# Sketching the English Translations of Kumārajīva's *The Diamond Sutra*: A Comparison of Individual Translators and Translation Teams

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## Abstract

This is a corpus-based study of four English translations of Kumarajiva's *The Diamond Sutra* (401/2002). We sketched the four translated English sutras made by both individual translators and translation teams in terms of the profile of their word and sentence use and readability, using a range of corpus tools. Our results reveal that there are major differences between the individual translators and the translation teams in terms of word repertoire, sentence length and readability. The translation teams produced the English Buddhist texts as easy to read and strict with key concept terms to facilitate their missionary work. The individual translators' renditions tend to differ remarkably based on the translators' identities. Our study would shed light on the future research on language studies of English Buddhist texts and the dissemination of Buddhism from East to West through translation.

## 1 Introduction

Kumārajīva was a monk from Kucha (龜茲 Qiūcí in Chinese), the current Aksu Prefecture in China.

He started to translate the Buddhist scriptures into Chinese when he arrived in Chang'an (the present-day Xi'an), China, in 401 CE and the translation activity lasted till his death in 409 CE. With the assistance of his translation team, he translated over 30 sutras containing 313 volumes. Regarding the scope, style, sophistication, popularity and influence, Kumārajīva's translated Buddhist scriptures are often considered best in Chinese history (Cheung, 2014, p. 93; Hung, 2005, p. 80).

The previous studies on Kumārajīva and his team's translation activity are situated in the field of translation history. Ma (1999) and Wang (2006) include their translation activity in the historical research on the translation of Buddhist scriptures. Wang (1984) elaborates Kumārajīva and his team's sophisticated translation process and Siu (2010) depicts their translation institutes in Chang'an. Kumārajīva's translated Buddhist scriptures are regarded as Buddhist classics in China. They were retranslated into English by different translators with the spread of Buddhism from East to West, especially the renowned *The Diamond Sutra*. Being able to access different translation versions presents a rare chance to compare the divergent images of the Buddhist philosophy in the English world. Although they were produced from the same source text, the diversity of these translated

texts would exert uneven influences on the audience varying from the mission of the religion to the study of the philosophy. It is thus of great value to investigate these English translations of *The Diamond Sutra*.

## 2 Translation Versions

We sorted out the English translations of *The Diamond Sutra* from Chinese (Table 1). The translators can be roughly divided into two groups, namely the individual translators and the translation teams. For the individual translators, they hold different professions like a physician (William Gemmel[1]), professors (Samuel Beal[2] and Daisetz Teitaro Suzuki[3]) and Buddhists (Bhikshu Wai-Tao, Dwight Goddard[4] and Pia Giammasi[5]). The translation teams, on the other hand, were made up of Buddhist monks. It is apparent that they produced the translated English sutras for the international preachment of their temples.

| N | First Published Year | Translator | Translation Title | Publisher |
|---|---|---|---|---|
| 1 | 1864 | Samuel Beal | Vajra-chhediká, the "Kin Kong King," or Diamond Sútra | Journal of Royal Asiatic Society |
| 2 | 1912 | William Gemmel | The Diamond Sutra (Chin-kang-ching) or Prajna-paramita | Kegan Paul, Trench, Trübner & Co., Ltd. |
| 3 | 1935 | Bhikshu Wai-Tao and Dwight Goddard | The Diamond Sutra: A Buddhist Scripture | Dwight Goddard |
| 4 | 1935 | Daisetz Teitaro Suzuki | The Kongokyo or Vajracchedika | Eastern Buddhist Society |
| 5 | 1947 | A.F. Price | The Diamond Sutra or The Jewel of Transcendental Wisdom | The Buddhist Society |
| 6 | 1974 | Buddhist Text Translation Society | The Diamond Sutra: A General Explanation of the Vajra prajna Paramita Sutra | Sino-American Buddhist Association |
| 7 | 2004 | Pia Giammasi | Diamond Sutra Explained | Primodia Media |
| 8 | 2005 | Cheng Kuan | The Diamond Prajna-paramita Sutra (The Diamond Sutra) | Vairocana Publishing |
| 9 | 2009 | Chung Tai Translation Committee | The Diamond of Perfect Wisdom Sutra | Chung Tai Chan Monastery |
| 10 | 2016 | Fo Guang Shan International Translation Center | Diamond Prajnaparamita Sutra | Fo Guang Shan International Translation Center |

Table 1: English Translations of *The Diamond Sutra* from Chinese

## 3 Methodology

We focus on four English translations of *The Diamond Sutra* from Chinese for this paper, namely Gemmel (1912), Hsuan (2002)[6], Giammasi (2004) and Chung Tai Translation Committee (2009) (Table 2). These texts were selected for three reasons. First, they explicitly state in the texts that their translations were rendered from the Chinese version of Kumārajīva's *The Diamond Sutra*. Second, they are still in circulation today. The translations made by Gemmel and Giammasi are still reprinted and sold on Amazon. The other two are distributed to the believers and disciples of their temples. Third, TT1 and TT2 were produced by the individual translators; TT3 and TT4 were made by the Buddhist translation teams. These four texts form the comparison groups as the Table 2 shows. We built a corpus of these four translated English sutras after digitalizing them for further analysis.

