

# A Key Word Analysis of English Intensifying Adverbs in Male and Female Speech in ICE-GB \*

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**Abstract.** Lakoff (1975), a pioneering study of women's language, suggested a tendency for women to use more of hedges and intensifiers. Subsequent studies still attract some opposing (Fahy, 2002; Nemati and Bayer, 2007) or reinforcing (Bradac *et al.*, 1995; Navalainen, 2008) views. This paper shows how a key word analysis offers an empirical evidence on the use of intensifying adverbs in male and female speech based on ICE-GB. We use the *KeyWords* facility in WordSmith tools (Scott, 1999) which has been used in several studies as means for describing the characteristics of different genres (Sardinha, 2000; Culpeper, 2002, 2009; Xiao and McEnery, 2005). One of the issues with respect to using *KeyWords* facility is the selection of the most appropriate reference corpus. Therefore, another goal of this paper is to test several possibilities for the selection of the appropriate reference corpus for key word analysis in terms of its size and composition.

**Keywords:** Intensifying Adverbs, ICE-GB, WordSmith, Key word, Reference corpus

## 1 Introduction

One of the characteristic features of women's speech, according to Lakoff (1975:53-54), is that women use, among others, hedges such as *well*, *y'know*, *kinda* and intensive *so* more frequently than men. Quirk and Greenbaum (1973) calls them "adverbial qualification" as being points on an intensity scale which may be high or low. For example, in (1a), *very*, *so*, *quite* heighten or amplify the semantic meaning of the assertion, while in (1b), *a bit*, *sort of*, *kind of* decrease the force of assertion.

- (1) a. He is (very/so/quite) reasonable.  
b. He is (a bit/sort of/kind of) reasonable.

Intensifiers in (1a) express the speaker's strong commitment, and those in (1b) express the speaker's reluctance to commit to the validity of that assertion. In this paper, we will refer to them as "intensifying adverbs."

Lakoff (1975:66) claims that the tentativeness and powerless of women's language reflected in heavy use of intensifying adverbs. Her pioneering work provided one of the most influential momenta in the feminist movement (Coates and Cameron, 1988). However, it also started a hot controversy regarding the validity of her linguistic observations and claims. Dubois and Crouch (1975:289), for example, criticized that her investigative method is introspective, asystematic, uncontrolled, and unverifiable observation. The controversy is still alive as Lakoff and Bucholtz (2004) shows, and we can still find some subsequent studies that supports

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(Bradac *et al.*, 1995; Navalainen, 2008) or disapproves (Fahy, 2002; Nemati and Bayer, 2007) Lakoff's linguistic generalizations, if not her feministic interpretation of them.

The purpose of this paper is to show how a key word analysis offers an empirical verification of the use of intensifying adverbs between male and female speech based on the International Corpus of English-Great Britain (ICE-GB), a standard large-scale corpus for present-day British English. Our main research question is: Are Lakoff's claims and generalizations supported by data extracted from ICE-GB? Related question is how this can be proved by some statistical tests. Specifically, the questions that involve statistical issues to be addressed in this paper are: 1) What are the intensifying adverbs characteristically used by female and male speakers respectively? 2) What are the methodological issues involved?

We use the *KeyWords* facility in WordSmith tools (Scott, 1999) which has been used in several studies as means for describing the characteristics of different genres (Sardinha, 2000; Culpeper, 2002, 2009; Xiao and McEnery, 2005). "Key word" is a term for statistically significant lexical item which is most or least frequent in a given context (corpus) compared with other context (corpus) as a reference. In this paper, we apply such a well established method of extracting key words to the question at hand, namely, which intensifying adverbs are characteristically used in female corpus compared with male corpus, or vice versa.

One of the issues with respect to using the *KeyWords* function is the selection of most appropriate reference corpus. Two questions that are raised concern the size and the composition of the reference corpus. It is obvious the selection of the appropriate reference corpus has much relevance to the results for key word search. Therefore, another goal of this paper is to test several possibilities for the selection of the appropriate reference corpus for key word analysis in terms of its size and composition.

