Quantitative Evidence on the Uses of the First Person Pronoun (*I* and *We*) in Journal Paper Abstracts

논문 초록상 사용되는 일인칭 대명사(*I*, *We*)의 수량적 활용도

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ABSTRACT

The objective of this research was to quantitatively examine the uses of first person pronouns in academic journal paper abstracts. An approximate total of 144,400 abstracts that comprising of four disciplines (chemistry, computer sciences, social sciences, and medicine) from nine countries (China, Germany, India, Japan, South Korea, France, Spain, United Kingdom, and U.S.) were quantitatively examined. By exploring the use of first person pronoun in abstracts, this paper examined the current practices among academics in the world. The results indicate the norms of each author's country and the norms of each discipline. Furthermore, the frequency-count result of this study contradicted viewpoints of academics who disapprove the use of personal person expressions in abstracts. An implication of this study is that there is a need for academics to acknowledge the uses of first person pronoun in the real world before forming personal opinions regarding the first person pronoun.

초 록

본 논문의 목적은 논문초록의 일인칭 대명사 사용 실태에 대한 수량적 고찰이다. 총 9개국 (중국, 독일, 인도, 일본, 한국, 프랑스, 스페인, 영국, 미국)의 네 가지 분야 (화학, 컴퓨터 과학, 사회 과학, 의학)에서 약 144,400개의 논문을 출력하여 수량적 사용빈도수를 분석하고 검토하였다. 이러한 연구를 통해 세계적으로 학계의 저자들이 보여주는 일인칭 대명사의 수량적 활용도를 보고하였다. 더 나아가 이러한 결과는 논문초록에서 일인칭 대명사 사용을 기피하는 저자들의 입장과는 달리 일반적으로 흔하게 사용되는 실태를 보여주고 있다. 이 연구의 의미는 일인칭 대명사에 대한 사용을 수량적 사용도로 측정하여 고찰하였다는 점이다. 또한 이를 근거로 학자들이 초록을 작성할 때 일인칭 대명사 사용에 대한 의견을 개진하기 앞서 사용 실태를 우선적으로 인정해야 할 필요성을 제시해준다는 것이다.

Keywords: first person pronoun, passive voice, active voice, abstracting and indexing, article abstracts
일인칭 대명사, 수동태, 능동태, 논문, 수량적 사용빈도수, 색인 및 초록, 논문 초록

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1. Introduction

Academics nowadays often seek to publish their works in international journals. In most disciplines, academics from many countries have contributed in the increase of academic publications in recent years, and this trend is likely to continue in coming years (Ware & Mabe, 2012). Amidst of this environment, one of commonly asked questions by academic authors is the use of first person (e.g., *I, me, mine, myself,* and *my*). For one reason or another, every author essentially needs to make a decision in regards to the use of the first person pronoun in the academic papers.

The uses of the first person pronoun, particularly *I* and *we*, is often discussed in reference to the active voice and passive voice. For instance, consider the following sentence *We present a detailed analysis of the performance of...* Instead of an active voice, this sentence can be rewritten using a passive voice as the following: *A detailed analysis of the performance of... is presented in this paper*. Even further, this sentence can be also stated as *This paper presents a detailed analysis of the performance of...* The latter form of a sentence is referred to as personification of inanimate nouns (Flottum et al., 2006).

The active voice is preferred by many journals in science for being more direct and clear. The active voice leads to shorter sentence length and avoidance of dangling modifiers, avoidance of being impersonal, and avoidance of ambiguous subject (Sheffield, 2013).

Yet, the passive voice also has its benefits since it can be used to stress the results and appearance of being objective and scientific. The first person *we* could be avoided in the case where the scientific objectivity behind the underlying data needs to be emphasized.

Meanwhile, one important task in publishing scholarly journal papers is to include an abstract that can be accepted by the author's peers in a particular discipline. In this process, the appropriate use of first person pronoun in an abstract becomes an important issue. Yet, some academic authors are often uncertain about the use of first person pronouns in an abstract. Many academics form an opinion solely based on his or her experience without considering the actual practices of authors among across disciplines.

The primarily motivation for pursuing this research is that authors are often unaware of the disciplinary characteristics due to the lack of quantitative information on this issue. To conform to a specific community implies that some levels of existing evidence is needed in order to accurately determine the conventional practices. To an extent, the general use of the first person pronoun in abstracts is not widely known. In this paper, the uses of the first person pronouns in academic journal paper abstracts are quantitatively explored. This research will show that the appropriateness of the uses of first person in abstract depends on the discipline and the conventional practices among academics in a given country.

2. Related Studies

The issue of using the first person pronoun in

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writing is not new in the academic community. In the past, academics in different disciplines have addressed the issue of first person pronoun in academic papers.