| Source Text | ST | 金剛般若波羅蜜經 *Vajracchedikā Prajñāpāramitā Sūtra* |
|---|---|---|
| Group 1 (Individual Translators) | TT1 | *The Diamond Sutra (Chin-Kang-Ching) or Prajna-Paramita* translated by William Gemmel in 1912 |
| | TT2 | *Diamond Sutra Explained* translated by Pia Giammasi in 2004 |

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1 Mattoon (2010)

2 Ockerbloom (n.d.)

3 Abe (1986)

4 Wai-Tao and Goddard (1935)

5 Giammasi (2004)

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6 Hsuan (2002) is the second edition of the translation made by Buddhist Text Translation Society in 1974. The Buddhist Master Hsuan Hua was put in the position of author. This kind of arrangement follows the tradition of Buddhist translation activity that the translated Buddhist scripture is authored by the Buddhist Master who chaired the translation activity. That Buddhist Master is called 主譯 zhǔ yì (Master Translator) in Chinese (Wang, 1984).

| | | |
|---|---|---|
| Group 2 (Translation Teams) | TT3 | *The Vajra Prajna Paramita Sutra: A General Explanation* translated by Buddhist Text Translation Society in 2002 |
| | TT4 | *The Diamond of Perfect Wisdom Sutra* translated by Chung Tai Translation Committee in 2009 |

Table 2: The Selected Four English translations of Kumārajīva's *The Diamond Sutra*

In order to sketch the profile of these English translations, we adopted four corpus tools to compare the texts in three dimensions: word, sentence and readability. The tools employed and their corresponding functions are listed in Table 3.

| Tools | Functions |
|---|---|
| WordSmith 8.0 | STTR, Mean Word Length, Sentences, Sentence Length |
| BFSU HugeMind Readability Analyzer 2.0 | Readability Tests |
| NVivo 12 Plus | Word List, Word Cloud |
| AntConc 3.5.7 | Collocation |

Table 3: Corpus Tools

By describing the four selected English translations of Kumārajīva's *The Diamond Sutra* with the assistant of corpus tools, this study aims to answer the following two research questions.

In terms of the profile of word, sentence and readability:

1. What differences exhibit between the individual translators and the translation teams, if there are?

2. Are there any differences within each group – i.e. the group of individual translators and the group of translation teams (cf. Table 2)?

## 4 Results

### 4.1 STTR, Words and Sentences

We used the WordSmith Tools 8.0 (Scott, 2020) to examine the lexical complexity and sentential patterns of the four translations regarding the STTR, word length, number of sentences and sentence length (Table 4). As the text size of TT1 (7,068 tokens) is much larger than the other three. The standard type-token ratio (STTR), which calculates the type-token ratio (TTR) on every 1,000 words, is adopted here as one indicator to compare the lexical diversity of these four texts. The STTR of Group 1 (TT1: 30.20%; TT2: 28.94%) is notably higher than Group 2 (TT3:

25.36%; TT4: 27.44%), which suggests the individual translators employ a wider range of vocabulary than the translation teams. With respect to the mean word length in words, the varieties in each group do not show the same tendency (TT1: 5.03; TT2: 4.66; TT3: 4.52; TT4: 4.76). At the sentential level, the individual translators (TT1: 333; TT2: 322) used fewer sentences than the translation teams (TT3: 359; TT4: 377). But the average length of the former (TT1: 21.23; TT2: 16.11) is greater than the latter (TT3: 15.17; TT4: 13.90).

| Indicators | TT1 | TT2 | TT3 | TT4 |
|---|---|---|---|---|
| Tokens | 7,068 | 5,189 | 5,447 | 5,243 |
| Types | 1,059 | 761 | 619 | 693 |
| TTR | 14.98% | 14.67% | 11.36% | 13.22% |
| STTR | 30.20% | 28.94% | 25.36% | 27.44% |
| STTR std.dev | 58.51 | 57.80 | 60.89 | 59.09 |
| STTR basis | 1,000 | 1,000 | 1,000 | 1,000 |
| Mean Word Length (characters) | 5.03 | 4.66 | 4.52 | 4.76 |
| Word Length std.dev | 2.71 | 2.53 | 2.63 | 2.60 |
| Sentences | 333 | 322 | 359 | 377 |
| mean (in words) | 21.23 | 16.11 | 15.17 | 13.90 |
| std.dev. | 14.97 | 12.51 | 12.65 | 11.52 |

Table 4: WordSmith Tools 8.0 Statistics List

### 4.2 Frequent Words and Collocations

The "word frequency query" function of NVivo 12 Plus (QSR International Pty Ltd, 2020) generated the content-word lists with word frequencies for each text and visualized the content words with word clouds. We set the query criteria as "display the 100 most frequent words with minimum length of 3 letters". The full top 100 frequent word lists of each file with their counts and weighted percentages are placed in the Appendices (A-D). To concisely illustrate the main differences of the four translations in terms of the frequently-occurring words, four word clouds of the 30 most frequent words are presented below (Figures 1-4). Visually, a considerable number of the highly frequently-used words in the four texts differ, although the main characters "Subhuti" and "Buddha" are consistently on the top of the lists. These differences largely result from the translators' varied renditions of some repetitive key terms in *The Diamond Sutra*, for example, "如來", "法" and "阿耨多羅三藐三菩提" (Table 5).

