

A Correspondence Analysis of Seventeen Japanese Historical English-as-a-Foreign-Language Textbooks

Ryohei Honda, Tomoo Asai and Kiyomi Watanabe
 Fukuyama Heisei University
 Fukuyama, Japan

Ozasa Toshiaki
 Hiroshima University (Professor Emeritus)
 Higashi-Hiroshima, Japan

Abstract. The present paper aims to quantitatively analyze the features of seventeen Japanese historical EFL (English as a Foreign Language) textbooks, Book 1, and their current counterpart, by using a correspondence analysis (henceforth CA), focusing on their similarities / differences. The following are the obtained results. First, the CA results proved capable of differentiating the features of the seventeen historical textbooks and their current counterpart quantitatively, specifying their similarities and differences. In particular, the CA map comprised of the two major dimensions specified indicated that both of the two dimensions, Dim 1 (difficult vs. easy texts) and Dim 2 (natural-sounding vs. artificial-sounding discourse) contributed to differentiating their inter-relationships. The locations of the eighteen textbooks on the CA map indicated that, while the feature of difficulty / easiness and that of naturalness / artificiality were closely related to each other with the seventeen historical textbooks, only the current one has the feature of easiness and that of naturalness at the same time. Second, the explaining categories (dimensions, axes) proved to be difficult vs. easy texts (Dim 1), natural-sounding vs. artificial-sounding discourse (Dim 2), passage-based vs. dialogue-based texts (Dim 3), teacher dominance vs. non teacher dominance (Dim 4), strictly-controlled vs. loosely-controlled texts (Dim 5), concise vs. redundant texts (Dim 6) and connected vs. disconnected contents (Dim 7). Third, the whole pictures of the relationships of the eighteen textbooks were described by a dendrogram, which visually summarized all of the features (similarities and differences) among the eighteen nominal variants in the present analysis. Finally, it was concluded that the results of the present study suggest that CA is a useful tool for describing, interpreting and diagnosing the features of Japanese EFL textbooks.

Keywords: Correspondence analysis; Japanese English textbooks; Corpora.

1. INTRODUCTION

It is to be noted first of all that the qualitative and quantitative analysis of Japanese historical English-as-a-foreign-language (henceforth EFL) textbooks is a narrow, limited area with very few researchers participating in developing and accumulating academic expertise in this field. This is probably because the research itself necessarily takes a time-consuming and energy-consuming process, which has to start with collecting relevant data scattered around and digitizing the collected historical data for quantitative analysis, transforming their graphic texts into digital corpora.

Presumably, Ozasa and Nakamura (2001) was the first academic contribution to the qualitative analysis of Japanese historical EFL textbooks in Japan, which, after presenting a bibliographical introduction of eight sets of Japanese historical EFL textbooks, depicted the contents of the eight sets based on a close reading of the texts. Ozasa (2003), an official research report of his team's collaborative work funded by the Japanese Scientific Research Grant, reported the results of the quantitative analyses of six historical EFL textbooks published from 1883 to 1932, conducted using two readability measuring tools, Flesch Reading Ease and Flesch-Kincaid Grade Level. It is to be noted in this respect that the readability measuring tools used in this study and the following ones, too, were widely known and globally used ones, i.e., Flesch Reading Ease and Flesch-Kincaid Grade Level.

Ozasa and Erikawa (Eds.) (2004) was a more comprehensive diachronic analysis of Japanese historical EFL textbooks, both qualitative and quantitative. In this study, sixteen sets of historical textbooks were described and qualitatively analyzed, covering most of the representative ones, and nine sets of textbooks, including H. E. Palmer's *The Standard English Readers*, were quantitatively analyzed in terms of lexical, grammatical and readability measures. The readability tools used in this analysis were also Flesch Reading Ease and Flesch-Kincaid Grade Level. Ozasa (2005), an official research report of his team's collaborative work funded by the Japanese Scientific Research Grant, reported the quantitative analyses of fourteen historical EFL textbooks published from 1861 to 1939, with two post-WW2 textbooks, *New Jack and Betty* (1952) and *Sunshine English Course* (1996) for comparison, conducted using two readability measuring tools, Flesch Reading Ease and Flesch-Kincaid Grade Level.

In 2007, various kinds of techniques were employed in the synchronic and diachronic analysis of EFL corpora. Nakamura and Ozasa (2007) analyzed two kinds of corpora, (1) fourteen EFL textbook series used in Japan across a span of 135 years and (2) five Asian EFL textbooks, in terms of gender awareness, the results of which contributed to proving that the authors of EFL textbooks in Japan, except for those aiming at women's education, seemed to have lacked gender awareness. Weir and Ozasa (2007) measured the naturalness of the discourse of three Japanese historical EFL textbooks as denoted by their appropriateness to the parts-of-speech profile represented by the American

English Brown corpus, the results of which suggested that all of the three textbook sets might be regarded as attaining a dimension of English naturalness.

Further, in this context, Weir and Ozasa (Eds.) (2007) and Weir and Ozasa (Eds.) (2008) compiled various kinds of synchronic and diachronic textbook studies using the techniques of corpus analysis, covering the areas of grammar, vocabulary, lexical collocation, semantics, readability, language acquisition, among others. Specifically, Ozasa, Umamoto, Matsuoka, and Motoooka (2008) reported on the diachronic comparison of the first year books of twenty-three historical EFL textbooks with their current counterpart for comparison, focusing on their overall tokens, types and new types, finding that older textbooks were generally higher than newer ones in the token / new type ratio. Matsuoka, Umamoto, Ozasa, and Motoooka (2008) reported on the diachronic comparison of the same set of EFL textbooks, focusing on the frequency of the past and the present forms of *be*-verbs and general verbs, finding that some textbooks in the Meiji Era (1868-1912), especially *Seisoku* (1889) and *Drill* (1907), laid the foundation of the grammar control in the Taisho (1915-1926) and Showa Era (1926-1989).

Also, Hosaka and his team reported a diachronic comparison of seven Japanese historical EFL textbooks, focusing on the occurrences of *to*-infinitive forms and of verbal forms. Hosaka, Abe, Uenishi, and Ozasa (2008), based on the findings of the diachronic comparison of *to*-infinitive, concluded that students mastered the three types of *to*-infinitive usage (noun, adverb and adjective usage) in the first grade before WW2, then started learning and mastering them in the second grade, and in the present textbooks, they are required to master the adjective usage in the third grade. Hosaka, Erikawa, Miura, and Ranjan (2008), based on the results of the diachronic comparison of verbal usage, proposed a hypothesis that H. E. Palmer, British applied linguist invited to Japan by the Japanese Government, was the first person to intentionally compile a grammar-based textbook in middle school in Japan.

George R. S. Weir, specialist in computer science and computer programming as well as in philosophy, put his high-tech expertise into practical use in the quantitative analysis of EFL textbook corpora. Weir and Ozasa (2008) computed and compared the frequency of individual words and multiword sequences (n-grams) across three Japanese historical EFL textbook corpora, the results of which revealed that *Jack and Betty*, a post-WW2 textbook, diverged more from the other two pre-WW2 textbook series in terms of n-gram frequencies. Weir and Ozasa (2009) performed a test of the assumption that the three sets of the above Japanese historical EFL textbooks exhibit priority of grammatical over vocabulary consideration, and found that there were discernible trends in verb usage which were strong evidence of grammar control across books in each textbook series. Weir and Ozasa (2010) reported on the application of computer-based text analysis tools, i.e., n-gram frequency, hapax legomena and Dolch word, in the diachronic comparison of the above three Japanese EFL textbook corpora, and suggested that their hypothesis that grammar control was prominent in the textbooks' design might be further explored by using other analysis tools like Posit.

In 2016, a new attempt was made in the EFL textbook corpus analysis in Kawamura, Umamoto, and Ozasa (2016), which was further followed by Kawamura, Umamoto, Matsuoka, and Ozasa (2017). In these, using the same textbook corpora as those of Ozasa and Erikawa (Eds.) (2004), new quantitative analyses were carried out by using a newly developed readability measuring tool attuned to the new Japanese EFL standard set up in the revised English course of study, i.e., Ozasa-Fukui Year Level, Ver. 3.4.2nhnc1-5 ($r^2=0.8802$) (Ozasa, Fukui, & Watanabe, 2015) and Ver. 3.5nhnc1-6 ($r^2=0.8912$) (Ozasa, Watanabe, & Fukui, 2016). The former study, based on a diachronic analysis of eight sets of Japanese historical EFL textbooks and their current counterpart in terms of readability, specified the readability levels of the nine sets and clustered them into three groups based on their measurement. The latter, based on the same approach with four sets, two Japanese middle school EFL textbooks for girls and two for boys, measured their readability, finding that the textbooks for girls were easier than the ones for boys in readability.

These studies were also followed by four related studies in 2017 and 2018, (1) Sakamoto, Watanabe, and Ozasa (2017), (2) Watanabe, Asai, and Ozasa (2017), (3) Honda, Watanabe, and Ozasa (2017), and (4) Ozasa, Kawamura, Umamoto, and Matsuoka (2018). In Sakamoto et al. (2017), a correspondence analysis was computed using five Japanese historical EFL textbooks and their current counterpart, the results of which proved CA to be powerful enough to quantitatively analyze, interpret and clarify the characteristic features, similarities and differences among the six textbooks, specifying four explaining categories (dimensions or axes), i.e., natural vs. drill centered (Dim 1), concise vs. redundant (Dim 2), difficult vs. easy (Dim 3) and monologue vs. multilogue (Dim 4). Watanabe et al. (2017) performed the same type of corpus analysis, using five different Japanese historical EFL textbooks and two of their current counterparts, the results of which proved that CA was able to quantitatively analyze, interpret and clarify the characteristic features, similarities and differences among the seven textbooks, specifying four explaining categories, easy vs. difficult (Dim 1), story vs. collection (Dim 2), concise vs. redundant (Dim 3) and monologue vs. multilogue (Dim 4).

In Honda et al. (2017), the same type of correspondence analysis was carried out using nine Japanese historical EFL textbooks and their current counterpart, in order to specify and classify their features, the results of which proved that CA was able to specify five criteria or dimensions, i.e., difficult vs. easy (Dim 1), drill-centered vs. natural (Dim 2), multi-viewpoints vs. single viewpoint (Dim 3), redundant vs. concise (Dim 4) and children's vs. adults' viewpoint (Dim 5). These findings were summarized by a nine-dimension-based dendrogram as well as a two-major-dimension-based coordinate representation. Finally, in Ozasa et al. (2018), a correspondence analysis was computed by using four Japanese historical EFL textbooks and their current counterpart, with the same aim as in the above analyses. The results of the analysis revealed that the five textbooks could be explained by four criteria or dimensions, natural vs. drill centered (Dim 1), easy vs. difficult (Dim 2), focused vs. unfocused (Dim 3) and varied vs. single practice type (Dim 4), and these findings were displayed by a

four-dimension-based radar gram as well as a two-major-dimension-based coordinate representation.

It is worthy of note that the results of all of these five studies proved that the new statistic tool, correspondence analysis, was powerful enough to specify distinctive features and to classify the EFL textbooks analyzed based on the specified distinctive features. In particular, in Honda et al. (2017) CA proved capable of discriminating a relatively large number of variants (ten variants, in this case) and classifying the nine historical EFL textbooks based on the distinctive features specified by the CA.

The present study, motivated by the same awareness and goals as in the preceding ones, especially by those of Honda et al. (2017), aims to quantitatively analyze and classify a relatively large number of historical EFL textbooks, seventeen textbooks and their current counterpart, from a new perspective, using a CA technique.