## 2 Previous studies: Issues on Key word

In corpus linguistics, the concept of a key word, and its usefulness for linguistic generalizations, is rather well established. Earlier studies refer to key words as words that embody concepts that are socially or culturally important (e.g., Firth, 1957; Williams, 1983). According to Culpeper (2002, 2009), the term key words can be seen as another term for style markers which are words whose frequencies differ significantly from their frequencies in a norm.

Previous studies adopted various methods for key word extraction. For example, Rayson *et al.* (1997) examine words most characteristic of male and female subcorpus by a comparison of the words marked by a very high chi-square value of difference. Oakes and Farrow (2007) also use the chi-square test to find the vocabulary most typical of seven different ICAME corpora, each representing the English used in a particular country. A more convenient and easy way to extract key words is to use some readily available tools, for example, the *KeyWords* facility in WordSmith tools (Scott, 1999), that gives various options in the menu. This program conducts a statistical comparison between the words of a corpus (or wordlist) and a reference corpus, in order to identify words that are unusually frequent, in other words, key words (Culpeper 2009:33).

In *KeyWords* facility, key words are derived by keyness value which is calculated either by the Ted Dunning's Log Likelihood test or by the Chi-square test. In order to apply to *Key Words* facility, we need 1) the frequency list of target corpus, 2) the frequency list of reference corpus, and 3) the selection of statistical value.

Culpeper (2002, 2009) analyses the characters speech in Shakespeare's *Romeo and Juliet* using the *KeyWords* facilities. He has generated a list of key words for the main characters and examined the function and context of the key words in order to validate and account for the results. The notable thing in his study is the selection of reference corpus. In his *Romeo and Juliet* analysis, the comparative reference corpus was the speech of the six characters minus the one being investigated (e.g. Romeo's speech was compared with the speech of the other five

characters). There are issues on the choice of corpora for comparison in at least two ways: size and composition. The issues related to reference corpus will be discussed in section 4.

### 3 Data, Methodology, and Results

Our analysis of the data proceeded as follows:

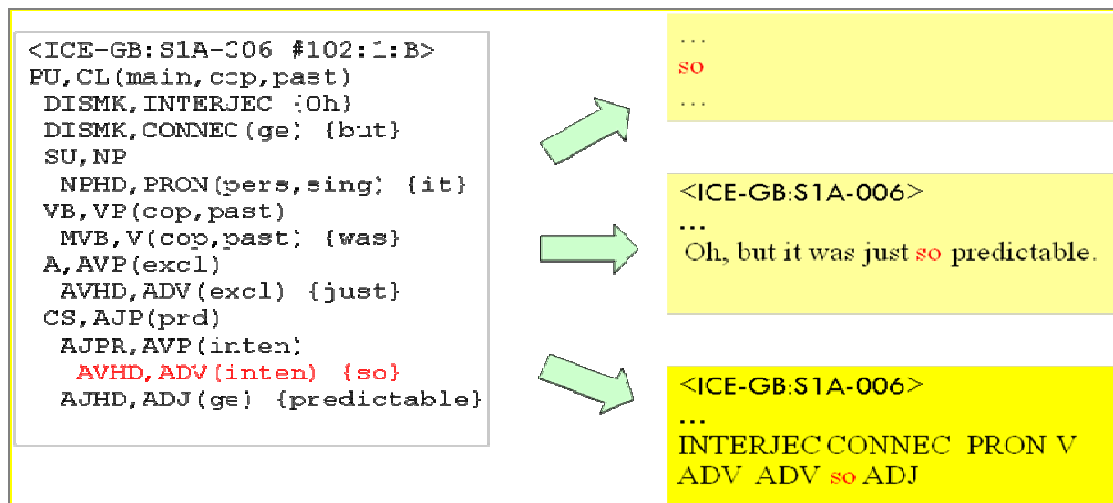
(1) We collected data from the International Corpus of English (ICE-GB) which contains a million words of 200 written and 300 spoken English texts (Nelson, Wallis and Aarts, 2002). Using ICECUP 3.1 (ICE Corpus Utility Program), we built subcorpora according to the sociolinguistic variable of our choice in this study, namely, speaker gender. ICE-GB is fully tagged and parsed so we can extract in a rather precise manner the sentences containing intensifiers in a given subcorpus.