First, "如來 rú lái" is the honorific title of Buddha. Its literal translation from Sanskrit is

"Tathāgata" (Ding, 2016). TT1 does not distinguish it from "佛 fó" (Buddha) that Gemmel translated it as "Lord Buddha" too. The other three follow the literal translation "Tathagata", which is different from "Buddha". Second, "法 fǎ" is a key concept in Buddhism and it has multiple meanings. It can refer to the universe's truth or law (Ding, 2016). TT1 substitutes it with "Law", while the other three adopts the literal translation "D/dharma". Third, "阿耨多羅三藐三菩提 ā nòu duō luó sān miǎo sān pú tí" is the transliteration of Sanskrit "anuttara-samyak-sambodhi", which was also translated into Chinese as "無上正等正覺 wú shàng zhèng děng zhèng jué" (supreme perfect enlightenment). It represents the highest wisdom of all truth in Buddhism (Ding, 2016). TT2 and TT3 retain the transliteration. TT1 substitutes it with "supreme spiritual wisdom", and TT4 literally translates it while providing the transliteration at the first time.
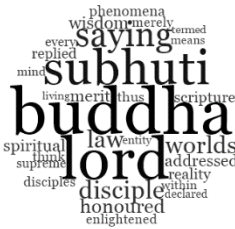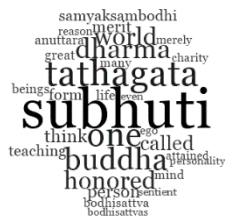

Figure 1: Word Cloud of TT1
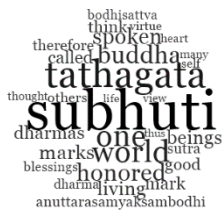

Figure 2: Word Cloud of TT2


Figure 3: Word Cloud of TT3
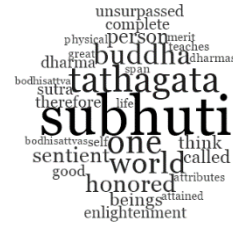

Figure 4: Word Cloud of TT4

| Terms | TT1 | TT2 | TT3 | TT4 |
|---|---|---|---|---|
| 如來 rú lái | Lord Buddha | Tathagata | Tathagata | Tathagata |
| 法 fǎ | Law | Dharma | dharma | dharma |
| 阿耨多羅三藐三菩提 ā nòu duō luó sān miǎo sān pú tí | supreme spiritual wisdom | anuttara-samyaksambodhi | Anuttarasamyaksambodhi | unsurpassed complete enlightenment (anuttara-samyak-sambodhi) |

Table 5: Translations of Key Terms

As *The Diamond Sutra* is the dialogue between Buddha and his disciple Subhuti, we further explore the verbs collocated with these two characters by virtue of AntConc 3.5.7 (Anthony, 2018). We set the span from 3L to 3R and the collocate measure as MI + Log-likelihood (p> 0.05). We list the frequently collocated verbs with high statistical scores in Tables 6-7. It can be seen that TT1 has the varied verbs (addressed, declared, enquired, etc.) collocated with Buddha and Subhuti, while TT2, TT3 and TT4 use the simple verbs, such as "said", "told" and "called".

| Texts | Collocate | Stat. | Freq | Freq(L) | Freq(R) |
|---|---|---|---|---|---|
| TT1 | saying | 4.10404 | 46 | 1 | 45 |
| | addressed | 5.16544 | 37 | 3 | 34 |
| | declared | 4.68002 | 15 | 0 | 15 |
| | enquired | 4.66294 | 12 | 0 | 12 |
| TT2 | said | 5.85739 | 14 | 4 | 10 |
| | says | 4.35936 | 6 | 1 | 5 |
| TT3 | said | 5.98352 | 23 | 12 | 11 |
| | told | 6.62989 | 7 | 0 | 7 |
| TT4 | said | 5.62832 | 22 | 6 | 16 |

Table 6: Buddha's Collocated Verbs

| Texts | Collocate | Stat. | Freq | Freq(L) | Freq(R) |
|---|---|---|---|---|---|
| TT1 | saying | 5.33639 | 79 | 2 | 77 |
| | addressed | 5.57804 | 36 | 33 | 3 |
| | replied | 5.47073 | 28 | 4 | 24 |
| | enquired | 5.61757 | 17 | 12 | 5 |
| TT2 | said | 4.92450 | 15 | 10 | 5 |
| | called | 3.85050 | 15 | 13 | 2 |
| | replied | 5.14001 | 11 | 0 | 11 |
| TT3 | said | 4.78715 | 25 | 4 | 21 |

| | called | 3.95064 | 14 | 14 | 0 |
|---|---|---|---|---|---|
| | told | 5.31321 | 7 | 7 | 0 |
| TT4 | said | 4.92734 | 29 | 13 | 16 |
| | called | 3.95688 | 14 | 12 | 2 |