2. AIM

The present paper aims to quantitatively describe and explain the features of seventeen Japanese historical EFL textbooks and their current counterpart, by using CA, focusing on their similarities / differences. The following are the research questions of the present paper:

1. How similar / different in contents are the seventeen Japanese historical EFL textbooks and their current counterpart to / from each other?
2. What kinds of dimensions explain the similarities / differences among the eighteen textbooks?
3. To what extent can the whole picture of the relationship among the eighteen EFL textbooks be displayed in its entirety?

The textbooks used in the present CA were seventeen historical EFL textbooks published during the period from 1861 to 1952, and a currently used EFL textbook, which was included in the present analysis for comparative purposes. The following are brief comments on the contents of the eighteen textbooks which are primarily based on Ozasa and Erikawa (Eds.) (2004).

(1) *Standard Choice Readers*, 1 (Shobido Editorial, 1902, Shobido, 5 Vols.) (Henceforth *Choice-1*.) Materials were chosen for this textbook from the four well-known EFL textbooks in those days, *Union*, *National*, *Longmans'* and *Swinton's Readers*, and used as a standard textbook attuned to the English Course of Study proclaimed by the Department of Education in those days. Main teaching / learning method used was to *retranslate* important expressions and sentences, i.e., to translate Japanese into English after translating first from Japanese into English. It seems to reflect an EFL teaching situation during the

transition era from imported-textbook days to made-in-Japan-textbook days (Kawamura et al., 2017).

(2) *English Readers: The High School Series, 1* (Education Department, Japan [W. Dening], 1887, Education Department Publishing, Japan, 6 Vols.) (Henceforth *Dening-1*.) Dening, a Japanologist, authored this textbook so that Japanese students can “cultivate their personality” through learning English by reading their familiar topics. It contained history, legends, records of ancient matters, and anecdotes in Japan and China. This textbook is expected to help reduce learners’ burden in understanding cultural diversity and explaining Japanese culture overseas. Japanese learners might have found the ‘no-grammar-control’ textbook quite difficult to learn.

(3) *New English Drill Books, 1* (Kenjiro Kumamoto, 1907, Kaiseikan, 5 Vols.) (Henceforth *Drill-1*.) This textbook seems to reflect the author’s unique educational principle that teachers themselves should write their textbook to make it helpful for their students and should refine and complete it through its modification based on their own teaching experiences in the classroom. We teachers will find many kinds of inventive ideas and techniques in this textbook. For example, at the beginning part of the text, the rules of English spelling and pronunciation are fully explained in detail. Sentence structures are introduced step by step from easy to difficult patterns. In this system, students are provided with many chances to ‘speak’ English in the classroom situation.

(4) *The Globe Readers, 1* (Yoshisaburo Okakura, 1907, Dainippon Tosho, 5 Vols) (Henceforth *Globe-1*.) Okakura, one of the most notable theorists on EFL education in Japan, wrote this textbook to fulfill his goal in formal education in Japan. His editorial intention was two-fold. First, EFL textbooks should help develop many kinds of knowledge or awareness through learning English. Second, it should help develop knowledge about English and American scenes and manners, awareness about linguistic structures, and the like. Okakura tried to help learners develop their reading proficiency under the scheme of formal EFL education in Japan in those days.

(5) *Shogakko Eigo Shin Tokuhon, 1* [New Primary School English Readers, 1] (Jukkichi Inoue, 1902, Kinkodo, 4 Vols.) (Henceforth *Inoue-p1*.) After graduating from Keio Gijuku University and Kings College, London, Inoue taught English at Tokyo High Commercial School (forerunner of Hitotsubashi University), etc. and then worked as a translator for the Foreign Ministry. He authored the EFL textbook for primary school pupils as well as Inoue’s English Grammar. This textbook valued repeated practices on daily topics to help learners acquire basic patterns of English sentences. The frequent references to dogs in this textbook might be reflecting the author’s personal experience in England.

(6) *New Jack and Betty: English Step by Step, 1* (K. Hagiwara, M. Inamura & K. Takezawa, 1952, Kairyudo, 3 Vols.) (Henceforth *Jack & Betty-1*.) The present version of *Jack & Betty-1* was a revised edition of its former version, attuned to the new Course of Study revised in 1951. It was the most popular textbook among junior high school students, probably because it depicted boys’ and girls’ daily life in U. S. A. through dialogues. Its high learnability was also confirmed

through the quantitative analysis of the grammar, vocabulary and readability of this book.

(7) *Shogakko Eigo Tokuhon, 1* [Primary School English Readers, 1] (Naibu Kanda, 1901, Sanseido, 4 Vols.) (Henceforth *Kanda-p1*.) The author, Kanda (Baron, member of the aristocracy), after graduating from Amherst College, taught at Tokyo Imperial University, Tokyo High Commercial School (forerunner of Hitotsubashi University), etc. It could be characterized as a natural-sounding, authentic discourse in spite of its inevitable repetitive nature in a primer texts.

(8) *Kanda's New Series of English Readers (Revised Edition), 1* (Naibu Kanda, 1903, Sanseido, 5 Vols.) (Henceforth *Kanda-1*.) The author, counted as one of the three greatest scholars of English in Japan in those days, with H. Saito and J. Inoue, wrote a number of EFL textbooks. This textbook is characterized by its emphasis on training four skills (listening, speaking, reading and writing) and on Japanese-into-English translation (Kawamura et al., 2017).

(9) *Shogakko Mombusho Eigo Tokuhon, 1* [Education Department English Readers for Primary School, 1] (English Department [ed.], 1908, Joint Sales Agency for National Textbooks, 3 Vols.) (Henceforth *Mombusho-p1*.) Although there was no clear statement about its author, it is generally said to be Eiji Asada who was then a professor at Tokyo University of Foreign Languages. It was published as a national textbook for higher primary schools and about 400,000 copies were said to be sold. Its teachers' guide says that in the classroom it has to be introduced aurally first, then practiced through oral practice and reading, and finally consolidated through writing.

(10) *New National Readers, 1* (C. J. Barnes, 1883, A. S. Barnes & Co., 5 Vols.) (Henceforth *National-1*.) Originally written for American primary school pupils and published in U. S. A., this textbook was imported to Japan as an EFL textbook for middle-grade schools. This was not only highly evaluated and widely accepted in middle schools in Japan in those days but still is, because it was well-designed and well-written. Specifically, its contents and readability were so well designed that vocabulary and grammatical items could be learned gradually from easy to difficult items. Regrettably, for non-native-speaker learners like Japanese, the goal set up in there, i.e., to help develop learners' ability to read long literary works, was too high to achieve.

(11) *Girls' Pacific Readers, 1* (Torajiro Sawamura, 1939, Kairyudo, 5 Vol.) (Henceforth *Pacific-1*.) A set of five textbooks, 1-5, written and edited for girl students at girls' normal school and girls' middle-grade schools. In selecting subjects and themes, priority is placed on those related to females' interest and life, such as housing, food and clothing, especially on clothing and accessories, and on stories about heroines such as Alice in Wonder Land, Madam Curie, etc. (Kawamura et al., 2017).

(12) *Seisoku Mombusho Eigo Tokuhon, 1* [Education Department English Reader, A Regular Way, 1] (Education Department, Japan, 1889, Education Department Publishing, Japan, 5 Vols.) (Henceforth *Seisoku-1*.) Not officially stated, this textbook is said to have been written by Shoich Toyama, a later Minister of

Education. It was historically noted as a textbook published to improve the rampant irregular way of English teaching and learning in Japan, which primarily encouraged oral practice of grammatical patterns.

- (13) *The Standard English Readers*, 1 (H. E. Palmer, 1926, Institute for Research in English Teaching, Japan, 5 Vols.) (Henceforth Standard(p)-1.) Palmer, a British expert in phonetics and applied linguistics, was invited to Japan by the Japanese government to improve the EFL teaching at middle-grade schools in Japan. Aiming at learners' developing a habit of "thinking in English," Palmer compiled a textbook which focused on the development of balanced four skills based on his Oral Method. It contained a wide scope of topics and various styles or genres of English.
- (14) *The Standard English Readers*, 1 (Tsuneta Takehara, 1932, Taishukan, 5 Vols.) (Henceforth Standard(t)-1.) Takehara, Ph.D. (New York University), developed an EFL textbook for Japanese learners based on the outcome of the frequency count of English vocabulary, especially on the selection and gradation of English vocabulary. Specifically, the contents of lexical items, pronunciation items and topics were carefully selected and graded based on a statistically analyzed word frequency list.
- (15) *Sunshine English Course*, 1 (M. Niizato, Y. Sato, T. Yamaoka & Y. Takanashi, 2012, Kairyudo, 3 Vols.) (Henceforth Sunshine-1.) A set of three textbooks, 1-3, written for junior high school students and authorized by the Ministry of Education. This textbook is chosen in the present study as a representative of current Japanese EFL textbooks since it is published by the publisher of *Jack and Betty*, a textbook that won sweeping popularity among both students and teachers after WW2.
- (16) *Girls' New Taisho Readers*, 1 (Umeko Tsuda & Kenjiro Kumamoto, 1916, Tokyo Kaiseikan, 4 Vols.) (Henceforth Taisho-1.) This textbook was developed for middle-grade girl students, by Umeko Tsuda, founder of Tsuda English School, the forerunner of Tsuda University, and her colleague, Kenjiro Kumamoto. Its contents are mainly focused on girls' education such as manners for ladies, women's biographies like Hellen Keller (Kawamura et al., 2017).
- (17) *Tsuda English Readers*, 1 (Joshi Eigaku Juku [English College for Women], 1931, Sanseido, 4 Vols.) (Henceforth Tsuda-p1.) Authored by a team led by U. Tsuda, founder of Tsuda University, this textbook depicted school environment, family and daily life of American / English families in grammatically and lexically controlled simple English. Although it was primarily meant to be an EFL textbook for primary school pupils, it was said that this textbook was not only used at primary schools but at normal schools, women's high schools and vocational schools, too.
- (18) *Sanders' Union Readers*, 1 (Charles Walton Sanders, 1861, Ivison, Blakeman, Taylor & Co., 5 Vols.) (Henceforth Union-1.) Originally, written and published in U. S. A. as an English textbook for native speakers, this textbook was imported to Japan as an EFL textbook for middle schools. It was authorized formally as an EFL textbook for the first time in the history of English language

teaching in Japan, and was used in middle schools in those days. It was gradually understood, however, that imported English textbooks such as *Union* were too difficult for non-native EFL learners in the non-English speaking environments like Japan.

Through this analysis, we hope to quantitatively clarify the similarities / differences and relationships among the seventeen Japanese historical EFL textbooks and their current counterpart.

3. METHOD

CA is a method which allows us to grasp visually the relationships among texts through reducing complex linguistic data of the texts to simplified Dimensions (Dims) and making a CA map whose x-axis and y-axis are Dim 1 and Dim 2 (Ishikawa, Maeda, and Yamazaki [Eds.], 2010, pp. 245-246). The present study employed a one-way CA model with eighteen nominal variants, in order to explore the relationships among the eighteen Japanese EFL textbooks, including a currently used junior-high school EFL textbook.

First, a cross tabulation table of the above-mentioned eighteen textbooks was prepared as a basic datum for the present CA, using the eighteen textbook corpora. This is practically a cross-textbook word-frequency table, which was made using *AntConc*, a vocabulary processing tool. In this frequency table the most frequent 100 words (content words and function words) were picked up from the frequency list and their frequency values were placed for each of the textbooks. (Since the eighteen kinds of 100-word frequency lists were incorporated into one cross-frequency word table, the number of words of the cross tabulation table was more than 100.)

