A Correspondence Analysis of Twelve Japanese Historical Fifth-Year English-as-a-Foreign-Language Textbooks

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Abstract. This paper aims to quantitatively analyze the features of twelve Japanese historical fifth-year English-as-a-Foreign-Language (EFL) textbooks (Book-5) and their current counterpart by using correspondence analysis, and to compare the results with those of the correspondence analyses of the first- and third-year EFL textbooks (Book-1 and Book-3). The following were the obtained results. First, the correspondence analysis results proved capable of differentiating quantitatively the features of the textbooks dealt with. Second, the explaining categories were explained 84.4 percent by four dimensions: speech-oriented (+) vs. exposition-oriented (-) discourse (Dim 1), easy (+) vs. difficult (-) texts (Dim 2), variety-rich (+) vs. variety-poor (-) (Dim 3), and teacher-assistance (+) vs. non-teacher-assistance (Dim 4). Third, the similarities/differences of the thirteen Book-5 textbooks were explained by the categories similar to but slightly different from the Book-1 and Book-3 results up to the fourth dimension. Finally, the results of the present correspondence analysis were graphically represented by (1) two-dimensional coordinate representation covering only Dim 1 and Dim 2 and (2) cluster-analysis-based dendrogram covering all the features of twelve dimensions specified. On the former, only *Sunshine-5* and *Seisoku-5* were distinctively different from the other textbooks, which proved the correspondence analysis map comprised of Dim 1 and Dim 2 to contribute to differentiating their inter-relationships, while on the latter, the same two textbooks were also distinctively different from the others. This could suggest the two textbooks should be closely examined from the qualitative perspective as well as the quantitative one.

Keywords: Correspondence analysis; English-as-a-foreign-language; Textbooks.

1. Introduction

First of all, it is to be noted that the correspondence analysis (henceforth CA) 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 (Asai, Honda, Watanabe & Ozasa, 2019; Honda, Asai, Watanabe & Ozasa, 2018; Honda, Watanabe & Ozasa, 2017). For example, a search by JSTOR, a digital library with a database of more than 2,000 journals, confirmed only 49 journal papers from 2000 to 2019, as related to CA in the area of education, among them no textbook analyses specified (as of May 19, 2019).

To the best of the present writers' knowledge, the quantitative analyses of Japanese historical EFL textbook corpora using CA started in Japan with Sakamoto, Watanabe, and Ozasa (2017), which computed a CA using five Japanese historical EFL textbooks and their current counterpart, proving CA to be powerful enough to quantitatively analyze, interpret and clarify the characteristic features, similarities, and differences among the six textbooks. Watanabe, Asai, and Ozasa (2017) also performed the same type of CA, using five Japanese historical EFL textbooks and two of their current counterparts, the results of which also proved that CA was able to quantitatively analyze and discriminate the seven textbooks.

In Honda et al. (2017), the same type of CA-based diachronic quantitative textual analysis was carried out using nine Japanese historical first-year EFL textbooks and their current counterpart, the results of which proved that CA was able to clarify the characteristic features among the ten textbooks, naming five criteria or dimensions. These findings were summarized by a nine-dimension-based dendrogram as well as a two-major-dimension-based coordinate representation. In Ozasa, Kawamura, Umamoto, and Matsuoka (2018), a CA was computed using four Japanese historical EFL textbooks and their current counterpart, with the same aim as in the above analyses. The results of the textual analysis revealed that the five textbooks were explained by four criteria or dimensions and that these findings were graphically displayed by a four-dimension-based radar gram as well as a two-major-dimension-based coordinate representation.

Also in Honda et al. (2018), the same type of quantitative diachronic CA was computed using a relatively large number of variants (18 first-year EFL textbooks in this case), the results of which 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. It has to be noted that these findings were graphically summarized by a seventeen-dimension-based dendrogram as well as by a two-major-dimension-based coordinate representation.

Finally, Asai et al. (2019) performed the same type of textual analysis with CA, using sixteen Japanese third-year EFL textbooks and their current counterpart, the results of which also proved capable of differentiating the features of the sixteen historical textbooks and their current counterpart quantitatively, specifying their similarities and differences. In particular, the bipolar graphic representation of the analysis 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.

It is worthy of note that the results of all of these CA-based studies proved that the relatively new statistic tool was powerful enough to specify the distinctive features of textual corpora and to classify the analyzed EFL textbooks based on the specified distinctive features. In particular, in Honda et al. (2017), Honda et al. (2018) and Asai et al. (2019), CA proved capable of discriminating a relatively large number of variants and classifying Japanese 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. (2018) and Asai et al. (2019), aims to quantitatively analyze and classify a relatively large number of historical EFL textbooks, twelve textbooks and their current counterpart, from a new perspective, using CA techniques.