Table 7: Subhuti's Collocated Verbs

## 4.3 Readability Tests

Finally, we tested the readability of these four translations via the BFSU HugeMind Readability Analyzer 2.0. It is a corpus tool developed by the FLERIC team of Beijing Foreign Studies University (http://corpus.bfsu.edu.cn/TOOLS.htm). It can do six different readability tests for the texts. The calculation formulae are listed in the Appendix E. Apart from the Flesch Reading Ease test, the higher the score is, the less understandable the text is (Coleman & Liau, 1975; Flesch, 1981; Gunning, 1952; Kincaid, Fishburne, Rogers, & Chissom, 1975; Mclaughlin, 1969; Smith & Senter, 1967). The scores of the four texts are listed in Table 8. The results infer that Group 1 (TT1 and TT2) are generally weaker than Group 2 (TT3 and TT4) in readability except that the score of TT2 is a little lower than TT4 in Gunning Fog Index test. Especially, the score of TT1 has marked gap between it and the other three texts.

| Tests | TT1 | TT2 | TT3 | TT4 |
|---|---|---|---|---|
| Automated Readability Index | 13.04 | 9.87 | 8.28 | 9.02 |
| Coleman–Liau Index | 13.42 | 11.36 | 9.91 | 11.4 |
| Flesch Reading Ease | 39.47 | 51.31 | 61.7 | 52.53 |
| Flesch–Kincaid Readability Test | 12.67 | 10.13 | 8.42 | 9.41 |
| Gunning Fog Index | 39.71 | 31.11 | 25.72 | 31.51 |
| SMOG (Simple Measure of Gobbledygook) | 24.73 | 20.30 | 17.95 | 19.49 |

Table 8: Readability Tests by BFSU HugeMind Readability Analyzer 2.0

## 5 Individual Translators versus Translation Teams

We have compared these four English translations of Kumārajīva's *The Diamond Sutra* using a range of corpus tools. In response to our research questions, results show that there are major differences between the individual translators and the translation teams. The individual translators employed a wider range of vocabulary than the translation teams. The former is inclined to use fewer but longer sentences than the latter. In terms of readability, the translated Buddhist texts made by the translation teams are easier to read than the ones rendered by the individual translators. For the inner group comparison, the two translations done by teamwork appear to be consistent with each other in our corpus-based sketching except for the rendition of "阿耨多羅三藐三菩提 ā nòu duō luó sān miǎo sān pú tí". TT4 provides both the literal translation and transliteration, and this seems to be a strategy to stay faithful to the original while facilitate the readers' reading. Although TT1 and TT2 show some similar tendencies as both belong to the group of individual translators, they markedly differ in word diction, i.e. the frequent words and verb collocations. TT1's readability tests scores are much distinct from the other three. This can be explained from the identities of these translators. William Gemmel was a physician, who had a "lifelong interest in history and archeology" (Mattoon, 2010). Although Pia Giammasi is an individual translator, she is the disciple of the Buddhist Master Nan Huai-Chin (Giammasi, 2005). Such a Buddhist background would situate herself in line with the Buddhist groups, which is revealed by her choices of the frequently used words. Therefore, William Gemmel as a translator outside the religious circle of Buddhism tends to enjoy the

highest subjectivity when translating the Buddhist sutra. Our description of the four texts by corpus tools can also offer a glimpse of the mechanism behind each group's translating practice on the Buddhist sutras. The Buddhist translation teams employ sterile and plain words and shorter sentences to reduce the difficulty of the Buddhist texts availing the preachment. They are strict with the key terms and concepts, which maintain a high level of faithfulness to the original text. The individual translators vary owing to their identities.

## 6 Conclusion

In this paper, we have compared four different English translations of Kumārajīva's *The Diamond Sutra* with corpus tools and demonstrated the differences between the individual translators and translation teams. Our study showed that the two groups clearly differ from each other in terms of the profile of the words and sentences they used and also in readability. The translated sutras rendered by the translation teams tend to be easy for reading while rigorous with the expressions of key concepts. The individual translators performed differently based on their own identities. However, we only compared four texts and did not involve the textual analysis of the Chinese source text as both the classic Chinese and religious language of Buddhist sutras are not supported by the mainstream corpus tools. That is the area in which subsequent studies can work on in the domain of this special textual genre (cf. Lee & Wong, 2016; Wong & Lee, 2018).

