of speeches as well; adjective and noun. Overall, this word appears 11 times in soft science and 5 times in hard science. However, after the sorting process to take the adjective only, it becomes 3 on soft science and 2 on hard science. Those which considered as noun are excluded, and this is the example of the word "potential" as an adjective hedge taken in soft science article:

> *(2) The significance of this is the implication of transmission of HIV to their partners and new born and they have to consider the <u>potential</u> risks to themselves and future children and also meet the expectations of their families.*

The function of the underline word above is to modulate the statement of the probability that might occur.

Above all the discussion of epistemic adjectives as hedges, the result implies that hard science writers used adjective hedges more often than soft science writers.

Table 5

Frequency of Epistemic Adverb

Epistemic Adverb	Soft Science	Hard Science
Possibly	2	0
Potentially	2	3
Relatively	4	2
Actually	2	1
Total	**10**	**6**

In the table 5 above, there are four different words of epistemic adverbs occupied on the data analysis which function as hedges. This time, soft science has greater number than the one in hard science and the gap is just like epistemic adjective has, viz. 4 items. *Possibly* has the least number with two items, and *relatively* has the most number with 6 items.

Relatively is a word that emphasizes a certain thing to be noticed in comparison with other things that are similar than to be considered as something absolute. Usually, *relatively* is written in the situation where there are knowledge shared and known in the previous by both the writer and the reader. In another word, it can be stated that *relatively* is used to say that something is true as a general statement even though it is not hundred-percent true. This is one of the adverbial hedges used in the soft science:

> *(3) Although studies have shown that the use of visuals, compared with*
>
> *plain text, can increase the diffusion of messages (Guerini, Staiano, &*

Albanese, 2013), the effects of specific visual features are <u>relatively</u>

understudied.

In the context of above, *relatively* as an adverbial hedge shows indefiniteness. The hedge word also functions to decrease the force of statement about the understudied features.

The least used adverbial hedge is word *possibly* which is written in soft science data. There are only two tokens found in this study. This word defines a possible manner. It shows hesitant or doubt action and can be used to decrease the responsibility of the writer. Here below is the example in the context:

(4) First, determinants of news coverage of politicians are classified to

bring some structure to the overwhelming group of <u>possibly</u> influential

factors.

The word *possibly* above is used by the writer to alleviate his responsibility about his statement.

Table 6
Frequency of Modal Auxiliary Verb

Modal Auxiliary Verb	Soft Science Frequency	Hard Science Frequency
Can (not)	67	52
May (not)	27	21
Will	11	11
Must	9	1
Should	5	6

Could	31	13
Might	10	2
Would	4	4
Total	**164**	**110**

Modal auxiliary verb, as shown in the table above, has a number that is much different from the previous two categories. In both soft and hard science data in the present study, it shows that modal auxiliary verbs as hedges are used more than a hundred times on each field of study. However, the result of the frequency shows that soft science uses it quite a lot more than hard science as soft science has 164 items and hard science has 110 items. It means soft science employs 54 more modal auxiliary verb as hedges than hard science.

Table 6 above reflects that there are 8 different words of modal auxiliary verbs found and the highest number is possessed by modal verb *can (not)* with the total number from both field of studies is 274 items or in percentage is 90%. Soft science uses *can (not)* the most from all other modal verbs and so does the hard science. In the case of the least used modal auxiliary verbs in soft science is *would*, whereas in hard science is *must*. *Would* in soft science has the least number with 4 items and *must* has only one item in hard science. From the table frequency of modal auxiliary verb above, it can be concluded that both soft and hard science apply so many modal auxiliary verb than epistemic adjective and adverb, also both have the same preference as they engage *can(not)* the most. The following is an example of how *can(not)* is used in a context of soft science and hard science:

(5) Usually, with the help of word expression and dissemination of public opinion, consumers <u>can</u> agree with certain concepts, viewpoints and analysis ideas, so as to achieve the purpose of brand publicity and product sales.

The modal verb *can* above is employed to indicate that there is a chance or opportunity for something to be happened. It shows such the writer's guess or assumption on something based on the situation mentioned.