Then, using the digital datum of the cross tabulation table, a CA was carried out by using Fukui's *College Analysis*, a statistics computer program developed for social studies by Masayasu Fukui, professor of applied mathematics at Fukuyama Heisei University, Japan. In evaluating and interpreting the results of the analysis, some of the ideas and techniques developed in Tono (2000) and Clausen (1998/2015) were used for reference where they were deemed relevant and appropriate to the topics dealt with in the present paper.

4. RESULTS AND DISCUSSION

Table 1 shows the basic statistics of the present CA, i.e., the eigenvalues, coefficient correlations, contribution rates and cumulative contribution rates of the analysis. As the contribution rate indicates in Table 1, the distinctive features of the eighteen nominal variants (textbooks) were explained 21% by the first dimension, 19.7% by the second dimension, 13.5% by the third dimension, 9.1% by the fourth dimension, 6.9% by the fifth dimension, 5.1% by the sixth dimension and 4.6% by the seventh dimension, the cumulative contribution rate being 80% on the seventh dimension. This means that at least seven dimensions should be included in the analysis and interpretation of the present results.

Table 1: Basic CA Data, 18 Textbooks

	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6
Eigenvalue	0.097	0.09	0.062	0.042	0.032	0.024
Correlation	0.311	0.301	0.249	0.204	0.178	0.153
Contribution rate	0.21	0.197	0.135	0.091	0.069	0.051
Cumulative contribution rate	0.21	0.407	0.542	0.633	0.702	0.753
	Dim 7	Dim 8	Dim 9	Dim 10	Dim 11	Dim 12
Eigenvalue	0.021	0.019	0.017	0.012	0.009	0.009
Correlation	0.146	0.139	0.13	0.111	0.097	0.095
Contribution rate	0.046	0.042	0.037	0.027	0.021	0.02
Cumulative contribution rate	0.8	0.841	0.878	0.905	0.926	0.945
	Dim 13	Dim 14	Dim 15	Dim 16	Dim 17	
Eigenvalue	0.008	0.007	0.005	0.004	0.001	
Correlation	0.09	0.081	0.072	0.065	0.033	
Contribution rate	0.018	0.014	0.011	0.009	0.002	
Cumulative contribution rate	0.963	0.977	0.988	0.998	1	

Table 2 shows the values of the eighteen textbooks on the seven dimensions and Table 3 and Figure 1 show the CA results of the eighteen textbooks on Dim 1, as a description of the relationships among the eighteen variants. As it is clear in Table 3 and Figure 1, on the first dimension, the value is the highest for *Dening-1* (1.396), the second highest for *Union-1* (1.11) and the third highest for *National-1* (0.782), while it is the lowest for *Sunshine-1* (-3.714), the second lowest for *Kanda-1* (-0.831) and the third lowest for *Kanda-p1* (-0.406), the following three variants, i.e., *Standard(p)-1* (0.024), *Tsuda-p1* (0.083) and *Dril-1* (-0.133) coming in between the two poles around the zero point. In decreasing order, the eighteen textbooks were: *Dening-1* > *Union-1* > *National-1* > *Choice-1* > *Standard (t)-1* > *Inoue-p1* >

Seisoku-1 > Globe-1 > Tsuda-p1 > Standard(p)-1 > Drill-1 > Taisho-1 > Pacific-1 > Mombusho-p1 > Jack & Betty-1 > Kanda-p1 > Kanda-1 > Sunshine-1 .

Table 2: Values of Eighteen Textbooks on Seven Dimensions

	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6	Dim 7
Choice-1	0.718	0.613	-1.186	-0.321	-0.551	-0.509	1.496
Dening-1	1.396	1.62	1.282	-1.726	0.747	-0.262	-1.47
Drill-1	-0.113	-0.382	0.595	1.017	-0.309	1.473	1.088
Globe-1	0.337	0.271	0.729	-0.673	-0.885	1.542	-0.757
Inoue-p1	0.524	0.004	-2.594	1.217	-0.251	0.323	-1.821
Jack & Betty-1	-0.36	-0.268	0.774	0.834	0.299	0.361	0.456
Kanda-p1	-0.406	-1.95	-1.002	-2.35	1.583	1.232	0.061
Kanda-1	-0.831	-1.668	0.008	-0.636	-0.233	-2.967	0.08
Mombusho-p1	-0.335	-0.726	0.303	0.46	-0.779	0.878	1.385
National-1	0.782	0.835	-1.132	-0.281	-0.628	-0.487	1.658
Pacific-1	-0.238	-0.8	0.838	0.657	-0.578	-0.712	-0.696
Seisoku-1	0.382	0.369	0.28	1.602	3.166	-0.261	0.299
Standard(p)-1	0.024	-0.123	0.701	-0.146	-0.915	0.648	-0.913
Standard(t)-1	0.569	0.523	0.587	-0.411	-0.073	-0.168	0.219
Sunshine-1	-3.714	2.295	-0.451	-0.426	0.181	0.025	-0.183
Taisho-1	-0.186	-0.583	0.312	0.315	-0.85	-0.381	-0.976
Tsuda-p1	0.083	-0.295	0.879	0.792	0.156	-0.582	-0.451
Union-1	1.11	1.078	0.134	-0.712	-0.096	-0.698	0.453

Table 3: Values of Eighteen Textbooks on Dim 1

	Dim 1
Dening-1	1.396
Union-1	1.11
National-1	0.782
Choice-1	0.718
Standard(t)-1	0.569
Inoue-p1	0.524
Seisoku-1	0.382
Globe-1	0.337
Tsuda-p1	0.083
Standard(p)-1	0.024
Drill-1	-0.113
Taisho-1	-0.186
Pacific-1	-0.238
Mombusho-p1	-0.335
Jack & Betty-1	-0.36
Kanda-p1	-0.406
Kanda-1	-0.831
Sunshine-1	-3.714

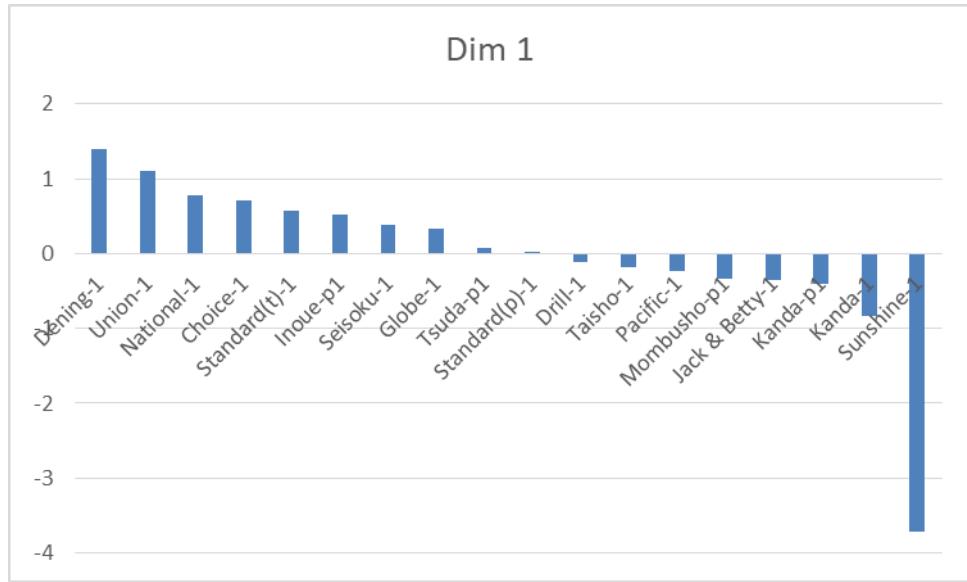


Figure 1: Values of Eighteen Textbooks on Dim 1

The differences / similarities among the eighteen textbooks on the first dimension could clearly be explained by the category of difficult (+) vs. easy (-) texts; in *Dening-1*(the highest), *Union-1*(the second highest), *National-1* (the third highest) and the other high-scoring textbooks, the texts were difficult since the grammatical and lexical items were not strictly controlled there, while in *Sunshine-1* (the lowest) and the other low-scoring textbooks, the texts were easy since they were written using a small, limited number of basic grammatical and lexical items in every lesson.

For example, when the following two pieces taken from the two contrasting textbooks, *Dening-1* and *Sunshine-1*, are compared, it is obvious that in *Dening-1* the text sounds more natural and therefore more challenging for fresh EFL learners and their readability is contrastively high while *Sunshine-1* uses easy and basic patterns repeatedly. For this reason, the first dimension was termed difficult vs. easy texts. The contribution rate of the first dimension was 21%, covering approximately one-fifth of the whole contribution.

"One night, when Toyotomi Hideyoshi was conversing with his friends, he put the following question to them: "What is the thing most to be feared on earth?" Those who were present said that there was nothing to be so much feared as one's superiors. Among them, however, there was one who held a different opinion. He was called Bannai. Bannai here interposed: "To my mind there is nothing that need give us less concern than our superiors. That which is most to be feared is our own want of judgment." (Dening-1, Lesson 14 [14th/29 lessons]) (The most difficult)

"How many CDs do you have?

Well, about one hundred.

So many!

Is that your schedule?

Yes. We have some Japanese classes every week.

Really? Oh, you don't have any classes on Saturdays"

(*Sunshine-1*, Program 7 [7th/11 programs]) (The easiest)

It is to be noted at this stage that this CA readability judgment is not a direct, measurement-based estimation like readability measurement but an indirect one based on a highly advanced correlation-based mathematical processing of cross-frequency tabulation of the top one-hundred words of the eighteen textbooks. In order to ascertain the degree of accuracy of this CA estimation, the degree of readability of the eighteen textbooks were actually measured using the newest readability measuring tool, Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6, and the results were compared with the present CA results.

Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6 is a readability measuring tool jointly developed in Japan by T. Ozasa (one of the authors of the present paper) and M. Fukui (developer of a statistic application tool, *College Analysis* used in the present analysis) for Japanese EFL teachers and educators. The function equation (NewDiff) of Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6 was as follows, where *Words* stands for number of words in a sentence, *Syllables* number of syllables in a word, *WordDiff* difficulty of a word, and *IdiomDiff* difficulty of an idiom and its prediction rate turned out to be .8912 (Ozasa et al., 2016, p. 392).

$$\text{NewDiff} = 5.2565 * \exp(-19.1656 * 0.4398^{\wedge} \text{Diff}) + 1 \quad (r^2 = 0.8912)$$

$$\text{Diff} = 0.0924 * \text{Words} + 0.5862 * \text{Syllables} + 1.8296 * \text{WordDiff} + 0.0615 * \text{IdiomDiff} - 0.3073$$

$$(r^2 = 0.4986)$$

Words: number of words in a sentence

Syllables: number of syllables in a word

WordDiff difficulty of a word

IdiomDiff difficulty of an idiom

In this system, *WordDiff* was defined as the year of a textbook in which a particular word appeared for the first time and *IdiomDiff* as the year of a textbook in which a particular idiom appeared for the first time. It has to be noted that this is a two-step development process comprised of (1) liner function development (development of *Diff*) and (2) non-linear function development (development of *NewDiff*), the combination of which we believe contributed to its fairly high validity with its powerful prediction rate ($r^2=.8912$).