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## Appendices

### Appendix A. Top 100 Frequent Word List of TT1

| Word | Length | Count | Weighted Percentage (%) |
|---|---|---|---|
| buddha | 6 | 197 | 5.21 |
| lord | 4 | 179 | 4.74 |
| subhuti | 7 | 144 | 3.81 |
| saying | 6 | 96 | 2.54 |
| disciple | 8 | 66 | 1.75 |
| law | 3 | 62 | 1.64 |
| worlds | 6 | 62 | 1.64 |
| honoured | 8 | 48 | 1.27 |
| wisdom | 6 | 40 | 1.06 |
| merit | 5 | 38 | 1.01 |
| spiritual | 9 | 38 | 1.01 |
| addressed | 9 | 37 | 0.98 |
| scripture | 9 | 34 | 0.90 |
| reality | 7 | 33 | 0.87 |
| phenomena | 9 | 31 | 0.82 |
| replied | 7 | 31 | 0.82 |
| thus | 4 | 30 | 0.79 |
| think | 5 | 29 | 0.77 |
| disciples | 9 | 28 | 0.74 |
| enlightened | 11 | 28 | 0.74 |
| merely | 6 | 28 | 0.74 |
| every | 5 | 26 | 0.69 |
| supreme | 7 | 26 | 0.69 |

| Word | Length | Count | Weighted % |
|---|---|---|---|
| within | 6 | 25 | 0.66 |
| mind | 4 | 24 | 0.64 |
| means | 5 | 23 | 0.61 |
| declared | 8 | 21 | 0.56 |
| entity | 6 | 21 | 0.56 |
| living | 6 | 20 | 0.53 |
| termed | 6 | 19 | 0.50 |
| body | 4 | 18 | 0.48 |
| enquired | 8 | 17 | 0.45 |
| life | 4 | 17 | 0.45 |
| personality | 11 | 17 | 0.45 |
| ideas | 5 | 16 | 0.42 |
| may | 3 | 16 | 0.42 |
| man | 3 | 15 | 0.40 |
| whether | 7 | 15 | 0.40 |
| charity | 7 | 14 | 0.37 |
| exercise | 8 | 14 | 0.37 |
| good | 4 | 14 | 0.37 |
| therefore | 9 | 14 | 0.37 |
| obtained | 8 | 13 | 0.34 |
| perceived | 9 | 13 | 0.34 |
| sentient | 8 | 13 | 0.34 |
| woman | 5 | 13 | 0.34 |
| ages | 4 | 12 | 0.32 |
| beings | 6 | 12 | 0.32 |
| doctrine | 8 | 12 | 0.32 |
| dust | 4 | 12 | 0.32 |
| faith | 5 | 12 | 0.32 |
| minds | 5 | 12 | 0.32 |
| numerous | 8 | 12 | 0.32 |
| physical | 8 | 12 | 0.32 |
| arbitrary | 9 | 11 | 0.29 |
| attained | 8 | 11 | 0.29 |
| considerable | 12 | 11 | 0.29 |
| distinctions | 12 | 11 | 0.29 |
| referred | 8 | 11 | 0.29 |
| unto | 4 | 11 | 0.29 |
| bodily | 6 | 10 | 0.26 |
| buddhist | 8 | 10 | 0.26 |
| eye | 3 | 10 | 0.26 |
| form | 4 | 10 | 0.26 |
| great | 5 | 10 | 0.26 |
| neither | 7 | 10 | 0.26 |

| Word | Length | Count | Weighted % |
|---|---|---|---|
| thought | 7 | 10 | 0.26 |
| entirely | 8 | 9 | 0.24 |
| ganges | 6 | 9 | 0.24 |
| idea | 4 | 9 | 0.24 |
| meaning | 7 | 9 | 0.24 |
| system | 6 | 9 | 0.24 |
| thereupon | 9 | 9 | 0.24 |
| become | 6 | 8 | 0.21 |
| condition | 9 | 8 | 0.21 |
| diligently | 10 | 8 | 0.21 |
| future | 6 | 8 | 0.21 |
| innumerable | 11 | 8 | 0.21 |
| material | 8 | 8 | 0.21 |
| others | 6 | 8 | 0.21 |
| particles | 9 | 8 | 0.21 |
| truly | 5 | 8 | 0.21 |
| arhat | 5 | 7 | 0.19 |
| bring | 5 | 7 | 0.19 |
| buddhic | 7 | 7 | 0.19 |
| continuing | 10 | 7 | 0.19 |
| dipankara | 9 | 7 | 0.19 |
| grains | 6 | 7 | 0.19 |
| greater | 7 | 7 | 0.19 |
| kingdoms | 8 | 7 | 0.19 |
| oblivious | 9 | 7 | 0.19 |
| occasion | 8 | 7 | 0.19 |
| one | 3 | 7 | 0.19 |
| paramita | 8 | 7 | 0.19 |
| proclaimed | 10 | 7 | 0.19 |
| qualities | 9 | 7 | 0.19 |
| realise | 7 | 7 | 0.19 |
| rigorously | 10 | 7 | 0.19 |
| sand | 4 | 7 | 0.19 |
| thirty | 6 | 7 | 0.19 |