**Table 1:** Distribution of subcorpus between Female and Male speech<sup>1</sup>

	Female	Male
Number of Speakers	532	1,116
Number of Sentences	27,045/28,812	49,702/53,426
Number of Words	287,434/284,262	584,497/682,590

In the whole of ICE-GB corpus for which gender of speaker is indicated, we find that male speakers (1,116) have a larger share of the participants than female speakers (532) as producers of the data in the corpus. Male corpus, consisting of 584,497 words, is two times as large as female corpus that contains 287,434.

(2) The extracted data were then fed into WordSmith after some preprocessing. For example, the parsed texts (.tre files), the output of the search function from ICE-GB, are shown in the left-hand side in Figure 1.



**Figure 1:** Preprocessing the parsed text extracted from ICE-GB

<sup>1</sup> ICE-GB does not provide a way to extract whole subcorpora according to a social variable only, so we tried to extract the maximal size allowed. The numbers after the slash in each cell in Table 1 indicate the number of words or sentences reported by ICE-GB as the total size of the corpus belonging to the social variable selected, and the preceding numbers indicate the size we were able to extract.

They were converted to the forms given in the right-hand side in the figure. In order to simplify the process, we actually converted all the words other than the intensifying adverbs into their categories, as shown in the bottom right-hand side.

(3) In WordSmith, there is a function called Wordlist that derives a word list from the input corpus. Separate lists were generated for the target corpus and the reference corpus respectively. In the female subcorpus, the type of intensifying adverbs counts as 180 and token of them 4,614. In the male subcorpus, the type of intensifying adverbs numbers 251 and token of them 8,226. The top 10 rank-ordered word frequency in each subcorpus is shown in Table 2.

**Table 2:** The top 10 rank-ordered word frequency for intensifying adverbs

Female (top ten)		Male (top ten)	
VERY	761	VERY	1,579
SORTOF	335	MORE	735
QUITE	321	QUITE	587
SO	314	SO	374
MORE	267	MUCH	355
REALLY	207	SORTOF	346
MUCH	200	MOST	344
ABOUT	175	ABOUT	337
TOO	164	TOO	301
MOST	119	AS	290

As Table 2 shows, the most frequent word is ‘*very*’ in the both of female and male corpora.<sup>2</sup> In fact, only one item ‘*as*’ from male based list does not appear amongst the top 10 in the female based list, and ‘*really*’ in female list. So the top ten lists do not seem to differentiate much between male and female speech. It does not mean that the most frequent word is the most typical word in each corpus, as it does not make much sense that almost the same set of words are typical both of male and female speech. The number of common intensifying adverbs is 140. The number of word types shown only in female subcorpus is 40, while that in male corpus is 111.

(4) The next step is to make a list of key words for files of each gender using the *KeyWords* function of WordSmith. In choosing the reference corpus for comparison, the female and male subcorpora were directly compared with each other (Culpeper, 2002). So for the female subcorpus, we chose the male subcorpus as its reference corpus, and vice versa. In this study, chi-square was chosen as the statistical metric, and the significance level (p-value) was set at 0.01 following Culpeper (2009).<sup>3</sup> The result of the operation is shown in the following two tables. Table 3 presents the list of 11 key words in female texts.

<sup>2</sup> In the case of some multi-word adverbial expressions like *sort of*, *a bit*, etc, we deleted the space lest each word is counted separately.