Table 4: Readability Measured by OFYL

Textbooks	O-FYL
Union-1	6.99
Dening-1	6.62
National-1	3.39
Choice-1	3.33
Globe-1	3.26
Standard(t)-1	3.16
Seisoku-1	3.15
Standard(p)-1	3.12
Taisho-1	3.04
Pacific-1	2.52
Tsuda-p1	2.07
Drill-1	1.91
Kanda-1	1.87
Mombusho-p1	1.75
Sunshine-1	1.63
Jack & Betty-1	1.58
Inoue-p1	1.45
Kanda-p1	1.18

Table 4 and Figure 2 show the readability values of the eighteen textbooks measured by Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6. In order to examine the degree of correspondence between the two measurements, the Dim 1 estimation and the Ozasa-Fukui Year Level estimation, a rank correlation coefficient or Spearman's rho was computed between them. The correlation coefficient yielded proved to be .804 ($p< .001$), which seems to be a fairly satisfactory degree of correspondence in rank order.

It could be stated that the indirect readability estimation of the CA is fairly accurate, on two grounds. First, the accuracy rate (prediction rate, r^2) of Ozasa-Fukui Year Level, Ver. 5nhnc1-6 is .8912 or 89.12%, which means that there are about 11% chances of errors in its estimation itself (Ozasa et al., 2016; Kawamura et al., 2017, p. 74). Second, the nine corpora used in the two analyses were not the same in the strict sense of the word; in the present CA, the whole corpora were used without any kinds of modification, while in the direct readability measurement, the corpora were "cleaned" or processed, in which unnecessary, irrelevant parts of the passages were deleted so that only "normal" sentences could be measured. All of these facts considered, it must be concluded, the estimation of the present CA judgment of the eighteen corpora is surprisingly accurate, accurate enough for the purpose of the present study.

This conclusion or the judgment of the Dim 1 results could be generalized to the judgments of the other six dimensions (Dims 2 to 7); although they are indirect estimation of the textbook features, it could be reasonably accurate and trustworthy estimation and interpretation of their features for the purpose of the present study.

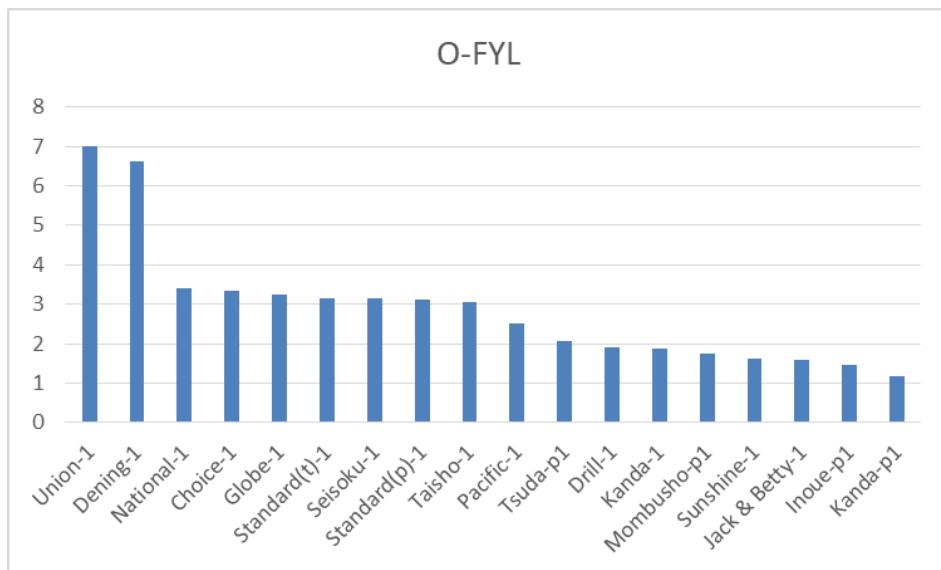


Figure 2: Readability Measured by OFYL

Table 5: Values of Eighteen Textbooks on Dim 2

	Dim 2
Sunshine-1	2.295
Dening-1	1.62
Union-1	1.078
National-1	0.835
Choice-1	0.613
Standard(t)-1	0.523
Seisoku-1	0.369
Globe-1	0.271
Inoue-p1	0.004
Standard(p)-1	-0.123
Jack & Betty-1	-0.268
Tsuda-p1	-0.295
Drill-1	-0.382
Taisho-1	-0.583
Mombusho-p1	-0.726
Pacific-1	-0.8
Kanda-1	-1.668
Kanda-p1	-1.95

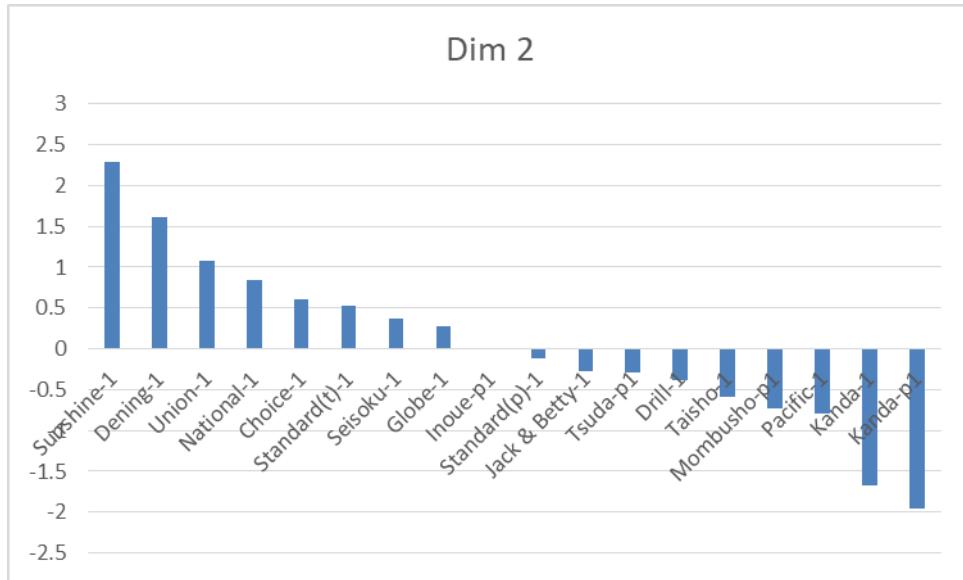


Figure 3: Values of Eighteen Textbooks on Dim 2

On the second dimension, as it is clear in Table 5 and Figure 3, the value is the highest for *Sundhine-1* (2.295), the second highest for *Dening-1* (1.62) , while it is the lowest for *Kanda-p1* (-1.95) and the second lowest for *Kanda-1* (-1.668), *Inoue-p1* being around the zero point. In decreasing order, the eighteen textbooks were: *Sunshine-1* > *Dening-1* > *Union-1* > *National-1* > *Choice-1* > *Standard(t)-1* > *Seisoku-1* > *Globe-1* > *Inoue-p1* > *Standard(p)-1* > *Jack & Betty-1* > *Tsuda-p1* > *Drill-1* > *Taisho-1* > *Mombusho-p1* > *Pacific-1* > *Kanda-1* > *Kanda-p1*.

The differences / similarities of values among the eighteen textbooks on the second dimension could best be explained by the category of natural-sounding (+) vs. artificial-sounding (-) discourse. As it is clear in the following examples, in *Sunshine-1* (the highest), *Dening-1* (the second highest), *Union-1* (the third highest), and other high-scoring ones, the discourses sound all natural in tone. In contrast, in *Kanda-p1* (the lowest), *Kanda-1* (the second lowest) and other low-scoring ones, the discourses sound all less-natural or artificial. In other words, *Kanda-1* and other low-scoring ones observe the principle of ‘pattern drill first’, while *Sunshine-1* and other high-scoring ones observe the principle of free communication as a basic strategy for the EFL textbook organization. For this reason, the second dimension was termed natural-sounding vs. artificial-sounding discourse.

“*What is this? It is a knife. What are these? They are knives. What are these? They are birds. What birds are these? They are cranes. What are these trees? They are pine trees and willow trees.*” (*Kanda-p1*, Lesson 15 [15th/30 lessons]) (The most artificial-sounding discourse)

"I am a teacher. You are a pupil. You are all pupils. Who are you?

I am Yamada Goro. What are you? I am a pupil of this school. We are all pupils.

You are a school-boy. You are all school-boys. You have a sister, Tanaka. She is a school-girl. I have two sisters. They are both school-girls.

What is your elder brother, Hayashi? He is a student of the Law College." (Kanda, Lesson 11 [11th/20 lessons]) (The second most artificial-sounding discourse)

"Wow! London is a wonderful city.

Yes. We have a lot of interesting places. Look! That's Matt.

Hi, Matt. Judy always talks about you.

Matt is a Sherlock Holmes fan. He knows a lot about Sherlock Holmes.

Let's go to Baker Street by tube." (Sunshine-1, Program 6 [6th/11 programs]) (The most natural-sounding discourse)

"One night, when Toyotomi Hideyoshi was conversing with his friends, he put the following questions to them: "What is the thing most to be feared on earth?" Those who were present said that there was nothing to be so much feared as one's superiors. Among them, however, there was one who held a different opinion." (Dening-1, Lesson 14 [14th/29 lessons]) (The second most natural-sounding discourse)

On the third dimension, as it is clear in Table 6 and Figure 4, the value is the highest for *Dening-1* (1.282) and the second highest for *Tsuda-p1* (0.879), and the lowest for *Inoue-p1* (-2.594), the second lowest for *Choice-1* (-1.186), *Kanda-1* and others coming in between them. In decreasing order, the eighteen textbooks were: *Dening-1* > *Tsuda-p1* > *Pacific-1* > *Jack & Betty-1* > *Globe-1* > *Standard(p)-1* > *Drill-1* > *Standard(t)-1* > *Taisho-1* > *Mombusho-p1* > *Seisoku-1* > *Union-1* > *Kanda-1* > *Sunshine-1* > *Kanda-p1* > *National-1* > *Choice-1* > *Inoue-p1*.

The differences / similarities among these five textbooks could best be explained by the category of passage-based (+) vs. dialogue-based (-) textbooks. *Dening-1* (the highest), *Tsuda-p1* (the second highest), and other high-scoring ones, without exceptions, consist of expository passages throughout their texts. On the contrary, *Inoue-1* (the lowest), *Choice-1* (the second lowest) and other low-scoring ones consist of dialogues throughout their text. The contribution rate of

the third dimension was 0.135, covering only the 13.5% of the whole contribution.