2. Aim

The present paper aims to quantitatively describe and explain the features of twelve Japanese historical fifth-year EFL textbooks (Book-5) and their current counterpart, by using CA, focusing on their similarities/differences and to compare the results with those of the CA of the first-year and third-year textbooks.

CA "is a statistical technique that is useful to all students, researchers, and professionals who collect categorical data, for example, data collected in social surveys. The method is particularly helpful in analysing crosstabular data in the form of numerical frequencies, and results in an elegant but simple graphical display which permits more rapid interpretation and understanding of the data" (Greenacre, 2017, p. xi). It is a statistical technique that can be used widely in varying areas such as sociology, ecology, paleontology, archaeology, geology, education, medicine, biochemistry, microbiology, linguistics, marketing research, advertising, religious studies, philosophy, art and music (Greenacre, 2017, p. xi). Its main purpose is to reveal the structure of a complex data matrix (in the present analysis, a complex data matrix of the thirteen Japanese fifth-year EFL textbooks) by replacing the raw data with a more simple data matrix without losing essential information (Clausen, 1998, p. 1).

Based on the above conception, research questions (RQs) were set for the present study as the following:

(1) How similar/different in contents are the twelve Japanese historical EFL textbooks and their current counterpart (Book-5) to/from each other?

(2) What kinds of dimensions explain the similarities/differences among the thirteen textbooks?

(3) How similar/different in contents are the thirteen Japanese fifth-year EFL textbooks to/from their first- and third-year counterparts (Book-1 and Book-3)?

The textbooks used in the present CA were twelve historical EFL textbooks published during the period from 1867 to 1953, and a currently used Japanese EFL textbook, which was included in the present analysis for comparative purposes. The following are the titles and bibliographical data of the thirteen textbooks, which are primarily based on Ozasa and Erikawa (Eds.) (2004). (As for the authors and characteristic features of these textbooks, please refer to Ozasa and Erikawa (Eds.), 2004 and Honda et al., 2018.)

(1) *Standard Choice Readers, 5* (Shobido Editorial, 1902, Shobido, 5 Vols.) (Henceforth *Choice-5*.)

(2) *English Readers: The High School Series, 5* (Education Department, Japan [W. Dening], 1887-88, Education Department Publishing, Japan, 6 Vols.) (Henceforth *Dening-5*.)

(3) *New English Drill Books, 5* (Kenjiro Kumamoto, 1907, Kaiseikan, 5 Vols.) (Henceforth *Drill-5*.)

(4) *The Globe Readers, 5* (Yoshisaburo Okakura, 1907, Dainippon Tosho, 5 Vols.) (Henceforth *Globe-5*.)

(5) *New High School English: Step by Step, 2* (K. Hagiwara, M. Inamura & K. Takezawa, 1953, Kairyudo, 3 Vols.) (Henceforth *Jack&Betty-5*.)

(6) *New National Readers, 5* (C. J. Barnes, 1883-84, A. S. Barnes & Co., 5 Vols.） (Henceforth *National-5*.)

(7) *Girls' Pacific Readers, 5* (Torajiro Sawamura, 1939, Kairyudo, 5 Vol.) (Henceforth *Pacific-5*.)

(8) *Seisoku Mombusho Eigo Tokuhon, 5* (Education Department English Reader, A Regular Way, 5 Vols.) (Education Department, Japan, 1889-90, Education Department Publishing, Japan, 5 Vols.) (Henceforth *Seisoku-5*.)

(9) *The Standard English Readers, 5* (H. E. Palmer, 1927, Institute for Research in English Teaching, Japan, 5 Vols.） (Henceforth *Standard(p)-5*.)

(10) *The Standard English Readers, 5* (Tsuneta Takehara, 1932, Taishukan, 5 Vols.) (Henceforth *Standard(t)-5*.)