<sup>3</sup> Culpeper (2009) selected the log-likelihood test for significance, but he reported that the same results were revealed with only minor and occasional differences in the ranking of key words when he repeated the analysis with the chi-square test. In our study, we also evaluated the results from both the log-likelihood test and the chi-square test. We found that the log-likelihood test allows us to get a little more number of key words than the chi-square test, but additional key words which were derived in log-likelihood test are not significant in terms of dispersion. So we chose to use the chi-square test. The discussion about dispersion will be dealt in section 5.

**Table 3:** Key word list from female subcorpus <X<sup>2</sup>, P=0.01>

Key word	Freq.	%	RC. Freq.	RC. %	Keyness
REALLY	207	0.07	108	0.02	151.46
SORTOF	335	0.12	346	0.06	80.48
SO	315	0.11	324	0.06	76.43
ABIT	109	0.04	132	0.02	15.85
THAT	42	0.01	35		15.27
ALL	74	0.03	81	0.01	14.66
TERRIBLY	19		10		12.47
COMPLETELY	46	0.02	49		9.58
TOO	164	0.06	249	0.04	8.20
SLIGHTLY	54	0.02	64	0.01	8.18
ATALL	95	0.03	134	0.02	7.14

“RC” in Table 3 stands for “Reference Corpus” and “%” indicates the percentile of the frequency value relative to the whole subcorpus. The degree of keyness of each intensifying adverbs is shown in the rightmost “Keyness” column in the table, and the intensifying adverbs are sorted in the descending order of the keyness value. The intensifying adverbs characteristically used by the female speakers, shown in the above table, mostly seem to have something to do with some emotional state of the speaker.

Recall that Lakoff (1975) has listed an intensifying adverb *so* as a kind of expression that indicates characteristic femaleness. She argues even the intensifying adverb *so* can be considered as a hedge.

“Here we have an attempt to hedge on one’s strong feelings, as though to say: I feel strongly about this—but I dare not make it clear *how* strong. To say ‘I like him very much,’ would be to say precisely that you like him to a great extent. To say, ‘I like him so much’ weasels on that intensity: again, a device you’d use if you felt it unseemly to show you had strong emotions, or to make strong assertions, but felt you had to say something along those lines anyway.” (Lakoff 1975: 54-5)

Table 3 includes not only *so*, but other similar expressions like *really*, *that*, *all*, *terribly*, *completely*, *too*, and *at all* that “express the speaker’s strong commitment.” Lakoff (1975) also listed some hedges ‘*well*, *y’know*, *kinda*’ as female speech. Table 3 does not include any of the three, but *sort of*, *a bit* and *slightly* can be said to “express the speaker’s reluctance to commit to the validity of that assertion” and can be regarded as hedges. Then does our result confirm Lakoff’s claim? Before answering it, we need to check what the intensifiers are that show characteristic maleness. The following table is the list of expressions from the male subcorpus measured against the female subcorpus.

**Table 4:** Key word list from male subcorpus <X<sup>2</sup>, P=0.01>

Key word	Freq.	%	RC. Freq.	RC. %	Keyness
RIGHT	137	0.02	32	0.01	14.43
ENTIRELY	60	0.01	7		14.37
WELL	138	0.02	38	0.01	9.80
SOME	48		9		6.85

Table 4 lists “strong commitment” adverb, *right* and *entirely*, and hedges, *well* and *some*.<sup>4</sup> Notice that *well* cited in Lakoff (1975) was as a typical female expression, so our result

<sup>4</sup> It is not so obvious to us whether *entirely* in Table 4 and *at all* in Table 3 can be treated as hedges according to Lakoff’s interpretation since they seem to indicate some extreme end on a scale in a very clear way.

contradicts her claim in that regard. However the spirit of her claim still seems to be preserved when Table 3 and Table 4 are compared with each other. There are two things to note between the two tables. One is the number of items in the list, namely 11 in Table 3 and four in Table 4. The other is the Keyness values for each item in the list. The four expressions in Table 4 correspond to those in the lower half in Table 3 in terms of their keyness values, which means they are rather weak in showing characteristic maleness compared to those in Table 3. So we can tentatively conclude that our analysis shows female speakers characteristically use a lot more intensifiers, which, according to Lakoff, reflects some typical, less confident, attitude of the female speakers in terms of power relations.