Table 6: Values of Eighteen Textbooks on Dim 3

	Dim 3
Dening-1	1.282
Tsuda-p1	0.879
Pacific-1	0.838
Jack & Betty-1	0.774
Globe-1	0.729
Standard(p)-1	0.701
Drill-1	0.595
Standard(t)-1	0.587
Taisho-1	0.312
Mombusho-p1	0.303
Seisoku-1	0.28
Union-1	0.134
Kanda-1	0.008
Sunshine-1	-0.451
Kanda-p1	-1.002
National-1	-1.132
Choice-1	-1.186
Inoue-p1	-2.594

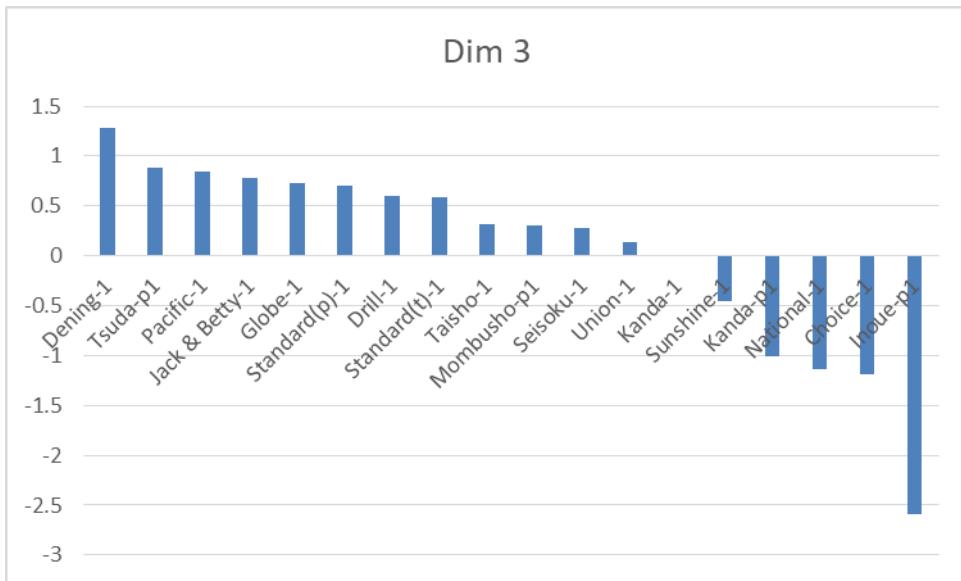


Figure 4: Values of Eighteen Textbooks on Dim 3

On the fourth dimension, as it is clear in Table 7 and Figure 5, the value is the highest for *Seisoku-1* (1.602), the second highest for *Inoue-p1* (1.217) and the third highest for *Drill -1* (1.017), while it is the lowest for *Kanda-p1* (-2.35), the second

lowest for *Dening-1* (-1.726) and the third lowest for *Union-1* (-0.712), the other textbooks being between them. In decreasing order, the eighteen textbooks were: *Seisoku-1* > *Inoue-p1* > *Drill-1* > *Jack and Betty-1* > *Tsuda-p1* > *Pacific-1* > *Mombusho-p1* > *Taisho-1* > *Standard(p)-1* > *National-1* > *Choice-1* > *Standard(t)-1* > *Sunshine-1* > *Kanda-1* > *Globe-1* > *Union-1* > *Dening-1* > *Kanda-p1*.

The differences / similarities among these eighteen textbooks could best be explained by the category of teacher dominance (+) vs. non teacher dominance (-). As it is clear in the following example cited from *Seisoku-1* (the highest), almost all texts are comprised of dialogs in which a teacher or a superior dominates pupils or inferiors in the whole linguistic activity, while in *Kanda-p1* (the lowest), *Dening-1* (the second lowest) and other low-scoring textbooks there were few such features observed in the texts. For this reason, the fourth dimension was termed teacher dominance vs. non teacher dominance. The contribution rate of the fourth dimension was 0.091, covering only the 9.1% of the whole contribution.

"To be learnt by Sight and by Heart

<i>The teacher.</i>	<i>The student.</i>
<i>What is this?</i>	<i>What is this?</i>
<i>What is this?</i>	<i>What is this?</i>
<i>What is this?</i>	<i>What is this?"</i>

(*Seisoku-1*, Lesson 1 [1st/21 lessons]) (The most teacher-dominant)

Table 7: Values of Eighteen Textbooks on Dim 4

	Dim 4
<i>Seisoku-1</i>	1.602
<i>Inoue-p1</i>	1.217
<i>Drill-1</i>	1.017
<i>Jack & Betty-1</i>	0.834
<i>Tsuda-p1</i>	0.792
<i>Pacific-1</i>	0.657
<i>Mombusho-p1</i>	0.46
<i>Taisho-1</i>	0.315
<i>Standard(p)-1</i>	-0.146
<i>National-1</i>	-0.281
<i>Choice-1</i>	-0.321
<i>Standard(t)-1</i>	-0.411
<i>Sunshine-1</i>	-0.426
<i>Kanda-1</i>	-0.636
<i>Globe-1</i>	-0.673
<i>Union-1</i>	-0.712
<i>Dening-1</i>	-1.726
<i>Kanda-p1</i>	-2.35

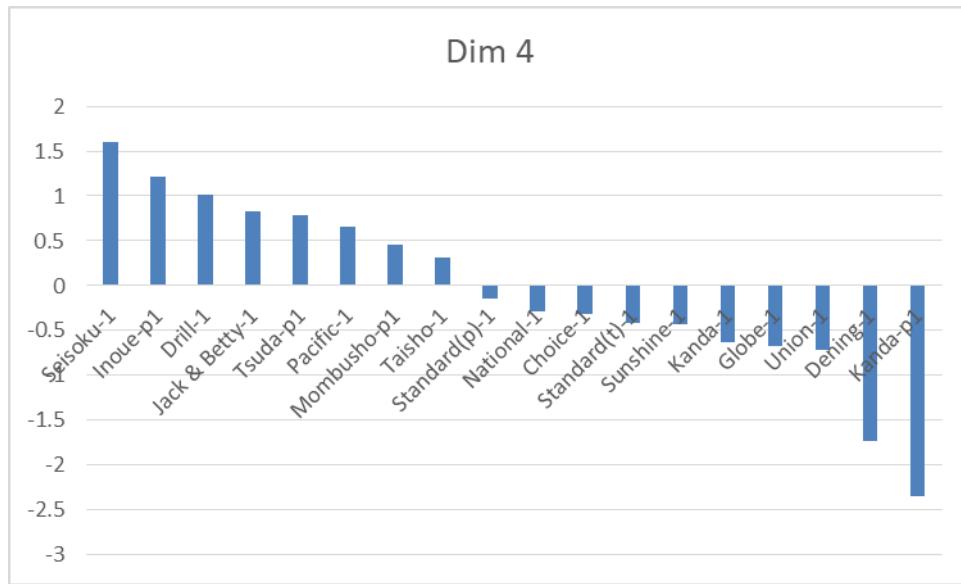


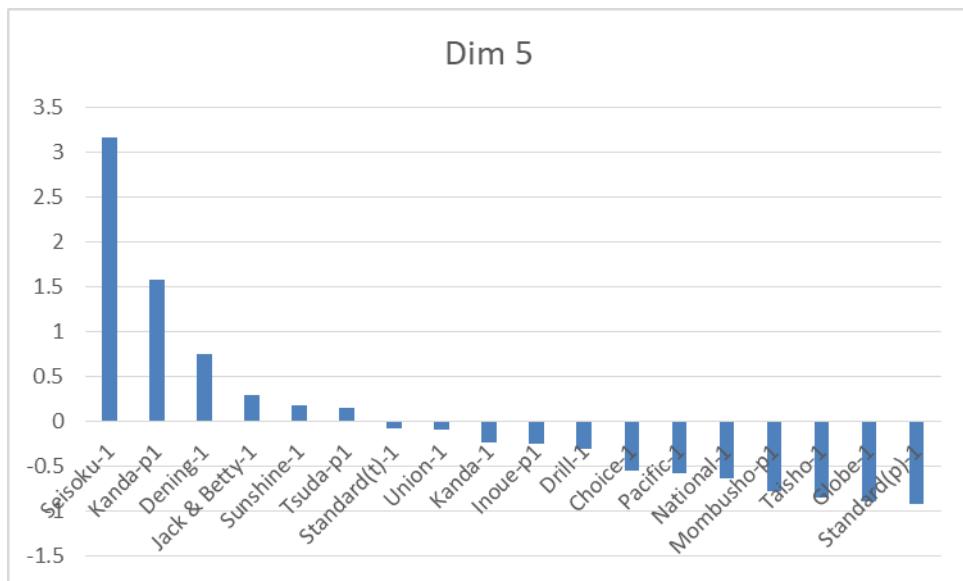
Figure 5: Values of Eighteen Textbooks on Dim 4

On the fifth dimension, as it is clear in Table 8 and Figure 6, the value is the highest for *Seisoku-1* (3.166), the second highest for *Kanda-p1* (1.583), and the lowest for *Standard(p)-1* (-0.915) and the second lowest for *Globe-1* (-0.885), the others coming in between them. In decreasing order, the ten textbooks were: *Seisoku-1* > *Kanda-p1* > *Dening-1* > *Jack & Betty-1* > *Sunshine-1* > *Tsuda-p1* > *Standard(t)-1* > *Union-1* > *Kanda-1* > *Inoue-p1* > *Drill-1* > *Choice-1* > *Pacific-1* > *National-1* > *Mombusho-p1* > *Taisho-1* > *Globe-1* > *Standard(p)-1*.

The difference of the values among the eighteen textbooks could best be explained by the category of strictly-controlled (+) vs. loosely-controlled (-) texts; in *Seisoku* (the highest), *Kanda-p1* (the second highest), and other high-scoring ones, linguistic items were strictly controlled so that a small number of grammatical and lexical items were selected, graded and carefully presented in the text / discourse for each lesson or unit, while in *Standard(p)-1* (the lowest) and *Globe-1* (the second lowest), and other low-scoring ones this kind of linguistic control is rather loosely observed, giving more freedom for natural communication and communicative activity. In other words, *Seisoku-1* observes the principle of a step-by-step progression, while *Standard(p)-1*, *Globe-1* and other low-scoring textbooks observes the principle of freer communication as a basic strategy of EFL textbook organization. For this reason, the fifth dimension was termed strictly-controlled vs. loosely-controlled texts. The contribution rate of the fifth dimension was 0.069, covering only 6.9% of the whole contribution.

Table 8: Values of Eighteen Textbooks on Dim 5

	Dim 5
Seisoku-1	3.166
Kanda-p1	1.583
Dening-1	0.747
Jack & Betty-1	0.299
Sunshine-1	0.181
Tsuda-p1	0.156
Standard(t)-1	-0.073
Union-1	-0.096
Kanda-1	-0.233
Inoue-p1	-0.251
Drill-1	-0.309
Choice-1	-0.551
Pacific-1	-0.578
National-1	-0.628
Mombusho-p1	-0.779
Taisho-1	-0.85
Globe-1	-0.885
Standard(p)-1	-0.915

**Figure 6: Values of Eighteen Textbooks on Dim 5**

On the sixth dimension, as it is clear in Table 9 and Figure 7, the value is the highest for *Globe-1* (1.542), the second highest for *Drill-1* (1.473), the third highest for *Kanda-p1* (1.232), and the lowest for *Kanda-1* (-2.967), the others coming in between them. In decreasing order, the ten textbooks were: *Globe-1* > *Drill-1* > *Kanda-p1* > *Mombusho-p1* > *Standard(p)-1* > *Jack & Betty-1* > *Inoue-p1* > *Sunshine-1* > *Standard(t)-1* > *Seisoku-1* > *Dening-1* > *Taisho-1* > *National-1* > *Choice-1* > *Tsuda-p1* > *Union-1* > *Pacific-1* > *Kanda-1*.

The difference of the values among the eighteen textbooks could best be explained by the category of concise (+) vs. redundant (-) texts; in *Globe-1* (the highest), *Drill-1* (the second highest), *Kanda-p1* (the third highest) and other high-scoring ones, the dialogues and expository passages are generally brief and comprehensive without tedious repetitive drill-like sentences while in *Kanda-1* (the lowest) and others a considerably large part of the text are long and tends to sound redundant although sentences are cohesive. For example, in *Kanda-1*, the presentation of key sentences or a key passage is followed by their repetitive learning activity such as writing, grammar, Japanese into English translation, spelling, dictation, homework, etc. For this reason, the sixth dimension was termed concise vs. redundant texts. The contribution rate of the sixth dimension was 0.051, covering only 5.1% of the whole contribution.