For example, as a proponent of the third person usage (e.g., *he, she, it,* and *they*), Wilkinson (1991) defended the use of the third person in a scientific academic writing. Wilkinson (1991) pointed out that the third person usages help to express the logical impersonal character and generality of an author's position, whereas the first person makes it seem more like personal opinion. Some authors such as Davies (2012) not only appeared to have a viewpoint in the field of psychology, but also argued that the use of first person pronoun can definitely differ depending on the particular discipline.

With contrasting preferences on the use of the first person pronoun in academic writing, the discussion on this issue is like to continue. In essence, the preference of using the first person pronouns related to a particular school of thoughts on this matter. However, the general consensus nowadays among academics is that the first person pronoun should be used appropriately and sparingly.

The uncertainty behind the use of the first person pronoun has prompted academics in linguistics to examine the discourse functions of the first person pronoun. From a linguistic viewpoint, the first person uses in academic writing are summarized as follows:

- To highlight and express the contribution of author (Vladimirou, 2006)
- To make the reader feel engaged with the content (Hyland, 2005)
- To help to identify a community's current research concern (Harwood, 2005, p. 364)
- To appear as a competent member of academic community (Tayyebi, 2012)
- To create cohesion in the writing (Zhang, 2012, p. 348)
- To explain what was done (Kuo, 1999)

Furthermore, a relevant issue in this research is the cultural differences in the uses of the first person pronoun in academic writing. From a linguistic viewpoint, Hyland (2002) explained some cultural differences between countries by stating that while Anglo-American academic conventions encourage a conscious exploitation of authorial identity to manage the reader's awareness of the author's role and view-point, L2 writers from other cultures may be reluctant to promote an individual self. In general, L2 is a term often used in the field of language education. L2 refers to the second language of the author or speaker, while L1 refers to the first language or the native language of the author or speaker. Later, Hyland (2006) pointed out that many second language writers feel uncomfortable using first person pronouns because of their connotations of authority. His viewpoints are noteworthy, but there is little quantitative evidence to support his claim.

Earlier research into the topic has provided some insights into the frequency of first person uses in the academic texts. Tayyebi (2012) conducted a frequency count of personal pronouns involving 45 med-

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ical journal articles written in English and, equally, 45 medical journal articles written in Persian. The author's examination of first person pronoun use included *we, us,* and *our*. It was indicated that plural first person pronouns occurred in both corpora, but greater frequencies were found in English research articles. According to the authors, the most frequently used first person pronoun in both corpora was *we*.

Basal and Bada (2012) examined 16 journal articles published in the field of social sciences and English language education. The authors reported that among the first person pronouns used, in general, the first person plural pronoun *we* was more frequently than the first person singular *I*.

Kuo (1999) also examined 36 journal articles from three journals in three scientific fields: computer science, electronic engineering, and physics. The author reported that first person pronouns (*we, us,* and *our*) occur far more frequently than any other types of personal pronouns. The author reported that in the scientific disciplines the use of *I* did not occur at all. Kuo examined the use of *we* even further by classifying into *inclusive-we* or *exclusive-we*. According to the author, *inclusive-we* is used with reference to the reader or the third person, while *exclusive-we* is used without reference to the reader or the third person. Kuo reported that the author's sample contained approximately 30% of *inclusive-we* and 70% of *exclusive-we*.

Zhang (2012) provided a frequency count of personal pronouns in nine conference presentations in the field of environmental science by examining the use of *I, me, my, we, us, let's,* and *our*. Out of these, the author reported that *we* and *I* were the most frequently used pronouns. Zhang (2012) suggested that that these characteristics are most likely due to the fact that speakers must emphasize the originality and importance of their research while humbly seeking the acceptance and recognition of their peer audience.

Previous research in this area also examined the uses of first person pronouns from languages other than English. Didriksen and Gjesdal (2006) examined the relationship between individual linguistic variation and genre conventions by examining the use of the French first person singular pronoun *je*, equivalent to *I* in English, in research writings. The authors pointed out that the average mean can be used to establish the norm of the use of *je*. Didriksen and Gjesdal observed the use of *je* by two popular French-speaking linguists Jean-Michel Adam and Claire Blanche-Benveniste. By observing these authors' use of *je* over duration of time, Didriksen and Gjesdal showed that the French authors still tend to comply with the norms of the genre in spite of considerable individual variation.

All of the above mentioned works highlighted the importance of examining the first person pronoun. With the exception of Flottum et al. (2006), the authors of most studies examined first person use in academic papers in the body of text rather than the abstract. Some academics, who will be mentioned later in this paper, have commented on the use of the first pronoun in abstracts. However, in most cases, disciplinary characteristics of the first person was not the focal point of their study. In addition, the

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sample data size used in their studies was rather small compared to this study. This study differs from the previous studies in these respects.

3. Methodology

To conduct this study, a corpus-based dataset was created to explore the use of the first person pronoun. The selected disciplines were computer science, social sciences and medicine and the selected countries were China, Germany, India, Japan, South Korea, France, Spain, United Kingdom, and U.S. The nine countries were selected since they were among the top countries that published journal articles in varying fields. Only journal articles published between the years 2010 and 2014 were used in this study.