(11) *Girls' New Taisho Readers, 5* (Umeko Tsuda & Kenjiro Kumamoto, 1916, Tokyo Kaiseikan, 5 Vols.) (Henceforth *Taisho-5.*)

(12) *Sanders' Union Readers, 5* (Charles Walton Sanders, 1861-67, Ivison, Blakeman, Taylor & Co., 5 Vols.) (Henceforth *Union-5.*)

(13) *Discovery English Communication, 2* (K. Ikui, et al., 2014, Kairyudo, 3 Vols.) (Henceforth *Sunshine-5.*)

Among the thirteen textbooks above cited, (5) and (13) need some annotation. In (5), there was no Book-5 of *New Jack and Betty: English Step by Step* ever published, since it was a junior high school textbook consisting of three volumes, first-year, second-year, and third-year books. To solve this problem newly selected as a replacement of *New Jack and Betty: English Step by Step, 5* was *New High School English: Step by Step, 2*, a senior high school textbook series authored by the same authors and published by the same publisher as those of *New Jack and Betty* series (abbreviated as *Jack&Betty-5*).

Also in (13), there was no Book-5 of *Sunshine English Course* ever published, since it was a junior high school textbook. To solve this problem newly selected also as a replacement for *Sunshine English Course, 5* was *Discovery English Communication, 2*, a senior high school textbook series published by the same publisher as that of *Sunshine English Course*, and was abbreviated as *Sunshine-5*.

Through this analysis, we hope to quantitatively clarify the similarities/differences and relationships among the twelve Japanese historical fifth-year EFL textbooks and their current counterpart and also the similarities/differences and relationships between the fifth-year books and the first- and third-year books.

3. Method

The present study, using a one-way CA model with thirteen categorical variants, tried to explore the relationships among the thirteen Japanese fifth-year EFL textbooks, including a currently used Japanese senior-high-school EFL textbook and to compare the results with those of the CA of the first- and third-year textbooks.

First, a contingency table consisting of the above-mentioned thirteen textbooks (row) and most frequently used 100 words in them (column) was prepared as a basic datum for the present CA, using the thirteen textbook corpora. Then, using the digital datum of the cross-tabulation table, a CA was computed by using Fukui's *College Analysis*, a statistics computer tool developed by M. Fukui.

In evaluating and interpreting the results of the analysis, some of the ideas used in the following research books and papers were employed for reference where they were deemed relevant and appropriate to the purpose and methodology of the present analysis. They were: Beh and Lombardo (2014), Clausen (1998), Fukui (2011), Fukui and Watanabe (2019a), Fukui and Watanabe (2019b),

Greenacre (2010), Greenacre (2017), Micheloud (1997), Tabata (1994), Tabata (2002), Tabata (2005), Tono (2000), Uenishi (2018), Van de Geer (1993), Takahashi (2018), Watanabe and Fukui (2018a) and Watanabe and Fukui (2018b). Specifically, Fukui and Watanabe (2019a) and Fukui and Watanabe (2019b) were consulted where various kinds of cross-tabulation frequency tables were examined and the best model was chosen for the present CA to best suit the aims of the present analysis. The others were also consulted where the results of the present CA were described, interpreted in terms of research questions and graphically represented in the bipolar, two-dimensional CA map or the dendrogram, in coping with the issues of the proposed research questions.

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 it is clear in Table 1, the distinctive features of the eighteen textbooks were explained 46.8% by Dimension 1 (Dim 1), 22.1% by Dim 2, 8.5% by Dim 3, 6.9% by Dim 4, the cumulative contribution rate 84.4% on Dim 4. This means that Dim 1 is an extremely powerful discriminator that explains almost half of the features specified in the present analysis and that four dimensions should be sufficient enough for the present analysis.

Table 1: Basic CA Data, 13 Textbooks (Book 5)

	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6
Eigenvalue	0.051	0.024	0.009	0.007	0.004	0.004
Correlation	0.225	0.155	0.096	0.087	0.066	0.06
Contribution rate	0.468	0.221	0.085	0.069	0.04	0.033
Cumulative contribution rate	0.468	0.689	0.775	0.844	0.884	0.917
	Dim 7	Dim 8	Dim 9	Dim 10	Dim 11	Dim 12
Eigenvalue	0.003	0.002	0.002	0.001	0.001	0
Correlation	0.051	0.047	0.042	0.033	0.029	0.019
Contribution rate	0.024	0.021	0.016	0.01	0.008	0.003
Cumulative contribution rate	0.941	0.962	0.978	0.989	0.997	1

Table 2 shows the values of the thirteen textbook variants on Dim 1. As it is clear in Table 2, on Dim 1 the value is the highest for *Seisoku-5* (3.241), and the second highest for *Dening-5* (0.082), while it is the lowest for *Union-5* (--0.733) and the second lowest for *Standard(p)-5* (-0.707). In decreasing order, the thirteen textbooks were: *Seisoku-5 > Dening-5 > Taisho-5> Jack&Betty-5 > Sunshine-5 > Pacific-5 > Choice-5 > Drill-5 > Globe-5 > National-5 > Standard (t)-5 > Standard(p)-5 > Union-5.*