4.2   The function of hedges used in soft and hard science

Hedges, as discussed in the preceding literature review section, has various functions such as down toning, modulating statement, reducing force of statement, making indefinite statement, and also decreasing responsibility. Yagiz and Demir (2014) also stated that hedges can be used to avert sureness and to alleviate absolute statement so the writer can evade dissent the readers might have. In this section now, the writer will analyze the hedges found in the present study whether there are any other functions of hedges and to find out if there any distinctive purpose of hedges use between soft and hard science as well.

4.2.1   The use of hedges in soft science

From the data analysis of soft science field in the present research, the writer found that hedges are used to express tentativeness, to show possibility, to decrease responsibility, reduce force of statement, down toning, and also modulate statement. Below are the examples of the hedges used in the data and along with the analysis of the functions:

(1) ... Strategies that need to be developed should include an analysis of the opportunities and threats of the external environment and internal readiness of the company in the face of possible changes. The strategy should be able to be communicated simultaneously to all members in the company covering all aspects of the company's business activities. … (SC-IJSR-6)

The first context of soft science research article above has three tokens of hedges in two consecutive sentences. There are 2 tokens of modal auxiliary verbs and one epistemic adjective. The word *should* are used to go side by side with the writer's propositions or ideas that lessen his/her force of statement, so that the writer can protect him/herself from any disagreement may appear from the readers. Then, *possible* is used to show that something may be able to occur or possibility, in this case is some changes in the company.

(2) ... Third, it broadens our understanding of news coverage of minority political candidates to the now-relevant presidential context, which will enable scholars to theorize about the opportunities and obstacles that minority presidential candidates are likely to face in the future. Indeed, these findings are likely to provide considerable insight into the dynamics that are likely to surround Hillary Clinton's upcoming 2016 presidential campaign as well as the early field of Republican primary candidates. ... (SC-IJoC-7)

From the context above, there is a token of modal auxiliary verbs, *will,* which shows something that might happen in the future. At the end of the same sentence, there is a word *likely* that supports the writer to state a high probability as well. In the second sentence, the writer tried to modulate or emphasize his/her statement that it is very possible to be true by applying two tokens of *likely* sequently. In another point of view, the hedge word *likely* also helps the writer to avoid him/her from any possible resistance.

> *(3) The celebrity endorsement, as a <u>potentially</u> effective advertising strategy, <u>can</u> simplify the process by which the audience interprets an advertising message. Each celebrity possesses a unique set of cultural meanings and <u>can</u> bring the meanings into the product he or she is promoting (McCracken, 1989). In this way, the celebrity <u>can</u> help greatly narrow down the thematic dimensions of meanings related to the product (Langmeyer & Walker, 1991).... (SC-IJoC-3)*

As shown in the context above, the writer wants to convey his/her supposition about the advertising strategy by using the word *potentially* to down tone his/her notion. The hedge *potentially* can be used to denote chances but in the same time it can also be used to reduce the writer's accountability. Besides, there are three tokens of modal auxiliary verb *can* which supporting to indicate possibility.

> *(4) Technically speaking, this massive surveillance program was made <u>possible</u> by decades of profound economic and cultural change due in part to the creation of broadband Internet and the*

progressive networking of the information society. The Internet's early nonhierarchical structural design facilitated its development into a <u>relatively</u> open medium that has been used in unexpected ways (Saco, 1999). ... (SC-IJoC-11)

There are two hedges used above; *possible* and *relatively*. Just like its literal meaning, the hedge word *possible* means to show a prospect or condition of a situation. Meanwhile, *relatively* is used in the context above for decreasing the writer's responsibility about the thing that is being talked.

(5) ... However, let no Mosotho make the mistake to think that AL Qaeda and its links <u>cannot</u> infiltrate into Lesotho. While this <u>may</u> not appear so nigh, as scholars of Religion, teaching and doing research in Comparative Religious Studies at the National University of Lesotho (NUL), we intend to put to public awareness and readership an account of the historical origins, basic similarities, commonalities and differences, as certainly there are, between Christianity and Islam. ... (SC-IJSR-11)

In the two consecutive sentences there are two tokens of modal auxiliary verbs. The first one, c*annot* used there is to express the writer's uncertainty toward a certain statement, and the second is *may not* to show a very low chance on something.