## Appendix B. Top 100 Frequent Word List of TT2

| Word | Length | Count | Weighted Percentage (%) |
|---|---|---|---|
| subhuti | 7 | 135 | 5.30 |
| tathagata | 9 | 83 | 3.26 |
| one | 3 | 75 | 2.94 |
| buddha | 6 | 66 | 2.59 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| dharma | 6 | 58 | 2.28 | true | 4 | 9 | 0.35 |
| honored | 7 | 50 | 1.96 | two | 3 | 9 | 0.35 |
| world | 5 | 50 | 1.96 | without | 7 | 9 | 0.35 |
| called | 6 | 40 | 1.57 | beyond | 6 | 8 | 0.31 |
| think | 5 | 33 | 1.30 | body | 4 | 8 | 0.31 |
| person | 6 | 31 | 1.22 | calls | 5 | 8 | 0.31 |
| merit | 5 | 28 | 1.10 | dust | 4 | 8 | 0.31 |
| form | 4 | 26 | 1.02 | galaxies | 8 | 8 | 0.31 |
| samyaksambodhi | 14 | 25 | 0.98 | good | 4 | 8 | 0.31 |
| teaching | 8 | 25 | 0.98 | know | 4 | 8 | 0.31 |
| life | 4 | 22 | 0.86 | marks | 5 | 8 | 0.31 |
| great | 5 | 20 | 0.79 | men | 3 | 8 | 0.31 |
| anuttara | 8 | 19 | 0.75 | notion | 6 | 8 | 0.31 |
| beings | 6 | 19 | 0.75 | receive | 7 | 8 | 0.31 |
| bodhisattva | 11 | 18 | 0.71 | appearance | 10 | 7 | 0.27 |
| many | 4 | 18 | 0.71 | dipankara | 9 | 7 | 0.27 |
| mind | 4 | 18 | 0.71 | dwelling | 8 | 7 | 0.27 |
| attained | 8 | 16 | 0.63 | expounded | 9 | 7 | 0.27 |
| charity | 7 | 16 | 0.63 | majestic | 8 | 7 | 0.27 |
| merely | 6 | 16 | 0.63 | means | 5 | 7 | 0.27 |
| ego | 3 | 15 | 0.59 | must | 4 | 7 | 0.27 |
| reason | 6 | 15 | 0.59 | neither | 7 | 7 | 0.27 |
| even | 4 | 14 | 0.55 | paramita | 8 | 7 | 0.27 |
| personality | 11 | 14 | 0.55 | practice | 8 | 7 | 0.27 |
| bodhisattvas | 12 | 13 | 0.51 | read | 4 | 7 | 0.27 |
| sentient | 8 | 13 | 0.51 | realization | 11 | 7 | 0.27 |
| thought | 7 | 13 | 0.51 | self | 4 | 7 | 0.27 |
| fortune | 7 | 12 | 0.47 | someone | 7 | 7 | 0.27 |
| replied | 7 | 12 | 0.47 | thirty | 6 | 7 | 0.27 |
| sand | 4 | 12 | 0.47 | understand | 10 | 7 | 0.27 |
| eyes | 4 | 11 | 0.43 | woman | 5 | 7 | 0.27 |
| minds | 5 | 11 | 0.43 | worlds | 6 | 7 | 0.27 |
| others | 6 | 11 | 0.43 | anutara | 7 | 6 | 0.24 |
| virtuous | 8 | 11 | 0.43 | attain | 6 | 6 | 0.24 |
| ganges | 6 | 10 | 0.39 | buddhas | 7 | 6 | 0.24 |
| man | 3 | 10 | 0.39 | expound | 7 | 6 | 0.24 |
| perceived | 9 | 10 | 0.39 | just | 4 | 6 | 0.24 |
| sutra | 5 | 10 | 0.39 | lands | 5 | 6 | 0.24 |
| dwell | 5 | 9 | 0.35 | meaning | 7 | 6 | 0.24 |
| grains | 6 | 9 | 0.35 | notions | 7 | 6 | 0.24 |
| retain | 6 | 9 | 0.35 | past | 4 | 6 | 0.24 |
| rupakaya | 8 | 9 | 0.35 | perfect | 7 | 6 | 0.24 |
| thus | 4 | 9 | 0.35 | real | 4 | 6 | 0.24 |