Table 2: Values on Dim 1

	Dim 1
Seisoku-5	3.241
Dening-5	0.082
Taisho-5	-0.012
Jack&Betty-5	-0.055
Sunshine-5	-0.058
Pacific-5	-0.081
Choice-5	-0.256
Drill-5	-0.368
Globe-5	-0.39
National-5	-0.394
Standard(t)-5	-0.537
Standard(p)-5	-0.707
Union-5	-0.733

The differences/similarities of the values among the thirteen textbooks on Dim 1 could best be explained by the feature of speech-oriented (+) vs. exposition-oriented (-) discourse. As it is clear in the following examples, in *Seisoku-5* (the highest) and other high-scoring ones, the texts tended to be more speech-oriented in the sense that they tend to use narrative style with direct speech quotations inserted frequently and /or the passages are followed or preceded by dialogues on the contents of the story. In contrast, in *Union-5* (the lowest), *Standard(p)-5* (the second-lowest) and other low-scoring ones, the texts tended to be more exposition-oriented in the sense that they seldom use narrative styles or dialogues in or related to the stories.

"*Pupil. Is it true that foreigners all have the "Arabian Nights" at their fingers' ends?*

Teacher. Yes, I suppose there is hardly anyone who has not read them over and over again. -- However, don't let us waste any more time, but let us set to at once. The story is as follows: --

In a certain town of Persia there lived two brothers one of whom was called Cassim, and the other Ali Baba. Their father, at his death, left them but a very moderate fortune, which they divided equally between them. It might, therefore, naturally have been conjectured that their riches would be the same. Fate, however, ordained it otherwise."

(*Seisoku-5*, Lesson 1 (The most speech-oriented))

"*Articulation is the art of uttering distinctly and justly the letters and syllables constituting a word. It deals, therefore, with the elements of words, just as elocution deals with the elements of sentences: the one securing the true enunciation of each letter, or combination of letters, the*

other giving to each word, or combination of words, such a delivery as
best expresses the meaning of the author. It is the basis of all good
reading, and should be carefully practiced by the learner."

(*Union-5*, Section 1 (The most exposition-oriented))

It is to be noted in this respect that in the CA of the Book-1 texts (Honda et al., 2018) and the Book-3 texts (Asai et al., 2019), the first and therefore most powerful discriminator (dimension) was closely related with the easy vs. difficult axis while the third powerful one was with the dialogue-based vs. passage-based axis. In contrast, in the present (Book-5) CA solution, the most striking is the fact that these two dimensions were altered from the previous ones, Dim 1 the category of speech-oriented vs. exposition-oriented (similar to dialogue-based vs. passage-based axis in the Book-1 and Book-3 solutions) and Dim 2 that of easy vs. difficult. In other words, Dim 3 of the Book-1 and Book-3 solutions turned out to be Dim 1 in the present (Book-5) solution and Dim 1 of the Book-1 and Book-3 solutions turned out to be Dim 2 in the present (Book-5) solution.   This could be explained by the fact that the difference in difficulty was not strong enough to clearly discriminate the texts of the thirteen fifth-year textbooks since at this level all of the texts tend to be deep and complicated in contents and therefore difficult in readability, although at the initial (Book-1) and middle (Book-3) levels their readabilities tend to be varied depending upon the philosophy and /or strategy of the textbooks.

Table 3 shows the values of the thirteen textbook variants on Dim 2. On Dim 2, as it is clear in Table 3, the value was the highest for *Sunshine-5* (3.016), the second highest for *Jack&Betty-5* (0.686) , while it is the lowest for *Union-5* (-1.194) and the second lowest for *Globe-5* (-0.861). In decreasing order, the thirteen textbooks were: *Sunshine-5 > Jack&Betty-5 > Pacific-5 > Taisho-5 > Drill-5 > Standard(t)-5 > Standard(p)-5 > Choice-5 > Seisoku-5 > Dening-5 > National-5 > Globe-5 > Union-5*.