Our tentative conclusion, however, requires further investigation in at least two respects. One question concerns the choice of the reference corpus, and the other is the question of dispersion, that is, how representative or spread-out in their use are the items chosen in the corpus. We will discuss these two subjects in turn in the following two sections.

#### **4 Selection of the appropriate reference corpus**

In any key word analysis, the choice of data for comparison (the reference corpus) is an issue. Scott and Tribble (2006:58) suggest that it “should be an appropriate sample of the language which the text we are studying (the “node-text”) is written in.” Two main issues related to the selection of the reference corpus are size and composition, as summarized below:

- (2) a. the size of the reference corpus
  - >> larger, similar, smaller than target corpus
- b. the composition of the reference corpus
  - >> inclusion or exclusion of target corpus

Concerning the issue (2a), one of the most pressing questions with respect to using key words seems to be what would be the ideal size of a reference corpus. Tribble (1999:171) claims that the size of the corpus from which the reference wordlist is created is relatively unimportant. Xiao and McEnery (2005:70) compared two reference corpora, the 100-million-word British National Corpus and the one million-word Freiburg-LOB Corpus, and achieved almost identical key word lists, thus concluding that the size of the reference corpus is not very important in making a key word list. However, Wendy and Corbett (2009) point out that “key words are more sensitive to the size of a corpus, for example, longer texts will contain fewer unique occurrences of particular words”. Scott and Tribble (2006:64) conclude that “while the choice of reference corpus is important, above a certain size, the procedure throws up a robust core of key words whichever reference corpus used.”

Similarly, but more specifically, Sardinha (2000) proposed that a reference corpus that is five times as large as the study corpus yielded a larger number of key words than a smaller reference corpus. So it seems there are some unresolved questions regarding the size of the reference corpus. Specifically, we would like to address two questions in our current research: 1) If the reference corpus should be larger than target corpus, then how much larger should it be. 2) If the reference corpus of a smaller size than the target corpus should be strictly disallowed. The second question is especially important to us because the result reported in Table 4 was on the basis of a smaller sized reference corpus. One might legitimately question if the small number of items in Table 4, compared to those in Table 3, are a result of the reference corpus of a smaller size.

Then, what is the appropriate size of the reference corpus which is good for comparison? The following two tables show how the resulting lists of key words vary depending on the relative size of the reference corpus in our study. When there was a need to randomly “downsize” the subcorpus so that we can make it fit to our target ratio, we used a Random Sample function in ICECUP to that effect.

**Table 5:** Female key words in the different “size” of reference corpus

Target	Reference	Ratio	Female key words
female100 (287,434)	a. male20 (133,505)	0.46	really, sort of, so, quite, a bit, slightly, much (7)
	b. male45 (308,445)	1.07	really, sort of, so, a bit, that, very, too, slightly, all, quite, completely, at all, much (13)
	c. male60 (408,802)	1.42	really, sort of, so, a bit, at all, quite, all, that, much, terribly, very, slightly (12)
	d. male80 (546,214)	1.90	really, sort of, so, a bit, that, terribly, quite, at all, all, slightly, very, completely, much (13)
	e. male100 (584,497)		2.03
f. female80 (231,402)		2.52	really, sort of, so, terribly, a bit, completely, that, all (8)
g. female60 (173,767)		3.36	really, so, sort of, that, all, terribly, awfully (7)
h. female40 (115,091)		5.07	really, sort of, so, in the least (4)
i. female20 (58,788)		9.94	really, sort of, so, terribly, a lot (5)