## Appendix C. Top 100 Frequent Word List of TT3

| Word | Length | Count | Weighted Percentage (%) |
|---|---|---|---|
| subhuti | 7 | 137 | 5.20 |
| tathagata | 9 | 91 | 3.45 |
| one | 3 | 71 | 2.69 |
| world | 5 | 70 | 2.66 |
| buddha | 6 | 55 | 2.09 |
| honored | 7 | 53 | 2.01 |
| spoken | 6 | 48 | 1.82 |
| marks | 5 | 43 | 1.63 |
| living | 6 | 42 | 1.59 |
| beings | 6 | 41 | 1.56 |
| dharmas | 7 | 38 | 1.44 |
| called | 6 | 36 | 1.37 |
| mark | 4 | 36 | 1.37 |
| good | 4 | 34 | 1.29 |
| think | 5 | 34 | 1.29 |
| therefore | 9 | 30 | 1.14 |
| anuttarasamyaksambodhi | 22 | 29 | 1.10 |
| sutra | 5 | 29 | 1.10 |
| others | 6 | 28 | 1.06 |
| blessings | 9 | 26 | 0.99 |
| bodhisattva | 11 | 26 | 0.99 |
| dharma | 6 | 25 | 0.95 |
| self | 4 | 23 | 0.87 |
| virtue | 6 | 23 | 0.87 |
| heart | 5 | 22 | 0.83 |
| many | 4 | 21 | 0.80 |
| thought | 7 | 21 | 0.80 |
| view | 4 | 21 | 0.80 |
| life | 4 | 20 | 0.76 |
| thus | 4 | 19 | 0.72 |
| hold | 4 | 16 | 0.61 |
| man | 3 | 16 | 0.61 |
| person | 6 | 16 | 0.61 |
| receive | 7 | 16 | 0.61 |
| actually | 8 | 15 | 0.57 |
| thousand | 8 | 15 | 0.57 |
| ganges | 6 | 14 | 0.53 |
| people | 6 | 14 | 0.53 |
| systems | 7 | 14 | 0.53 |
| dwell | 5 | 13 | 0.49 |
| means | 5 | 13 | 0.49 |
| woman | 5 | 13 | 0.49 |
| perfection | 10 | 12 | 0.46 |
| sand | 4 | 12 | 0.46 |
| someone | 7 | 12 | 0.46 |
| dust | 4 | 11 | 0.42 |
| eye | 3 | 11 | 0.42 |
| grains | 6 | 11 | 0.42 |
| great | 5 | 11 | 0.42 |
| paramita | 8 | 11 | 0.42 |
| reason | 6 | 11 | 0.42 |
| without | 7 | 11 | 0.42 |
| across | 6 | 10 | 0.38 |
| know | 4 | 10 | 0.38 |
| motes | 5 | 10 | 0.38 |
| produce | 7 | 10 | 0.38 |
| two | 3 | 10 | 0.38 |
| understand | 10 | 10 | 0.38 |
| body | 4 | 9 | 0.34 |
| foremost | 8 | 9 | 0.34 |
| physical | 8 | 9 | 0.34 |
| seen | 4 | 9 | 0.34 |
| speak | 5 | 9 | 0.34 |
| thirty | 6 | 9 | 0.34 |
| attain | 6 | 8 | 0.30 |
| attained | 8 | 8 | 0.30 |
| even | 4 | 8 | 0.30 |
| extinction | 10 | 8 | 0.30 |
| four | 4 | 8 | 0.30 |
| give | 4 | 8 | 0.30 |
| gives | 5 | 8 | 0.30 |

| Word | Length | Count | Weighted Percentage (%) |
|---|---|---|---|
| hear | 4 | 8 | 0.30 |
| merit | 5 | 8 | 0.30 |
| obtained | 8 | 8 | 0.30 |
| read | 4 | 8 | 0.30 |
| recite | 6 | 8 | 0.30 |
| river | 5 | 8 | 0.30 |
| three | 5 | 8 | 0.30 |
| believe | 7 | 7 | 0.27 |
| big | 3 | 7 | 0.27 |
| buddhas | 7 | 7 | 0.27 |
| burning | 7 | 7 | 0.27 |
| completely | 10 | 7 | 0.27 |
| dwelling | 8 | 7 | 0.27 |
| fine | 4 | 7 | 0.27 |
| form | 4 | 7 | 0.27 |
| forms | 5 | 7 | 0.27 |
| future | 6 | 7 | 0.27 |
| lamp | 4 | 7 | 0.27 |
| like | 4 | 7 | 0.27 |
| might | 5 | 7 | 0.27 |
| see | 3 | 7 | 0.27 |
| taken | 5 | 7 | 0.27 |
| told | 4 | 7 | 0.27 |
| adornment | 9 | 6 | 0.23 |
| bodhisattvas | 12 | 6 | 0.23 |
| buddhalands | 11 | 6 | 0.23 |
| devoid | 6 | 6 | 0.23 |
| gems | 4 | 6 | 0.23 |
| gift | 4 | 6 | 0.23 |

## Appendix D. Top 100 Frequent Word List of TT4

| Word | Length | Count | Weighted Percentage (%) |
|---|---|---|---|
| subhuti | 7 | 135 | 5.10 |
| tathagata | 9 | 82 | 3.10 |
| one | 3 | 76 | 2.87 |
| world | 5 | 66 | 2.49 |
| buddha | 6 | 63 | 2.38 |
| honored | 7 | 51 | 1.93 |
| sentient | 8 | 44 | 1.66 |
| person | 6 | 41 | 1.55 |
| beings | 6 | 36 | 1.36 |
| think | 5 | 36 | 1.36 |
| called | 6 | 35 | 1.32 |
| therefore | 9 | 30 | 1.13 |
| complete | 8 | 29 | 1.10 |
| dharma | 6 | 29 | 1.10 |
| enlightenment | 13 | 29 | 1.10 |
| sutra | 5 | 29 | 1.10 |
| unsurpassed | 11 | 29 | 1.10 |
| good | 4 | 28 | 1.06 |
| self | 4 | 22 | 0.83 |
| life | 4 | 20 | 0.76 |
| teaches | 7 | 20 | 0.76 |
| attributes | 10 | 19 | 0.72 |
| dharmas | 7 | 19 | 0.72 |
| great | 5 | 19 | 0.72 |
| physical | 8 | 19 | 0.72 |
| span | 4 | 19 | 0.72 |
| attained | 8 | 18 | 0.68 |
| merit | 5 | 18 | 0.68 |
| bodhisattvas | 12 | 17 | 0.64 |
| bodhisattva | 11 | 16 | 0.60 |
| body | 4 | 16 | 0.60 |
| means | 5 | 16 | 0.60 |
| notions | 7 | 16 | 0.60 |
| charity | 7 | 15 | 0.57 |
| teaching | 8 | 15 | 0.57 |
| attain | 6 | 14 | 0.53 |
| non | 3 | 14 | 0.53 |
| perfect | 7 | 14 | 0.53 |
| thought | 7 | 14 | 0.53 |
| without | 7 | 14 | 0.53 |
| worlds | 6 | 14 | 0.53 |
| thoughts | 8 | 13 | 0.49 |
| even | 4 | 12 | 0.45 |
| sand | 4 | 12 | 0.45 |
| actually | 8 | 11 | 0.42 |
| eye | 3 | 11 | 0.42 |
| ganges | 6 | 11 | 0.42 |
| others | 6 | 11 | 0.42 |
| appearances | 11 | 10 | 0.38 |
| particles | 9 | 10 | 0.38 |
| rise | 4 | 10 | 0.38 |
| tiny | 4 | 10 | 0.38 |