A total of 144,400 abstracts from *Scopus* (http://www.sciencedirect.com) was used in this study. Table 1 shows four disciplines and nine countries and each intersecting cell (e.g., in Chemistry-China) with 4,000 abstracts. This numeric value indicates the equal number of abstracts that were sampled in order to conduct this study. Additional sub-datasets were created based on the accumulation of countries and disciplines. For instance, the sub-dataset that represents the chemistry has a total of 36,000 abstracts and accumulated abstracts from 9 countries as shown.

Though not shown in Table 1, the number of journals for each intersecting cell category was calculated. The number of journals ranged from 105 (Chemistry-Spain) to 739 (Social Sciences-United Kingdom). Additional sub-datasets were further created based on the disciplines and the authors' countries.

The objective of this study was to explore the use of the first person pronoun in abstracts of journal papers. To achieve this objective, a number of research questions were proposed:

- How many times are the first person pronoun likely to occur in an abstract?
- Is there a noticeable relationship between the number of authors and the use of first pronoun?
- What are the cultural and disciplinary characteristics of using first person pronoun?
- What verbs and other form of words are commonly used in conjunction with first person pronoun?
- Where in the abstract is the first person pronoun likely to be used in an abstract?

A UNIX/LINUX based shell scripting program (Ousterhout, 1998) was developed to process the downloaded raw data and to perform the frequency count. In many instances, Microsoft Excel was used to further analyze the frequency count.

Some of the methodological limitations need to be mentioned. First, despite the use of a larger sample size than the mentioned previous studies, the sample data drawn from the *Scopus* database may not adequately represent the particular discipline and authors' country. Despite the vast number of journal articles in the *Scopus* database, the database contains a only fraction of the available published journal articles in a particular discipline.

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〈Table 1〉 Detailed Numbers of Abstracts Used in This Study

	China	Germany	India	Japan	South Korea	France	Spain	United Kingdom	U.S.	Total
Chemistry	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	36,000
Computer Science	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	36,000
Social Sciences	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	36,000
Medicine	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	36,000
Total	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	144,000 (Grand Total)

Second, this study relied upon quantitatively calculating the use of first person. The semantic use of *we* has not been examined. Conducting a frequency count of additional types of the first person use would be interesting, but a corpus-based approach would require more complex computational techniques.

Third, this study is limited to examining the first person pronoun *we* and *I*, while excluding other personal pronouns. In particular, the fact that findings of this study is solely based on first person pronoun *I* and *we* without possessive form (e.g., mine, my, our, ours, etc.) should be taken into account when interpreting the findings of this study.

Finally, authors from one country may have published papers with authors in another country. Admittedly, a paper can belong to authors in multiple countries due to international collaboration among academics. Such cases were small and were not distinguished for the purpose of conducting this study. For the above-stated reasons, the result of study must be interpreted in respect to the disciplinary and cultural characteristics, along with an understanding of the limitations of this study.

4. Overall Occurrences of *We* and *I*

One of primary objectives of this study was to investigate the extent of first person pronoun usage in journal paper abstracts. There are a number of ways in which the occurrences of the first person pronoun could be counted. Previous research has shown that *we* and *I* are the most common first person pronoun variations (*I, me, my, we, us, let's, our*) in the academic writing. More specifically, Kuo (1998) demonstrated that first person plural pronouns are used far more than any other type of personal pronoun in academic writing. In this study, the extent of the use of *we* and *I* was first investigated by determining whether *we* and *I* are present in each abstract or not, and by counting the total occurrences of *we* and *I* in each abstract.

First, to count the occurrences of *we* in the abstract, each abstract is categorized into *we* or *non-we,* depending on the presence of *we* in the abstract. Table 2 shows the percentages of abstracts that contain *we* and abstracts not containing *we* in the abstracts in respect to four disciplines: chemistry, computer

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science, social science, and medicine. In calculating the occurrences of *we*, case-folding was applied. This means all instances of the upper case instances of *we*, which is *We*, were normalized into lower case, and they were counted as an instance of lower case *we*.

In Table 2, each *we* and discipline intersecting cell indicates the percentage of abstracts that contain at least one instance of the word *we* in the abstracts; each *non-we* and the discipline intersecting cell indicates the percentage of abstracts that does not contain the word *we* in the abstract. As shown in Table 2, the use of *we* is popular among the four disciplines. The medicine discipline ranks the highest in terms of abstracts containing the term *we*, while the chemistry discipline ranks the lowest in terms of abstracts containing the word *we*. As shown, 57.1% of abstracts in medicine contain at least one instance of the term *we*. Although the use of *we* in chemistry is the lowest compared to other disciplines, approximately one-third of abstracts in the field of chemistry contained the word *we*. By and large, the result shows that the use of *we* is relatively common in many of disciplines that were examined in this study.