As a criterion for comparison between the results, we will assume, following Sardinha (2000), the reference corpus that gives more key words is to be preferred over the others that provide less. In Table 5, Line e. is the result when the given corpora without any proportional downsizing were used for comparison (See Table 3). As we randomly downsizing the reference corpus, the resulting number of key words becomes slightly larger until the ratio becomes one to one (Line b.). Then the number drastically decreases as shown in Line a. Downsizing the target corpus so that the ratio becomes bigger also affect the result, but negatively, as shown from Line f. downwards. Sardinha (2000), as we noted in the above, proposed that the optimal reference corpus is five times as large as the target corpus. This proposal turns out not to be appropriate in our case because, in the first place, the given reference corpus is just two times as large as the target corpus and cannot be artificially expanded, and secondly, even if we shrink the target corpus so that the ratio of target-reference be 1 to 5, it gives very poor results as shown in Line h. Now let us turn to the male key words.

**Table 6:** Male key words in the different “size” of reference corpus

Target	Reference	Ratio	Male key words
a. male100 (584,497)	female100 (287,434)	0.49	right, entirely, well, some (4)
b. male80 (546,214)		0.52	well, entirely, around, right, relatively (5)
c. male60 (408,802)		0.70	entirely, some, right, well, relatively, around (6)
d. male40 (276,412)		1.03	entirely, right, around, over, some, relatively, well (7)
e. male30 (198,005)		1.45	entirely, relatively, right, well (4)
f. male20 (133,505)		2.15	right, entirely, around (3)
g. male10 (68,344)		4.02	entirely (1)

Our starting point is Line a., where no proportional adjustment was made to the given subcorpora (See Table 4). Since the given reference corpus is half as large as the target corpus, the only way we can adjust the ratio is to randomly downsize the target corpus. As we see in

Table 6, the results get better until the ratio becomes one to one as in Line d., where we get seven key words compared with four in Line a. However, the results become a lot poorer as we go further down from Line d.

Tables 5 and 6 show that in both cases the reference of similar size to the target corpus gives the best, or one of the best results, especially when the reference corpus is smaller than the target. The reference corpus of similar size fairs slightly better for female key words and much better for male key words than the original size we adopted in the above (Section 3). However, our earlier analysis and conclusion still largely holds as the optimal results, shown Lines b.-d. in Table 5 and Line d. in Table 6, still prove that intensifying adverbs are more typical for female speakers than male speakers. Another point to note is that the key words in different ratio largely overlap. The words in Line a. of Table 6 are all included in the better result given in Line d. Likewise, almost all the lists in Lines b.-e. of Table 5 overlaps with each other. In the following section, we will deal with the possible relevance of the marginality of certain key words in the lists to their dispersion values.

Now let us turn to (2b), the issue over the choice of the reference corpus we need to address in this study, that is, what difference would it make if the reference corpus includes the target corpus. It is quite likely that the choice of the reference corpus and the composition of it will affect the resulting key word list. One can assume, for example, the closer the relationship between the target corpus and the reference corpus, the more likely the resultant key words will reflect something specific to the target corpus. Culpeper (2002, 2009) hypothesizes that some genres within that corpus have a relatively close relationship with the data to be examined, but other genres have a relatively distant relationship. These relationships will influence the key words revealed.

The following two tables show how the key word extraction is affected by inclusion or exclusion of the target corpus in or from the reference corpus.

**Table 7:** Female key words in the different “composition” of reference corpus

Target	Reference	Ratio	Female key words (p=0.01)
Female corpus (287,434)	Inclusion of target corpus (Whole corpus) random sampling 30% (319,985)	1.11	really, sort of, so, a bit, that, quite, very (7)
	Exclusion of target corpus (Male corpus) random sampling 45% (308,445)	1.07	really, sort of, so, a bit, that, very, too, slightly, all, quite, completely, at all, much (13)

**Table 8:** Male key words in the different “composition” of reference corpus

Target	Reference	Ratio	Male key words (p=0.01)
Male corpus (584,497)	Inclusion of target corpus (Whole corpus) random sampling 60% (641,820)	1.09	right, very (2)
Male corpus random sampling 40% (276,412)	Exclusion of target corpus (Female corpus) (287,434)	1.03	entirely, right, around, over, some, relatively, well (7)

In the comparison, we kept the ratio between the target and the reference at around 1, following our discussion in the above. For example, in Table 8, we reduced the target corpus (male) randomly sampled 40% (276,412 words) for matching the size of the reference corpus (female: 287,434 words) to extract significant male key words. The results show that exclusion of the target corpus, which has been adopted in this study so far, provides a lot better result than the other option.