From the discussion on the hedge used in soft science field above, it proves that hedges can also indicate or show possibility and probability, and this function of hedges appear in the data analysis pretty a lot.

4.2.2 The use of hedges in hard science

Having analyzed the data, the writer found that the use of hedges in hard science is similar to the one in soft science, that is to make statement indefinite, to reduce the risk of rejection, and also downtoning. The following are the examples of the result and discussion on hedges used in hard science field:

(1) ... One _possible_ way to maintain a minimal plasticity for the proteome _may_ be through chaperone proteins that fold and stabilize other proteins (5). ... (HS-AAAS-2)

The two tokens of hedges in the context were used together to assist the writer in stating probability. Those also used to make the writer decrease the risk of contradiction and make the statement be such an opinion than an absolute statement.

(2) ... _Compared with the other rehealable devices and electronics, our e-skin _can_ be not only rehealed but also fully recycled and reprocessed because of the reversible bond exchange through simultaneous bond forming and breaking reactions under certain external stimuli (35, 36). The recyclability of our e-skin _can_ greatly reduce electronic waste and environmental impact and _can_ also _potentially_ decrease manufacturing cost. ... (HS-AAAS-1)_

From the hedges used above, there are two types of hedges; modal auxiliary verb represented by _can_ that appear three times and epistemic adjective represented by _potentially_ that appear one time. It

shows that in fact hard science field also applies a number of hedges consecutively. Similar to the previous discussion on soft science that the hedge *can* shows possibility and at once also shows uncertainty whether the statement submitted will really happen or not. *Potentially,* in this context appoints a modulation of the writer's statement.

> *(3) ... The mineralization of nutrients from the chemically degrading POM is facilitated by soil microorganisms. Thus, leaf litter decomposition <u>will</u> promote addition of soil organic matter as well as nutrient banking that <u>will</u> sustain the fertility condition of the soil. ... (HS-IJSR-14)*

Two tokens of modal auxiliary verb (will) are used in the context. Recognizably, the hedges were used to tone down the writer's opinion/statement so that he/she will have less potential disagreement from readers.

> *(4) To meet the international goal of limiting global warming to 1.5^{0}C, the use of fossil fuels <u>would</u> have to end before 2040 (3) and <u>may</u> need to be complemented by mitigation technologies.*

There are 2 tokens of modal auxiliary verbs in the above sentence used. The first one, *would,* is used and followed by a verb 'have', and this means that the hedge's function is to modify the verb by making the statement less power/certainty. By using *would,* the writer can mitigate his/her responsibility and make the statement become indefinite.

Next, the use of *may* as hedge also helps the writer to down tone the statement. The other aim of the use of *may* is to alleviate the risk of any negation.

(5) It is therefore vital that new and feasible methods of disposal

and utilization of fly ash <u>must</u> be explored.

In the above sentence, *must* is used to declare the writer's position towards the contention. It also can be said that the hedge *must* modulate the statement. The existence of the word *must* make the sentence sounds suggestive that the writer is delivering his/her recommendation.

After the preceding discussion of the analysis of hedges used in soft and hard science, the writer find that there are both differences and similarities from the results shown. The first one is that soft science applies more hedges than hard science in terms of the overall hedges frequency. Although the frequency of epistemic adjectives and adverbs in soft and hard science are equal, soft science uses more modal auxiliary verbs than hard science. This made the conclusion that indeed, soft science applies more hedges to modify the statements in various fuzzy ways.

The similarities found on using hedges in both fields of study are the purposes or aims. In the analysis process, it is shown that both soft and hard science writers use hedges to express any probability in the future, to down tone notion, to modulate statement, to reduce the force of statement, to make indefinite statement and also to avoid any rejection from readers. In all efforts from writers of both soft and hard science fields, they try to give readers more space to interpret their statements without forcing them to agree with what they say. Similar claim is stated

by Tran and Duong (2013) that it is given to the readers for which can

lead to precision in scientific claims and a sense of decency in discourse.