〈Table 2〉 Abstracts Containing *We* and *Non-We* in Each Discipline

	Chemistry	Computer Science	Social Sciences	Medicine
We	31.3%	55.2%	33.4%	57.1%
Non-we	68.7%	44.8%	66.6%	42.9%
Total	100.0%	100.0%	100.0%	100.0%

Similarly, the occurrences of *I* were investigated by counting the presence of *I* in the abstract. Each abstract is categorized as *I* or *non-I*, depending on the presence of *I* in the abstract. Table 3 shows the result of counting the presence of *I* in the four disciplines: chemistry, computer science, social sciences, and medicine. Compared with the use of *we*, occurrences of *I* in the abstracts were substantially lower in all disciplines. Table 3 shows the use of *I* among the fields of the four disciplines. As shown, less than 1% of abstracts in chemistry, computer science, and medicine contain the word *I*. The chemistry discipline contained the least amounts of *I* in the abstract: 0.0%. The presence of the first person pronoun *I* was the highest in the social sciences discipline, resulting in a percentage of 2.5%.

Although at a comparatively higher percentage rate, the low frequency count suggests that it is less conventional to use *I* in the abstract. In social sciences, authors predominantly use *I* in a qualitative studies. In qualitative study, authors often bring naturalistic experience and to the interpretive understanding of human experience (Denizen, 2011).

〈Table 3〉 Abstracts Containing *I* and *Non-I* in Each Discipline

	Chemistry	Computer Science	Social Sciences	Medicine
I	0.0%	0.8%	2.5%	0.9%
Non-I	100.0%	99.2%	97.5%	99.1%
Total	100.0%	100.0%	100.0%	100.0%

In the past, the use of the *I* pronoun in the social sciences had a harmful effects on academic writing, causing a controversy. Two decades ago, Webb (1992,

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p. 747) commented that researchers have experienced difficulties in having papers which are based on qualitative research accepted for publication because the papers have been written in the first person. Horsburgh (2003) pointed out that the primary reason for using the first person in social sciences is the *reflexivity*, which refers to active acknowledgement by the researcher that her or his own actions and decisions will inevitably impact upon the meaning and context of the experience under investigation. More recently, Davies (2012) demonstrated the fact that showing emotions in social sciences can be an important element and should not be disregarded when conducting studies.

The frequent uses of *I* in qualitative studies in the social sciences appears to be a plausible reason for the comparatively higher percentage in Table 3. The frequency count of qualitative studies was considered due to difficulties in automatic determination of the type of study.

Despite this study limitation, the negligible presence of *I* in abstracts reveals that its use appears to be still unconventional among disciplines. Considering the multi-functionality of the *we*, it appears that authors prefer to use *we* rather than *I*.

In an abstract, the pronoun *we* can occur more than once. Table 4 shows the frequency of *we* occurrences in an abstract among disciplines. Table 4 only pertains to only abstracts that contain *we*. The percentage in a cell indicates the total percentage of abstracts that contain any particular number of *we* in a given discipline.

The result suggests that the disciplines show similar pattern in terms of number of *we* in each abstract. As shown, the highest frequency of *we* is two. This implies that if *we* is found in an abstract, two occurrences of *we* is more likely to be found than any other number of occurrences. The percentage of two occurrences of *we* is highest in the chemistry discipline: 34.7%. In contrast, computer science has a percentage of 25.3%. In the computer science, the percentage that represents the number of occurrences of *we* in an abstract is more evenly distributed than other disciplines. With an exception of the chemistry discipline, in most disciplines, occurrences of 3 *we* is higher than 1 *we*. Having occurrences of more than 7 *we* in an abstract is rare at less 5%.

Table 5 shows the frequency of *I* occurrence in each abstract within the social sciences discipline. Other disciplines were not examined due to extremely low occurrence of *I* in the abstracts. Unlike the occurring pattern of *we* in the dataset, for the abstracts that contain *I*, only the frequency of occurrences

〈Table 4〉 The Frequency of *We* in an Abstract among Disciplines

# of We in Each Abstract / Discipline	1-we	2-we	3-we	4-we	5-we	6-we	7-we	8-we	9-we	10-we	11-we	Total
Chemistry	23.9%	34.7%	22.3%	11.7%	5.1%	1.4%	0.7%	0.2%	0.1%	0.0%	0.0%	100.0%
Social Science	18.3%	29.0%	24.1%	15.3%	7.3%	3.4%	1.7%	0.5%	0.2%	0.0%	0.1%	100.0%
Computer Science	15.3%	25.3%	22.6%	17.0%	10.2%	5.2%	2.4%	1.3%	0.5%	0.2%	0.1%	100.0%
Medicine	22.3%	32.6%	22.9%	12.5%	5.6%	2.5%	1.0%	0.4%	0.1%	0.1%	0.0%	100.0%

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of *one-I* substantial: As shown in Table 4, 68.5% of abstracts that contain *I* has only one instances of *I* per abstract. The percentage of abstracts that contain more than one *I* drops precipitously as the overall percentage of number of *I* increases. Within abstracts that contain the term *I*, the chance of finding more than three occurrences of *I* would be extremely low. As a whole, the result indicates that authors who use *I* in an abstract use *I* more sparingly than authors who use the word *we* in an abstract.