## 5 Dispersion

For a key word to be representative of a subcorpus, we also have to check how evenly it is distributed through the corpus. If the distribution of a particular item of high frequency is heavily concentrated on a particular text of the corpus, we can suspect the high frequency is a result of some peculiarity of the corpus. Thus, it is necessary to measure how evenly the key words are presented in the list, namely, the dispersion. Again, there is a function of dispersion in WordSmith, which shows graphically as well as in numbers how words are distributed throughout a corpus.

We will first consider the dispersion values of the female key words, focusing on those that appear in Lines b.-d. in Table 5. All of the key words show very high dispersion values which are over 0.6, a lot higher than the cut-off value 0.4 suggested by Oakes and Farrow (2007). For example, the dispersion values of “core” key words that appear in all of the lists are: *really* (0.65), *sort of* (0.628), *so* (0.852), *a bit* (0.605), *that* (0.614), *slightly* (0.706), *all* (0.843), *at all* (0.919). Those of the “marginal” ones that appear in some of the lists are: *very* (0.836), *too* (0.866), *quite* (0.732), *completely* (0.728), *much* (0.851), *terribly* (0.63). Since the dispersion measure depends only on the target corpus regardless of the reference corpus, the dispersion value remains constant in Lines b.-d.

The dispersion of male key words shows somewhat different picture. The following table shows the distribution of the dispersion values depending on the ratio of the target and reference corpus.

**Table 9:** The dispersion value of male key words

	Ratio	1.03	0.7	0.52	0.49
1	entirely	0.854	0.771	0.845	0.765
2	right	0.845	0.432	0.51	0.533
3	around	0.795		0.61	
4	over	0.677			
5	some	0.661	0.676		0.658
6	relatively	0.456	0.673	0.659	
7	well	0.426	0.85	0.815	0.825

It is rather remarkable that the dispersion values fluctuate along the sampling rates, which seem to indicate that some of the key words might not be stable as representative words of the subcorpus. In other words, although the ratio of one to one gives a better result, the dispersion value of some of them, say *well*, drops to 0.426 from 0.825, meaning that it becomes less solid as a typical word of the subcorpus. Interestingly, the same thing happens with female corpus. When the size of the target corpus was reduced, the resulting dispersion values for some of the key words (Lines g., h., i. in Table 5) get lowered: *terribly* (0.495), *awfully* (0.359) *in the least* (0.25) and *a lot* (0.553).

## 6 Conclusion

In this paper, we compared the female corpus and the male corpus in ICE-GB using the *KeyWords* function in WordSmith tools. The first research question was which intensifying adverbs characteristically used female and male speakers are. In female corpus, we got 13 key words of intensifying adverbs such as *really*, *sort of*, *so*, *a bit*, *that*, *very*, *too*, *slightly*, *all*, *quite*, *completely*, *at all*, *much*, while in male corpus, 7 key words are derived such as *entirely*, *right*, *around*, *over*, *some*, *relatively*, *well*. There seems to be some tendency for female key

intensifiers to have a bit more hedge-like properties as Lakoff would have wished, and the male key intensifiers tend to indicate some extreme end of the scale (Footnote 4) or tend to occur with numbers as in *around*, *over*, and even *some*. One big difference between the key words of this study and the words claimed to be characteristically female in many other studies including Lakoff (1975), is that the method adopted in this study is a lot more solid and objective one that can be repeated by anyone. The second research question concerned the size and composition of the reference corpus. One clear conclusion is that the smaller reference corpus gives poorer results, nor does the ratio one to five recommended by an earlier research give the expected result.

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