| Word | | | | Word | | | |
|---|---|---|---|---|---|---|---|
| yes | 3 | 10 | 0.38 | free | 4 | 6 | 0.23 |
| follow | 6 | 9 | 0.34 | jewels | 6 | 6 | 0.23 |
| immeasurable | 12 | 9 | 0.34 | line | 4 | 6 | 0.23 |
| know | 4 | 9 | 0.34 | man | 3 | 6 | 0.23 |
| nothing | 7 | 9 | 0.34 | many | 4 | 6 | 0.23 |
| paramita | 8 | 9 | 0.34 | | | | |
| remember | 8 | 9 | 0.34 | | | | |
| teach | 5 | 9 | 0.34 | | | | |
| thus | 4 | 9 | 0.34 | | | | |
| two | 3 | 9 | 0.34 | | | | |
| abide | 5 | 8 | 0.30 | | | | |
| extremely | 9 | 8 | 0.30 | | | | |
| fact | 4 | 8 | 0.30 | | | | |
| form | 4 | 8 | 0.30 | | | | |
| four | 4 | 8 | 0.30 | | | | |
| gives | 5 | 8 | 0.30 | | | | |
| like | 4 | 8 | 0.30 | | | | |
| meaning | 7 | 8 | 0.30 | | | | |
| merits | 6 | 8 | 0.30 | | | | |
| neither | 7 | 8 | 0.30 | | | | |
| practice | 8 | 8 | 0.30 | | | | |
| real | 4 | 8 | 0.30 | | | | |
| resolve | 7 | 8 | 0.30 | | | | |
| thirty | 6 | 8 | 0.30 | | | | |
| also | 4 | 7 | 0.26 | | | | |
| attachment | 10 | 7 | 0.26 | | | | |
| away | 4 | 7 | 0.26 | | | | |
| buddhas | 7 | 7 | 0.26 | | | | |
| comprehend | 10 | 7 | 0.26 | | | | |
| dipankara | 9 | 7 | 0.26 | | | | |
| former | 6 | 7 | 0.26 | | | | |
| give | 4 | 7 | 0.26 | | | | |
| grains | 6 | 7 | 0.26 | | | | |
| men | 3 | 7 | 0.26 | | | | |
| mind | 4 | 7 | 0.26 | | | | |
| reality | 7 | 7 | 0.26 | | | | |
| recite | 6 | 7 | 0.26 | | | | |
| someone | 7 | 7 | 0.26 | | | | |
| verse | 5 | 7 | 0.26 | | | | |
| women | 5 | 7 | 0.26 | | | | |
| come | 4 | 6 | 0.23 | | | | |
| countless | 9 | 6 | 0.23 | | | | |
| faith | 5 | 6 | 0.23 | | | | |

## Appendix E. Readability Tests Formulae

$$4.71 \left( \frac{characters}{words} \right) + 0.5 \left( \frac{words}{sentences} \right) - 21.43$$

**Automated Readability Index**

$$CLI = 0.0588L - 0.296S - 15.8$$

L is the average number of letters per 100 words and S is the average number of sentences per 100 words.

**Coleman–Liau Index**

$$206.835 - 1.015 \left( \frac{total\ words}{total\ sentences} \right) - 84.6 \left( \frac{total\ syllables}{total\ words} \right)$$

**Flesch Reading Ease**

$$0.39 \left( \frac{total\ words}{total\ sentences} \right) + 11.8 \left( \frac{total\ syllables}{total\ words} \right) - 15.59$$

**Flesch–Kincaid Readability Test**

$$0.4 \left[ \left( \frac{words}{sentences} \right) + 100 \left( \frac{complex\ words}{words} \right) \right]$$

**Gunning Fog Index**

$$grade = 1.0430 \sqrt{number\ of\ polysyllables \times \frac{30}{number\ of\ sentences}} + 3.1291$$

**SMOG**