〈Table 5〉 Occurrences of *I* within Each Abstract in Social Sciences

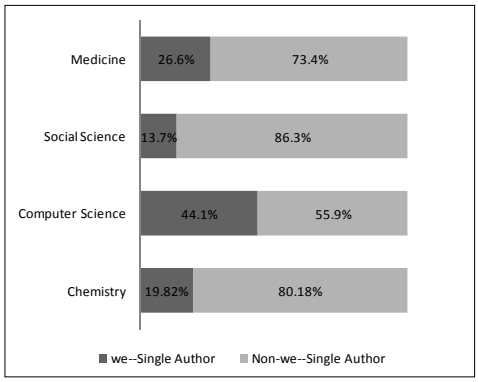
One-I	Two-I	Three-I	Four-I	Five-I	Total
68.5%	23.6%	6.5%	0.9%	0.5%	100%

5. Number of Authors and the Use of *We*

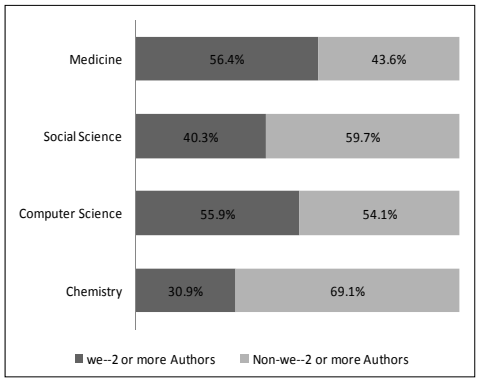
There is an intriguing question in respect to the number of authors involved with the journal articles. *Is there a relationship between the number of authors and the use of we in the abstract?* To answer this question, papers written by a single author and multiple authors were compared in respect to the presence of *we* in the datasets.

As shown in Figure 1, overall, the ratio of using the *we* is higher among papers written by multiple authors rather than a single author. Furthermore, among the fields that were examined, the presence of *we* in the abstracts of papers published by multiple authors is consistently higher than the abstracts of papers written by only one author. Yet, in terms of single or multiple authors, there is a considerable amount of variability between the fields regarding the use of *we*.

In Figure 1(a), the computer science has a highest percentage of the use of *we,* which is 44.1% for the single author. Meanwhile, the social sciences has the lowest percentage of the use of *we,* which is 13.7%. In contrast, in regards to the papers published by multiple authors, the highest percentage



(a) Single Author



(b) Multiple Authors

〈Figure 1〉 The Uses of *We* between Single Author and More Authors

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rate in the use of *we* is found in medicine: 56.4%. In contrast, the lowest percentage rate in the use of *we* is found in chemistry: 30.9%.

In general, the figure shows that the use of *we* is common among single author and multiple authors. In terms of disciplinary characteristics, the social sciences and medicine show a greater variability in the use of *we*. The reason is that the use of *we* in papers published by multiple authors is considerably greater than the use of *we* in papers published by a single author.

Regardless of the number of authors involved in publishing the journal paper, in a sentence, the first person pronoun *we* may or may not include readers. As mentioned in the related studies section, the first person pronoun *we* can include readers in some instances. As a consequence, the word *we* can be further categorized into *inclusive-we* and *exclusive- we*. Considering the number of authors and readers, Table 6 shows a possible combination of the word *we*.

As shown in Table 6, it is relatively easy to imagine the possible combination of *we* criteria based on the previous studies. However, the frequency of *inclusion-we* and *exclusive-we* is difficult to perform automatically due to the ambiguity involved with *we*. Determining *inclusive-we* and *exclusive-we* requires an understanding of the discourse of *we* - the context in which the particular *we* is being used. Automatic classification of *we* into *inclusive-we* and *exclusive-we* is beyond the scope of this paper since developing an algorithm to automatically handle this classification is imprecise and difficult. It would require further research.

〈Table 6〉 The Possible Combination of the *We* categories

	Inclusive-We	Exclusive-We
Single Author	Inclusive-We with-Single-Person	Exclusive-We with-Single-Person
Multiple Authors	Inclusive-We with Multiple Authors	Exclusive-We with Single-Person

6. Cultural and Disciplinary Characteristics

Figure 2 shows the percentage of abstracts that contain *we* in each discipline and in each country. The percentage of abstracts that does not contain *we* would be opposite, which is 100 minus the percentage of abstracts that contain *we*. For instance, the figure shows that 12.4% the abstracts of papers published by authors of India in the discipline of chemistry contains *we*. Therefore, 87.6% would be the abstracts of papers published by authors of India in the discipline of chemistry do not contain *we*. The frequency count of uses of *we* is ordered from right to left. The authors in Japan ranks top in terms of the *we* use, while the authors in India ranks lowest in terms of the *we* use. The average among the discipline is indicated with a dotted line.