Table 9. Values of Eighteen Textbooks on Dim 6

	Dim 6
<i>Globe-1</i>	1.542
<i>Drill-1</i>	1.473
<i>Kanda-p1</i>	1.232
<i>Mombusho-p1</i>	0.878
<i>Standard(p)-1</i>	0.648
<i>Jack & Betty-1</i>	0.361
<i>Inoue-p1</i>	0.323
<i>Sunshine-1</i>	0.025
<i>Standard(t)-1</i>	-0.168
<i>Seisoku-1</i>	-0.261
<i>Dening-1</i>	-0.262
<i>Taisho-1</i>	-0.381
<i>National-1</i>	-0.487
<i>Choice-1</i>	-0.509
<i>Tsuda-p1</i>	-0.582
<i>Union-1</i>	-0.698
<i>Pacific-1</i>	-0.712
<i>Kanda-1</i>	-2.967

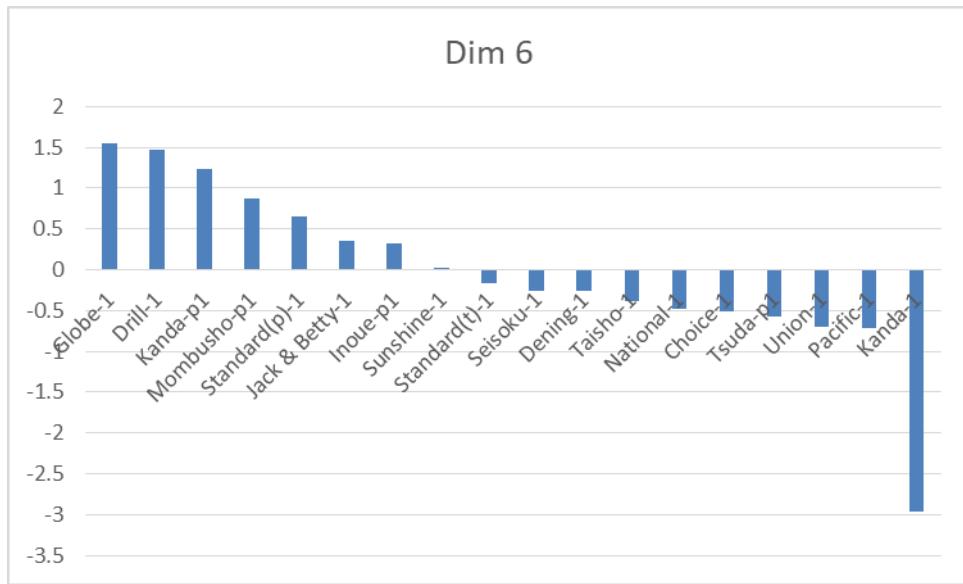


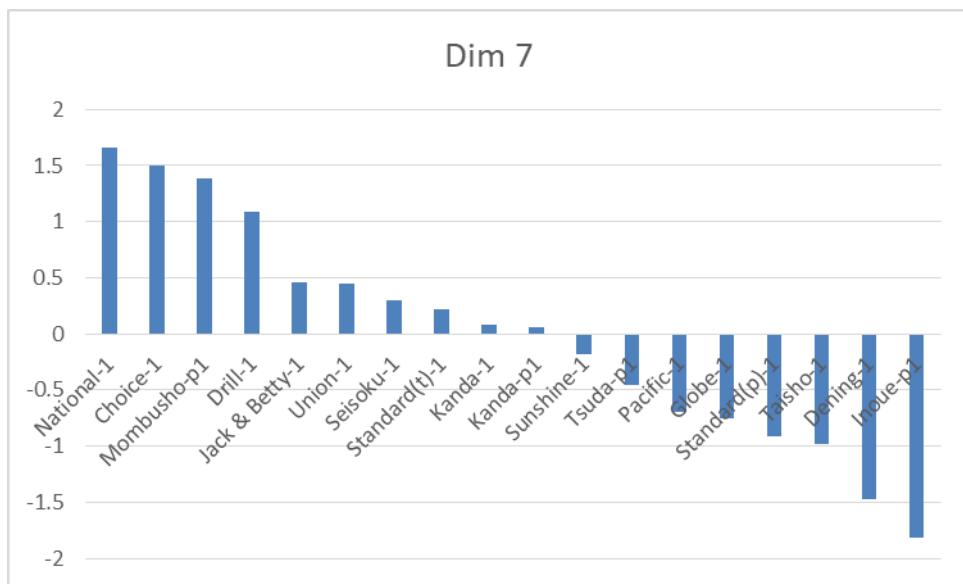
Figure 7: Values of Eighteen Textbooks on Dim 6

On the seventh dimension, as it is clear in Table 10 and Figure 8, the value is the highest for *National-1* (1.658), the second highest for *Choice-1* (1.496), The third highest for *Mombusho-p1* (1.385), and the lowest for *Inoue-p1* (-1.821), the second lowest for *Dening-1* (-1.47) and the others coming in between them. In decreasing order, the ten textbooks were: *National-1* > *Choice-1* > *Mombusho-p1* > *Drill-1* > *Jack & Betty-1* > *Union-1* > *Seisoku-1* > *Standard(t)-1* > *Kanda-1* > *Kanda-p1* > *Sunshine-1* > *Tsuda-p1* > *Pacific-1* > *Globe-1* > *Standard(p)-1* > *Taisho-1* > *Dening-1* > *Inoue-p1*.

The difference of the values among the eighteen textbooks could best be explained by the category of connected (+) vs. disconnected (-) contents. In *National-1* (the highest), *Choice-1* (the second highest) and other high-scoring ones, the contents of the lessons are connected and the same characters such as Roy, Kate, etc., appear throughout the whole text, while in *Inoue-p1* (the lowest), *Dening-1* (the second lowest) and others, in a whole text or a considerably large part of the text, lessons are independent and disconnected in meaning. For example, in *Dening-1* (the second lowest), Lesson 1 is an Aesop's fable entitled "The Snipe and the Clam" and Lesson 2 is a precept for living entitled "The Use and Abuse of things," which have nothing to do with each other in any way. For this reason, the seventh dimension was termed connected vs. disconnected contents. The contribution rate of the seventh dimension was 0.046, covering only 4.6% of the whole contribution.

Table 10: Values of Eighteen Textbooks on Dim 7

	Dim 7
National-1	1.658
Choice-1	1.496
Mombusho-p1	1.385
Drill-1	1.088
Jack & Betty-1	0.456
Union-1	0.453
Seisoku-1	0.299
Standard(t)-1	0.219
Kanda-1	0.08
Kanda-p1	0.061
Sunshine-1	-0.183
Tsuda-p1	-0.451
Pacific-1	-0.696
Globe-1	-0.757
Standard(p)-1	-0.913
Taisho-1	-0.976
Dening-1	-1.47
Inoue-p1	-1.821

**Figure 8: Values of Eighteen Textbooks on Dim 7**

As a summary of the above descriptions and discussions, Figure 9 visualizes the 40.7% of the spatial relationships among the eighteen nominal variants or textbooks in focus, in which the *x*-axis represents the first dimension or the axis of difficult (+) vs. easy (-) texts and the *y*-axis the second dimension or the axis of natural-sounding (+) vs. artificial-sounding (-) discourses. As it is clear in Figure 9, all of the eighteen textbooks were systematically located, except one, i.e., *Sunshine-1*, in one diagonal line starting at the high plus(x)-plus(y) position and

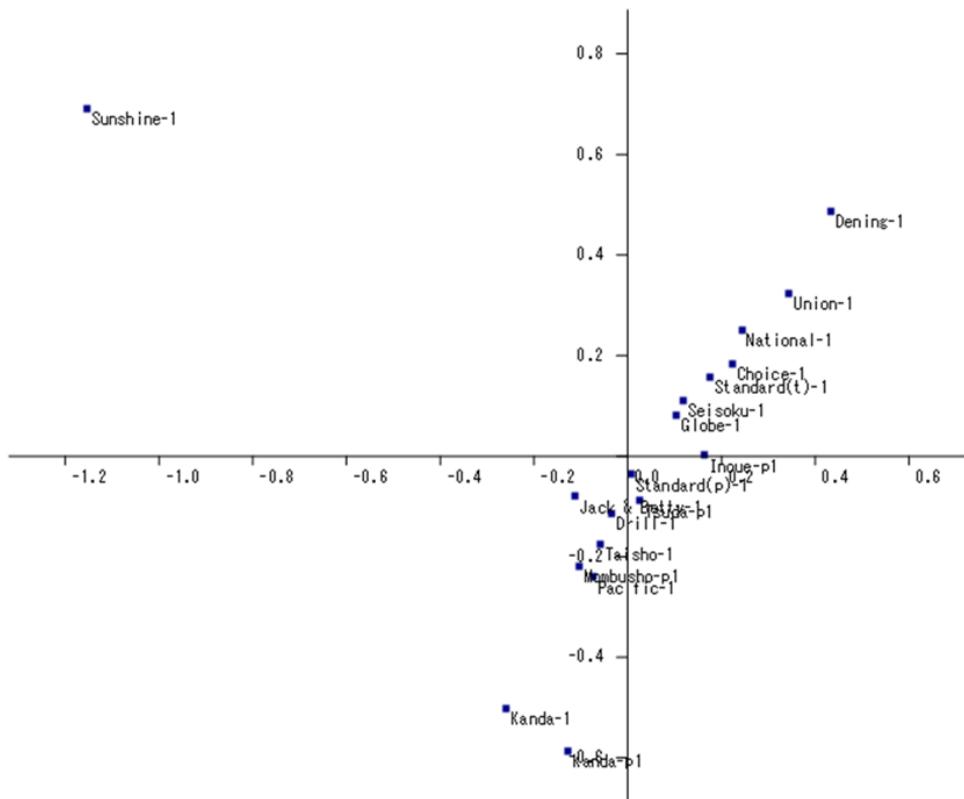
ending at the low minus(x)-minus(y) position. Interestingly in this respect, the only exception, *Sunshine-1*, was not a historical EFL textbook as the other ones but a currently used EFL textbook specifically selected in the present analysis for comparative purposes.

These results clearly indicate three points. First, all of the seventeen historical textbooks were located diagonally in decreasing order in terms of two criteria, difficult vs. easy texts and natural-sounding vs. artificial-sounding discourses, as in the following: *Dening-1* > *Union-1* > *National-1* > *Choice-1* > *Standard(t)-1* > *Seisoku-1* > *Globe-1* > *Inoue-p1* > *Standard(p)-1* > *Tsuda-p1* > *Jack & Betty-1* > *Drill-1* > *Taisho-1* > *Mombusho-p1* > *Pacific-1* > *Kanda-1* > *Kanda-p1*. It means that *Dening-1*, rank 1 textbook, is the highest in difficulty as well as in naturalness and *Kanda-p1*, rank 17, is the lowest in the two criteria. It is interesting to note that among them, the three top-ranking textbooks, *Dening-1*, *Union-1* and *National-1* were originally authored by native-speaker writers and that the bottom-ranking three textbooks, *Kanda-p1*, *Kanda-1* and *Pacific-1* and *Mombusho-p1*, excluding *Kanda-1* as an exception, were textbooks for primary schools or girls' middle schools, types of schools generally considered as lower than boys' middle schools.

Second, *Sunshine-1*, a current textbook, was located at a location distinctively different from those of the other seventeen historical textbooks in terms of the two dimensions, i.e., difficult / easy texts and naturalness / artificiality. Although *Sunshine-1* was the easiest in difficulty, it is not the most artificial one as in the case of historical textbooks, but proved to be the most natural-sounding. This could be one of the distinctive features of the current textbooks compared with historical ones.