Table 3: Values on Dim 2

	Dim 2
Sunshine-5	3.016
Jack&Betty-5	0.686
Pacific-5	0.546
Taisho-5	0.359
Drill-5	0.2
Standard(t)-5	-0.295
Standard(p)-5	-0.315
Choice-5	-0.389
Seisoku-5	-0.446
Dening-5	-0.518
National-5	-0.704
Globe-5	-0.861
Union-5	-1.194

The differences/similarities of the values among the thirteen textbooks on Dim 2 could best be explained by easy (+) vs. difficult (-) texts. As it is clear in the following examples, in *Sunshine-5* (the highest) and *Jack&Betty-5* (the second-highest), and other high-scoring ones, all the texts sound easy. In contrast, in *Union-5* (the lowest), *Globe-5* (the second-lowest) and other low-scoring ones, the texts sound all difficult in readability.

For example, when the following two pieces which are taken from the two contrasting textbooks, *Sunshine-5* (the easiest) and *Union-5* (the most difficult), are compared, it is obvious that *Sunshine-5* uses easy and basic vocabulary and grammatical structure in the dialogue while in *Union-5* the texts sound more natural and more difficult. Therefore, Dim 2 was termed easy vs. difficult texts, just as in the Book-1 (Honda et al., 2018) and Book-3 results (Asai et al., 2019). The contribution rate of Dim 2 was 0.221 or 22.1%.

"*Mr. Sato: Have you gotten used to the Japanese lifestyle?*
Mike: Yes. I even enjoy eating natto these days.
Mr. Sato: That's great.
Mike: But at first, I wasn't familiar with your customs at all. I often felt Japan was a strange country.
Mr. Sato: Then, it's natural you felt that way.

Mike: Well, I've made many mistakes, too."

(*Sunshine-5*(*Discovery English Communication, 2*), Unit 1 (The easiest))

"*Elocution is the art of delivering written or extemporaneous composition with force, propriety, and ease. It deals, therefore, with words, not o0nly as individuals, but as members of a sentence, and parts of a connected discourse: including everything necessary to the just expression of the sense. Accordingly, it demands, in a special manner, attention to the following particulars; viz., Articulation, accent, emphasis, inflection, modulation, and pauses.* "

(*Union-5*, 1st passage (The most difficult))

To verify the accuracy of the present difficulty estimation by CA, the readability of the thirteen textbooks was measured using Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6 [1] and the results were compared with the present CA results.

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[1] The development of the Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6 was financially supported by the Grant-in-aid for Scientific Research (KAKENHI), Japan Society for the Promotion of Science (JSPS), 2007-9, Basic Research

Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6 is a readability measuring tool jointly developed in Japan by T. Ozasa, applied linguist (author of the present paper) and M. Fukui, applied mathematician (developer of the 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: *Words* stands for a 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, Watanabe, & Fukui, 2016, p. 392).

NewDiff = 5.2565*exp(-19.1656*0.4398^Diff) + 1 (r^2=0.8912)

Diff=0.0924*Words+0.5862*Syllables+1.8296*WordDiff+0.0615*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) (Asai et al., 2019, p. 30; Honda et al., 2018, p. 114-115; Ozasa et al., 2016, p. 392).

Table 4 shows the readability values of the thirteen textbooks as measured by Ozasa-Fukui Year Level, Ver. 3.5nhnc1-6. To measure the degree of correspondence between the two measurements, the Dim 2 estimation and the Ozasa-Fukui Year Level estimation, a rank correlation coefficient or Spearman's *rho* was computed between them. The correlation coefficient computed proved to be 0.566 (p< .005), which does not seem to be a satisfactorily high degree but is a medium degree of correlation or correspondence in rank order. This means that the correlation coefficient was not as high as those of the other recent CA studies, such as .8802 in the CA with ten historical textbooks (Book-1) (Honda et al., 2017), .804 (p<.001) in the CA with eighteen historical textbooks

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(Book-1) (Honda et al., 2018), and .696 (p<. 001) in the CA with eighteen historical textbooks (Book-3) (Asai et al., 2019).

Table 4: Readability Measured by OFYL

	OFYL
Sunshine-5	5.14
Jack&Betty	5.91
Seisoku-5	6.06
Drill-5	6.41
Taisho-5	6.42
Standard(p)	6.56
Globe-5	6.63
Standard(t)	6.89
National-5	7.39
Choice-5	7.49
Dening-5	7.62
Pacific-5	7.69
Union-5	8.05

We can assume that this CA estimation is reasonably accurate on two grounds. First, the accuracy rate (r^2) of our readability tool is .8912 (89.12%), which means that there are about 11% of estimation errors (Kawamura, Umamoto, Matsuoka, & Ozasa, 2017, p. 74; Ozasa et al., 2016, p. 392). Second, the thirteen corpora used in the two analyses were slightly different from each other; in the present CA, the whole corpora were used without any kinds of modification, while in the direct readability measurement, the corpora were "cleaned," in which irrelevant parts of the passages such as titles, etc. were deleted so that only "normal" sentences could be measured. All of these facts considered, it must be concluded that the present CA estimation is reasonably accurate for the present study (Asai et al., 2019; Honda et al., 2017; Honda et al., 2018).