As mentioned earlier in regards to Table 2, Figure 2 also shows that, among disciplines, medicine contains the highest in terms of presence of *we*. The disciplines of computer science, social science, and chemistry follow the medicine respectively. The four

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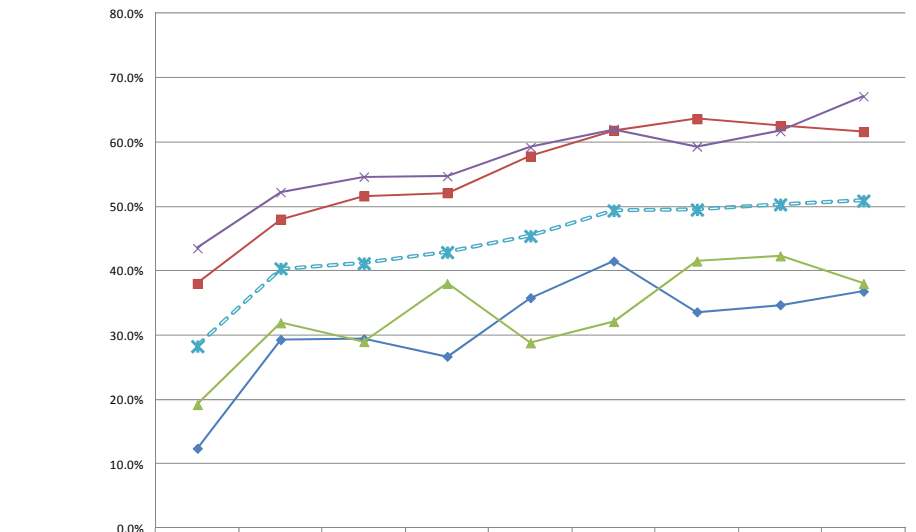

	India (9)	China (8)	United Kingdom (7)	Spain (6)	South Korea (5)	United States (4)	Germany (3)	France (2)	Japan (1)
Chemistry	12.4%	29.3%	29.4%	26.7%	35.8%	41.5%	33.6%	34.7%	36.8%
Computer Science	38.0%	48.0%	51.6%	52.1%	57.8%	61.8%	63.6%	62.5%	61.6%
Social Science	19.2%	31.9%	29.0%	38.0%	28.8%	32.1%	41.5%	42.3%	38.0%
Medicine	43.5%	52.2%	54.6%	54.7%	59.2%	62.0%	59.3%	61.7%	67.1%
Average	28.3%	40.4%	41.2%	42.9%	45.4%	49.4%	49.5%	50.3%	50.9%

〈Figure 2〉 Percentage of Abstracts in Each Country/Discipline Containing *We*

Note: Each cell indicates the percentage of abstracts that contain the word *we*. Number in parentheses indicates the rank of the percentage of abstracts in each discipline-country that contains the word *we*.

lines which indicate the percentage of *we* in the authors' country show a similar pattern in terms of *we* uses among disciplines. In this figure, the more jagged lines reveal sporadic differences that exist among countries. For example, the use of *we* in computer science abstracts by the authors in France is higher than the authors in Japan, but lower than the authors in Japan in the medicine.

Furthermore, in Figure 2, in the medicine discipline, authors in Japan ranks highest in the uses of *we*. In contrast, in the chemistry, authors in India shows the lowest uses of *we*. In fact, India notably ranked lowest among all four disciplines. Authors in China ranks next to authors in India in terms of use of *we*. The difference between these two countries is 12.1%. The difference between China and Japan, which ranks highest in the use of *we*, is approximately 10.5%. Thus, the use of *we* differs considerably from the rest of the countries. Yet, overall, a considerable amount of *we* is found in abstracts across all disciplines of study.

7. Collocating Terms

It is useful to examine the words that surround the word *we* in order to gain insights into how first person pronoun are used in the abstracts. The result

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of this study confirms Mingfang's (2011) observation that the writer frequently employs the first person pronouns with reporting verbs to comment on other's research or introduce his own studies.

In particular, this study shows verbs that are frequently used with the word *we*. Table 7 shows the top 10 collocating terms of *we* in each disciplines. Collectively, collocating terms form an expression. Expressions that are present in every discipline are highlighted in this figure. These are *we also, we show,* and *we present*. These highlighted expressions indicate that authors use *we* most frequently in the context of presenting and showing the results. Also, the collocating term *also* indicates that multiple statements involving the uses of *we* would likely to be present in the dataset that contains abstracts.

The common tense used along with the pronoun *we* is also noteworthy. As shown in Table 7, a variety of tenses can be used with the word *we* in the abstract. A verb is likely to follow after the expression *we have,* suggesting the use of the present perfect tenses. Some words such as *find* and *found* are frequently used in both past and present tenses. On the other hand, words such as *show* and *report* are used more often in the presence tense, suggesting the actions that are used with the verb forms are still relevant at the present time.