Finally, it is worthy of note that the seventeen historical textbooks were closely interrelated to each other between Dim 1 (the axis of difficult vs. easy texts) and Dim 2 (the axis of natural-sounding vs. artificial-sounding discourse). To confirm this hypothesis, a rank correlation coefficient (Spearman's rho) was computed between the two ranks of the seventeen textbooks on the two dimensions or axes, which yielded an extremely high coefficient, 0.946 ($p < .001$). This suggests that with historical EFL textbooks, the feature of difficulty/easiness and that of naturalness/artificiality were closely related to each other, to the point where they were almost identical.

Clearly, it was both Dim 1, difficult / easiness, and Dim 2, naturalness / artificialness that differentiated *Sunshine-1* from the seventeen textbooks and each of the seventeen textbooks from each other. This will prove that both of the two axes, both x-axis (difficult vs. easy texts) and y-axis (natural-sounding vs. artificial-sounding axis) are efficient and powerful differentiators of the eighteen EFL textbooks in focus.



X-axis: difficult (+) vs. easy (-) texts

Y-axis: natural-sounding vs. artificial-sounding discourse

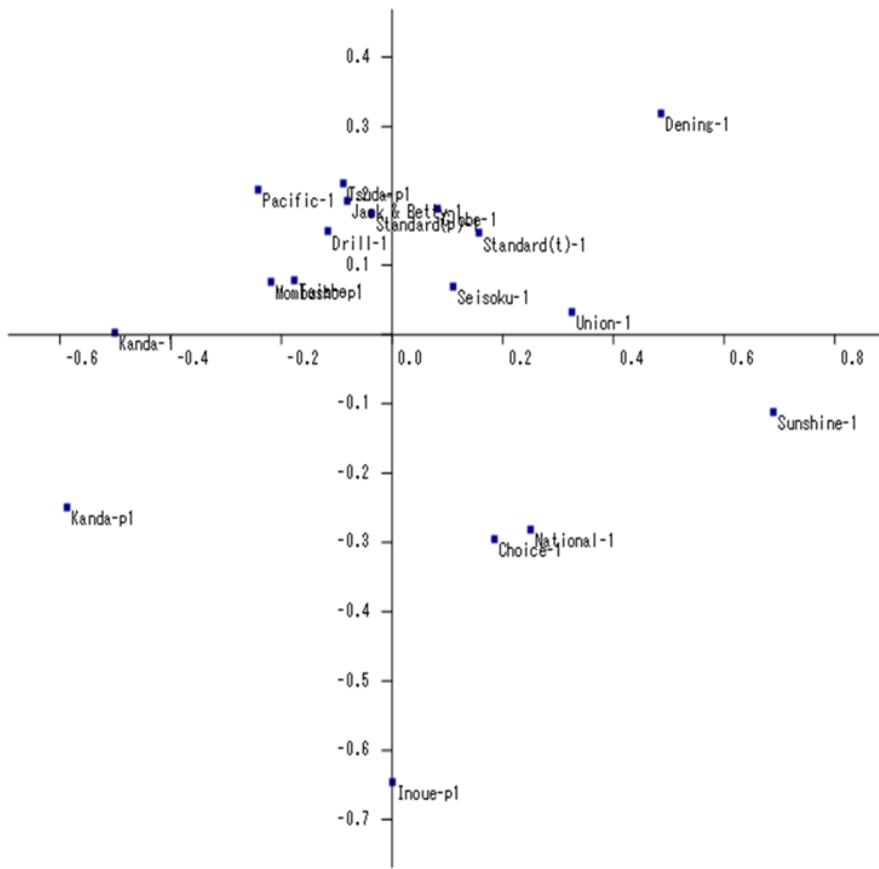
Figure 9: CA Map of 18 Textbooks

Furthermore, in addition to the CA map of Dim 1 and Dim2 above (Figure 9), the another CA map (Figure 10) was displayed as a summary of the descriptions and discussions of Dim 2 and Dim 3, in which the *x*-axis represents the second dimension or the axis of natural-sounding vs. artificial-sounding discourse and the *y*-axis the third dimension or the axis of passage-based vs. dialogue-based discourse. As it is clear in Figure 10, all of the eighteen textbooks could be classified into four groups, (1) plus(x)-plus (y) group, (2) minus(x)-plus (y) group, (3) plus (x)-minus(y) group, and (4) minus (x)-minus (y) group, as in the following classification.

Group 1 (plus(x)-Plus (y))	Group 2 (minus(x)-plus (y))
<i>Dening-1</i>	<i>Pacific-1</i>
<i>Union-1</i>	<i>Mombusho-p1</i>
<i>Standard(t)-1</i>	<i>Taisho-1</i>
<i>Seisoku-1</i>	<i>Drill-1</i>
<i>Globe-1</i>	<i>Tsuda-p1</i>
	<i>Jack & Betty-1</i>
	<i>Standard(p)-1</i>
Group 3 (plus (x)-minus(y))	Group 4 (minus (x)-minus (y))
<i>Sunshine-1</i>	<i>Kanda-p1</i>
<i>National-1</i>	<i>Kanda-1</i>
<i>Choice-1</i>	<i>Inoue-p1</i>

As it is clear in the above classification, Group 1, which is characterized by natural-sounding and passage-based texts, was comprised of five textbooks, i.e., *Dening-1*, *Union-1*, *Standard(t)-1*, *Seisoku-1* and *Globe-1*. Group 2, which is characterized by artificial sounding and passage-based texts, was comprised of seven textbooks, i.e., *Pacific-1*, *Mombusho-p1*, *Taisho-1*, *Drill-1*, *Tsuda-p1*, *Jack & Betty-1* and *Standard(p)-1*. Group 3, which is characterized by natural-sounding and dialogue-based texts, was comprised of three textbooks, i.e., *Sunshine-1*, *National-1* and *Choice-1*. Group 4, which is characterized by artificial-sounding and dialogue-based texts, was comprised of three textbooks, i.e., *Kanda-p1*, *Kanda-1* and *Inoue-p1*. It is understandable in a sense that *Inoue-p1* and *Kand-1* are artificial-sounding since they were textbooks for primary school pupils.

Clearly, it was both Dim 2, the axis of natural-sounding vs. artificial-sounding discourse, and Dim 3, the axis of passage-based vs. dialogue-based discourse that differentiated eighteen textbooks from each other. This will prove that both of the two axes, both x-axis (natural-sounding vs. artificial-sounding discourse) and y-axis (passage-based vs. dialogue-based discourse) are also efficient and powerful differentiators of the eighteen EFL textbooks in focus.



X-axis: natural-sounding vs. artificial-sounding discourse (Dim 2)

Y-axis: passage-based vs. dialogue-based discourse (Dim 3)

Figure 10: CA Map of 18 Textbooks

It is true that the CA map based on the two selected major dimensions (axes) can differentiate the major features of the eighteen historical and current EFL textbooks but naturally it cannot differentiate visually all of their features detected in the analysis. As it is clear in the cumulative contribution rates in Table 1, the CA map comprised of two dimensions, Dim 1 and Dim 2, can only display the 40.7 percent of the whole features, leaving the rest of 59.3 percent of the features untouched. Again, as it is clear in the contribution rates in Table 1, the CA map comprised of two dimensions, Dim 2 and Dim 3, can only display the 33.2 percent of the whole features, leaving the rest of 66.8 percent of the features untouched. In order to overcome this weakness, a new attempt was made to display the whole pictures of their features based on the values of the whole dimensions dealt with in the present analysis. It is a way of computing the actual distance (Euclidean distance) of the eighteen individual textbooks on each of the seventeen dimensions, by multiplying the weighted correlation coefficients by the coefficients proportional to the contribution rates. Using the

thus-computed Euclidean distances of the eighteen textbooks on the seventeen dimensions, a cluster analysis was performed using *College Analysis*, by maximum distance method, so as to draw a dendrogram of the eighteen textbooks. Figure 11 is a dendrogram which visually summarizes the degree of similarities and differences among the eighteen nominal variants of the present analysis, based on the values (distances) of all of the (seventeen) dimensions computed in the present analysis, not based on the results of the two selected dimensions as in Figures 9 and 10.

Dendrogram is a branching diagram like biological taxonomy, representing a hierarchy of categories based on the degree of similarity or the numbers of shared characteristics and graphically displays the internal cohesion and external isolation of the variants in focus, i.e., the eighteen textbooks in the present analysis.

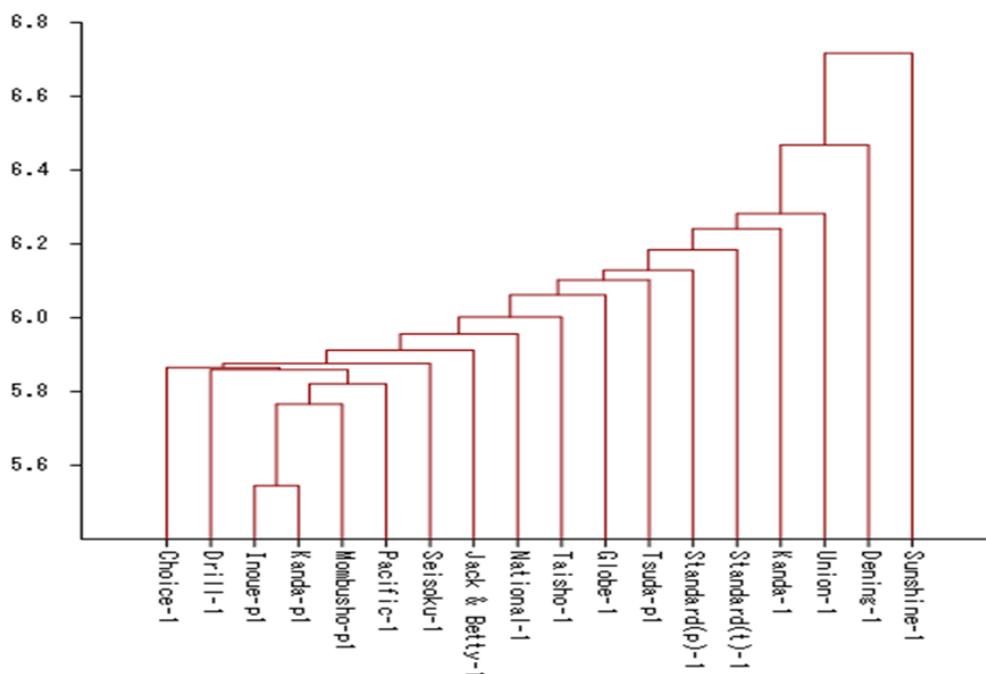


Figure 11: Dendrogram by Longest Distance Method

As Figure 11 shows, the whole features specified in the present analysis are visually summarized in the dendrogram, which can also be described as in the following combination of brackets.

(((((((((((Choice-1(Drill-1(((Kanda-p1, Inoue-p1)Mombusho-p1)Pacific-1)))Seisoku-1)Jack&Betty-1)National-1)Taisho-1)Globe-1)Tsuda-p1)Standard(p)-1)Standard(t)-1)Kanda-1)Union-1)Dening-1)Sunshine-1)

These descriptions clearly indicate that six textbooks, i.e., *Kanda-p1*, *Inoue-p1*, *Mombusho-p1*, *Pacific-1*, *Drill-1* and *Choice-1*, are close in relationship among each other, forming a cluster. It is interesting to note that among them, the three located in the center of the cluster, i.e., *Kanda-p1*, *Inoue-p1* and *Mombusho-p1*, are all textbooks for primary school pupils. This basic cluster is then connected with *Seisoku-1*, a textbook next close to the cluster, and the newly-made larger cluster is further connected with a textbook next close to the newest larger cluster, i.e., *Jack & Betty-1*, on and on, until *Sunshine-1*, which is a current textbook, specifically selected in the present analysis for comparative reasons. This clearly shows that all of the features specified in the present CA counted for, *Sunshine-1* is the most different from the other seventeen historical textbooks.