8. Position of *We* in the Abstract

Abstracts can be considered as a mini version of the paper's main body. *Informative abstract* is the most common form of abstracts. An *Informative abstract* often contains moves-communicative events-such as background, objectives, methods, results, and conclusion (Swales, 2009). Out of these 5 moves, the most frequently appearing moves in abstracts are the objectives, methods, and results. Also, Kim (2014) has shown that most moves generally appear in a sequential order when it comes to the discipline

〈Table 7〉 Collocation of the Term *We*

Rank	Chemistry	Computer Science	Social Sciences	Medicine
1	we have	we also	we also	we report
2	we report	we present	we find	we found
3	we also	we propose	we show	we also
4	we show	we show	we found	we have
5	we demonstrate	we have	we present	we investigated
6	we found	we consider	we conclude	we used
7	we present	we demonstrate	we argue	we present
8	we describe	we then	we propose	we conclude
9	we find	we study	we use	we show
10	we propose	we use	we then	we examined

Note: Expressions that are present in all 4 disciplines are highlighted.

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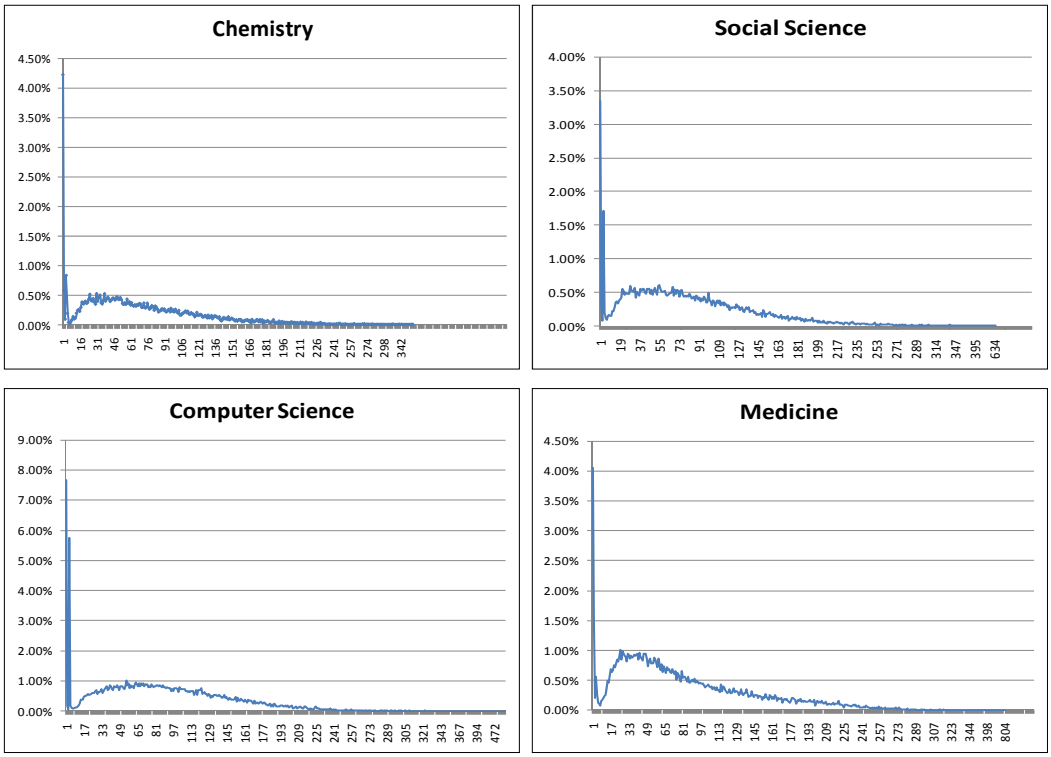
of social sciences. Recognizing the pattern of *we* can aid in understanding the type of abstract components that are likely to be used with *we*.

Figure 3 shows the frequency characteristics of the location of *we* in the abstract. The Y-axis represents occurrences of *we* in terms of percentage. The percentage is obtained by the following:

$$\%\ of\ we\text{-}position = \frac{frequency\ of\ we\text{-}position}{\#\ of\ abstracts\ in\ each\ discipline}$$

X-axis represents the position of the term. Since *X*-axis indicates the number of words in the abstract, the *X*-axis indicates the overall length of the abstract to a certain extent. All disciplines show a similar pattern in the position of *we* in the abstracts.

The most noteworthy point of this figure is the spike on the left side of each graph. The graph in each figure depicts the fact that the word *we* appears most frequently in the opening part of abstract as a first word. For instance, the abstract may start with the following phrases: *We report on an improved...* In all disciplines, the graph drops sharply after the first word peak and rises slowly afterward.



〈Figure 3〉 Frequency Characteristics of the Location of *We* in the Abstract

Note: Y-axis represent occurrences of *we* in terms of percentage, while *X*-axis represent the location of *we* based on the word count.

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The highest frequency of *we* in the opening of abstract is the computer science discipline. In the computer science dataset, approximately, 7.6% of abstracts contained *we* in the opening part of the abstracts.

In comparison, it appears that the authors in the computer science discipline tend to use *we* in the beginning of abstract rather than at the end. On the other hand, the social sciences show the least amount of *we* in the opening part of the abstract. Still, the occurrences are much higher than any other position of *we*. The distributional characteristics may suggest that authors frequently make a stance in the beginning of the abstracts.

9. Discussion and Conclusion

By exploring the use of pronoun in the abstracts, this research has provided quantitative evidence of the conventional practice in regards to the use of the first person pronoun. Overall, a varying degree of cultural similarities and difference between the countries appears to be present regarding the first person pronoun uses.

An un-answered question so far is: *What is the implication of this research on the proper use the first person pronoun in the abstract?* As aforementioned, the appropriate uses of the first person pronoun remain to be unsettled. This research was not intended to address the appropriateness of any particular first person pronoun usage in an abstract. The contribution of this study is that it has showed the existing state of the first person usage in abstracts of academic papers. The information provided in this paper reflects the norms of each authors' country and the norms of each discipline. It further illustrates the degree in which the first person is used in the context of culture and discipline. This paper shed new lights on the issue of the first person pronoun usage in this respect.

The results shown in this paper appears to contradict the viewpoint of some authors in academic writings. For example, Shultz (2009) recommends authors not to use the first person pronouns in the abstract of scientific writings due to the reason that most journals do not accept them. Wilkinson (1991) also suggested that an informative abstract should use the third person for the reason that the abstract should be about the paper and not the author.

However, the frequency count result of this study contradicted the above mentioned author's arguments to a certain extent. In contrast to their suggestions, although the first person singular use of *I* was not found in the scientific abstracts, a vast amount of abstracts contain the use of *we* in the science-related disciplines. Although historical trends were not examined, the results of this study more than likely substantiate some authors' observations that the use of the first person pronoun in academic texts has been rising.

Based on this quantitative data, it appears that the use of *we* in an abstract is acceptable to a limited extent, but most likely the quantity should be three or less. The quantitative results on the position of *we* appears to suggest that many authors who use the pronoun, *we*, may take a stance at the beginning

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of abstract rather than later. However, as previously pointed out, the possessive forms of first person pronoun were excluded from discussion. Consequently, the authors' inclination in using the pronoun needs to be interpreted in light of this limitation. With regards to the use of *I*, the result suggests that authors should use within the discipline of social sciences in order to conform to the norm of current practices.

As for the arguments of Shultz (2009) and Wilkinson (1991), it should be mentioned that the intention of this study was not to discredit these authors' viewpoints. The intention of this study was to merely reveal the conventional practices among authors in the academic communities. Thereby, the academic community can consider setting more detailed guidelines and suggestions regarding the use of first person pronoun. Reviewers of journal articles should be aware of some of these quantitative results among disciplines and countries. In publishing an academic article, Hartley (2012) seems to offer the best advice on the use of *I*: "If, as a writer, you are unsure about how to proceed in terms of clarity, it may be best to play it safe until you are an established author!"

Besides the uses of first person pronoun, this study may have implications on the methods related to automatic sentence classification. Works such as Agarwal and Yu (2009) and Kim et al. (2011) suggested an approach for automatically classifying sentences in abstracts into pre-defined categories. The large quantity of available abstracts containing *we* implies the need for utilizing this first person pronoun in an automatic sentence classification process. Computational techniques can be developed to classify the sentences based on the first person pronoun. This can aid in classifying the type of study based on the information available abstracts.

To this researcher's knowledge, this is the first study of its kind that quantitatively examined the use of first person pronouns in the abstracts. As mentioned earlier, there have been studies that examined the frequency characteristics of first pronoun uses pertaining to the main body of text. Additional studies that examine the characteristics of first person pronouns *we* and *I* can further strengthen this study by revealing the current authors' tendencies of uses in this regard.

In a larger sense, library and information science as a discipline has a long tradition of setting guidelines pertaining to abstracts. Indexing and abstracting have been part of a library and information science curriculum in the past decades. Several books such as *Introduction to Indexing and Abstracting* Cleveland and Cleveland (2013) have been written on the subject concerning indexing and abstracting. However, the pedagogical issue of using the first person pronoun has rarely been mentioned in the discipline of library and information science. Consequentially, the information could be used for didactic purposes for students and authors who are not sure about writing abstracts.

Furthermore, additional findings of this study presented so far can raise awareness among practitioners who work in the areas of indexing and abstracting. A professional abstractor should be well-versed in all aspects of writing abstracts. In a nutshell, the

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findings presented in this study should be used to raise awareness of among academics as well as publishers of academic papers, who many refuse some papers based on the author's chosen stance on pronouns, so that better decisions can be made regarding the use of first person pronoun. Additionally, this study suggests that there is a need for academics to acknowledge the uses of first person pronoun in the real world before forming personal opinions regarding the first person pronoun.

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