5. CONCLUSION

So far, the results of the CA have been analyzed, interpreted and discussed, focusing on the characteristic features, similarities and differences among the seventeen textbooks with their current counterpart. As a summary of the results and discussions of the present CA, the RQs were answered as in the following.

RQ 1. How similar / different in contents are the seventeen Japanese historical EFL textbooks and their current counterpart to / from each other? The CA results proved capable of differentiating the features of the eighteen textbooks quantitatively, specifying their similarities and differences. In particular, the CA map comprised of Dim 1 (difficult vs. easy) and Dim 2 (natural-sounding vs. artificial-sounding) proved powerful enough to differentiate *Sunshine-1* from the seventeen historical textbooks and each of the eighteen textbooks from each other: While the seventeen historical textbooks were located diagonally on the map, which suggests that, with the seventeen textbooks, the feature of difficulty / easiness and that of naturalness / artificiality were closely related to each other, the current textbook was located at a location distinctively different from the other seventeen textbooks. This means that, of the eighteen textbooks, only the current one has the features of easiness and that of naturalness at the same time.

RQ 2. What kinds of dimensions explain the similarities / differences among the eighteen textbooks? Their features, or the similarities / differences (distances) among the eighteen textbooks were explained 80 percent by seven dimensions, i.e., difficult vs. easy texts (Dim 1), natural-sounding vs. artificial-sounding discourse (Dim 2), passage-based vs. dialogue-based texts (Dim 3), teacher dominance vs. non teacher dominance (Dim 4), strictly controlled vs. loosely controlled texts (Dim 5), concise vs. redundant texts (Dim 6) and connected vs. disconnected contents (Dim 7).

RQ 3. To what extent can the whole picture of the relationship among the eighteen EFL textbooks be displayed in its entirety? In order to display the whole pictures of their relationships, an attempt was made to draw a dendrogram by maximum distance method, which visually summarized all of the features (similarities and differences) among the eighteen nominal variants of the present analysis, based on the values of all of the seventeen dimensions computed in the present analysis.

Finally, it was concluded that the CA proved to be powerful enough to quantitatively analyze, interpret and clarify the characteristic features, similarities and differences among a large variants (18 variants in this case), i.e., seventeen historical textbooks and their current counterpart. Especially, the CA map comprised of Dim 1 and Dim 2 indicated that, while seventeen historical textbooks must be difficult in order to sound natural, the current textbook manages to be both easy and natural. Also, the dendrogram based on the values of the seventeen dimensions of the CA proved to be powerful enough to present a visual summary of all the features of the eighteen textbooks examined in this study.

REFERENCES

- Clausen, S.-E. (2015). *Taiobunseki nyumon: Genri kara oyo made*. [Applied correspondence analysis: An introduction]. (K. Fujimoto, Trans.). Tokyo, Japan: Ohmsha. (Original work published 1998)
- Honda, R., Watanabe, K., & Ozasa, T. (2017). A correspondence analysis of nine Japanese historical English-as-a-foreign-language textbooks. *International Journal of Learning, Teaching and Educational Research*, 16(10), 100-113. doi: 10. 26803/ijlter. 16. 10. 8
- Hosaka, Y., Abe, N., Uenishi, K., & Ozasa, T. (2008). To-infinitive in Japan's EFL textbooks: A diachronic comparison. *Proceedings of 4th International ICTATLL (ICT in the Analysis, Teaching and Learning of Languages) Workshop, University of Colombo, Sri Lanka, September, 2008*, 1-5.
- Hosaka, Y., Erikawa, H., Miura, S., & Ranjan, C. K. (2008). Verbals in Japan's first-year EFL textbooks: A diachronic quantitative comparison. In G. R. S. Weir & T. Ozasa (Eds.), *Studies in language and textbook analysis*. (pp. 143-148). Glasgow, Scotland: University of Strathclyde Publishing.
- Ishikawa, S., Maeda, T., & Yamazaki, M. (Eds.). (2010). *Gengo kenkyu notameno tokei nyumon* [An introduction to statistics for linguistic study]. Tokyo, Japan: Kurosoio.
- Kawamura, K., Umamoto, T., Matsuoka, H., & Ozasa, T. (2017). Meiji-Showaki no eigo kyokasho no ri-dabiriti bunseki: Jogakko kyokasho o chushin tosite [Readability of four English textbooks used from the Meiji to Showa Era in Japan: Focusing on girls' middle school textbooks]. *Journal of ICTATLL (ICT in the Analysis, Teaching and Learning of Languages) Japan*, 4, 71 – 85.
- Kawamura, K., Umamoto, T., & Ozasa, T. (2016). Meijiki-gendai no eigo kyokasho 9shu no ri-dabiriti bunseki: Ozasa-Fukui Year Level, Ver. 3.4.2nhnc1-5 niyoru bunseki [Readability of nine English textbooks used from the Meiji Era to the present day in Japan: An analysis with the use of Ozasa-Fukui Year Level, Ver. 3.4.2nhnc1-5].

- Journal of ICTATLL (ICT in the Analysis, Teaching and Learning of Languages) Japan*, 3, 85 - 99.
- Matsuoka, H., Umamoto, T., Ozasa, T., & Motooka, N. (2008). A diachronic quantitative analysis of the first-year EFL textbooks of Japan: With a focus on the introduction of verbs. In G. R. S. Weir & T. Ozasa (Eds.), *Studies in language and textbook analysis*. (pp. 29-36). Glasgow, Scotland: University of Strathclyde Publishing.
- Nakamura, T., & Ozasa, T. (2007). Diachronic and synchronic analysis of English textbooks: With a focus on the gender awareness. *Proceedings of the 12th Conference of Pan-Pacific Association of Applied Linguistics, Pataya, Thailand, 19-21, December, 2007*, 126-129.
- Ozasa, T. (2003). *Meiji, Taisho, Showa-shoki no eigo kyokasho no keiryouteki bunseki* [A quantitative analysis of Japanese historical EFL textbooks published from the Meiji Era (1868-1912), the Taisho Era (1912-1926) and the early Showa Era (1926-1945)]. Research report of the Japanese Scientific Research Grant, 2000 - 2002, Basic Research (C) (1) 12680269.
- Ozasa, T. (2005). *Meiji, Taisho, Showa-shoki no eigo kyokasho no keiryouteki bunseki* [A quantitative analysis of Japanese historical EFL textbooks published from the Meiji Era (1868-1912), the Taisho Era (1912-1926) and the early Showa Era (1926-1945)]. Research report of the Japanese Scientific Research Grant, 2003 - 2004, Basic Research (C) (1) 15520358.
- Ozasa, T., & Erikawa, H. (Eds.). (2004). *Eigo kyokasho no rekishiteki kenkyu* [A historical study of [Japanese] English textbooks]. Tokyo, Japan: Jiyusha.
- Ozasa, T., Fukui, M., & Watanabe, K. (2015). Development of a readability index attuned to the new English course of study of Japan (3): Development of Ozasa-Fukui Year Level, Ver. 3.4.2nhnc1-5. In Pixel (Ed.), *Conference Proceedings, 8th International Conference of ICT for Language Learning, Florence, Italy, 12-13 November, 2015*, 349-354.
- Ozasa, T., Kawamura, K., Umamoto, T., & Matsuoka, H. (2018). 1900-1908nen shuppan no shogakko eigo kyokasho 4shu to genko chugakko kyokasho no taiobunseki [Correspondence analysis of four Japanese primary school EFL textbooks published during 1900-1908 and a current junior high school textbook]. *Journal of ICTATLL (ICT in the Analysis, Teaching and Learning of Languages) Japan*, 5, 57 - 68.
- Ozasa, T., & Nakamura, Y. (2001). *Meiji, Taisho, Showa shoki no eigo kyokasho nikansuru kenkyu: Shitsuteki bunseki to kaidai* [A Study of [Japanese] historical English textbooks published in the Meiji, Taisho and Showa Era: A qualitative analysis and explanatory notes]. Hiroshima, Japan: Keisuishisha.
- Ozasa, T., Umamoto, T., Matsuoka, H., & Motooka, N. (2008). Vocabulary of the first-year EFL textbooks of Japan: A diachronic quantitative comparison. In G. R. S. Weir & T. Ozasa (Eds.), *Studies in language and textbook analysis*. (pp. 149-155). Glasgow, Scotland: University of Strathclyde Publishing.
- Ozasa, T., Watanabe, K., & Fukui, M. (2016). Development of a readability index attuned to the new English course of study of Japan (4): Development of Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6. *Conference Proceedings, ICSSB (International Conference on Social Sciences and Business)*, Tokyo, Japan, August 25 - 27, 2016, 385-394.
- Sakamoto, M., Watanabe, K., & Ozasa, T. (2017). A Correspondence analysis of five Japanese historical English-as-a-foreign-language textbooks. *Conference Proceedings of ICSSB (International Conference on Social Science and Business)*, Okinawa, Japan, July 25 - 27, 2017, 132-144.

- Tono, Y. (2000). A Corpus-based analysis of interlanguage development: Analysing part-of-speech tag sequences of EFL learner corpora. In B. Lewandowska-Tomaszczyk, & P. J. Melia (Eds.), *Proceedings of PALC' 99: Practical Applications in Language Corpora, University of Lodz, Poland, 15-18 April, 1999* (pp. 323-340).
- Watanabe, K., Asai, T., & Ozasa, T. (2017). A correspondence analysis of five Japanese historical English-as-a-foreign-language textbooks. *Conference Proceedings, ICEPL (International Conference on Education, Psychology, and Learning), Sapporo, Japan, August 23-25, 2017*, 61-73.
- Weir, G. R. S., & Ozasa, T. (2007). Estimating naturalness in Japanese English textbooks. *Proceedings of the 12th Conference of Pan-Pacific Association of Applied Linguistics, Pattaya, Thailand, 19-21, December, 2007*, 130-133.
- Weir, G. R. S., & Ozasa, T. (Eds.). (2007). *Texts, textbooks and readability*. Glasgow, Scotland: University of Strathclyde Publishing.
- Weir, G. R. S., & Ozasa, T. (2008). Multiword vocabulary in Japanese ESL texts. *Proceedings of the 13th Conference of Pan-Pacific Association of Applied Linguistics, University of Hawaii, U.S.A., 20-22 August, 2008*, 63-66.
- Weir, G. R. S., & Ozasa, T. (Eds.). (2008). *Studies in language and textbooks analysis*. Glasgow, Scotland: University of Strathclyde Publishing.
- Weir, G. R. S., & Ozasa, T. (2009). Verb form usage in Japanese EFL texts. *Proceedings of the 14th Conference of Pan-Pacific Association of Applied Linguistics, Kyoto, Japan, 31 July - 2nd August, 2009*, 101-104.
- Weir, G. R. S., & Ozasa, T. (2010). Learning from analysis of Japanese EFL texts. *Educational Perspectives* (Journal of the College of Education, University of Hawaii at Manoa), 43, 1 & 2, 56-66.