This Dim 2 evaluation could and should be generalized to the judgments of the other three Dims (Dims 1, 3 and 4): although they are indirect estimation, it could be reasonably accurate and trustworthy estimation, accurate enough to satisfy the goal of the present study (Asai et al., 2019; Honda et al., 2017; Honda et al., 2018).

This judgment and explanation could also be reinforced by the fact that *Sunshine-5* (the easiest) and *Jack&Betty-5* (the second easiest) were both textbooks used for compulsory education after the World War 2 when the Japanese educational system was reformed and primary and pre-secondary education became opened for all people under the new scheme. This means that these two

textbooks are/were used by almost 100% of the Japanese twelfth-graders while the other pre-ww2 textbooks were only used by selected (about 5%) elite learners in those days.

For this reason, Dim 2 was termed easy vs. difficult texts, just as Dim 1 of the Book-1 CA results (Honda et al., 2018) and the Book 3 CA results (Asai et al., 2019). The contribution rate of the second dimension was 0.221 (22.1%).

As it has been stated earlier at the interpretation of the Dim 1 result, in the present CA solution, the first and second dimensions were reversed from those of the Book-1 and Book-3 analysis, Dim 1 the category of speech-oriented vs. exposition-oriented and Dim 2 that of easy vs. difficult. This could be due to the difference in their authors' views concerning how difficult the texts should be at the initial and middle levels of the Japanese middle school EFL textbooks.

Table 5: Values on Dim 3

	Dim 3
Union-5	1.783
Standard(p)-5	1.179
Sunshine-5	1.067
Standard(t)-5	0.855
Seisoku-5	0.584
Drill-5	-0.118
Taisho-5	-0.159
National-5	-0.332
Globe-5	-0.338
Jack&Betty-5	-0.513
Choice-5	-0.712
Dening-5	-1.128
Pacific-5	-2.005

On Dim 3, as it is clear in Table 5, the value is the highest for *Union-5* (1.783), the second highest for *Standard(p)-5* (1.179), the third highest for *Sunshine-5* (1.067), and the lowest for *Pacific-5* (-2.005), the second lowest for *Dening-5* (-1.128), the third lowest for *Choice-5* (-0.712), and the others are between the two groups. In decreasing order, the seventeen textbooks were: *Union-5 > Standard(p)-5 > Sunshine-5 > Standard(t)-5 > Seisoki-5 > Drill-5 > Taisho-5 > National-5 > Globe-5 > Jack&Betty-5 > Choice-5 > Dening-5 > Pacific-5*.

The features among these thirteen textbooks on Dim 3 could best be interpreted by variety-rich (+) vs. variety-poor (-) textbooks. *Union-5* (the highest), *Standard-(p)-5* (the second highest), *Sunshine-5* (the third highest) and other high-scoring ones are rich in variety in the sense that in their lessons the main bodies (expository passages) are usually preceded by the introductory questions, dialogues, questions or hints and /or followed by the post-reading comments, proverbs, or related poems or dialogues on the passages. For example, in

Sunshine-5 (*Discovery II*) Lesson 2 consists of (1) the introductory (pre-reading) hints, (2) the main body (expository passage), and (3) the post-reading comments. Also in *Union-5*, the first unit consists of main bodies (two expository passages), i.e., "Achievements and Dignity of Labor" and "Power of the Hand" and (2) two poems related to the contents of the main expository passages, i.e., "There's Work Enough to Do" and "Fields for Labor." This variety in style or linguistic activity seems to be intended to help the learners understand and discuss the contents of the topics dealt with in the lessons. On the contrary, *Pacific-5* (the lowest), *Dening-5* (the second-lowest), and the other low-scoring ones do value expository passages, only carrying them, nothing else.

It has to be noted in this respect that the feature of Dim 3, "variety-rich (+) vs. variety-poor (-) textbooks" proved to be different from any features specified in the Book-1 (Honda et al., 2018) and Book-3 results (Asai et al., 2019). The contribution rate of Dim 3 was 0.085 (8.5%).
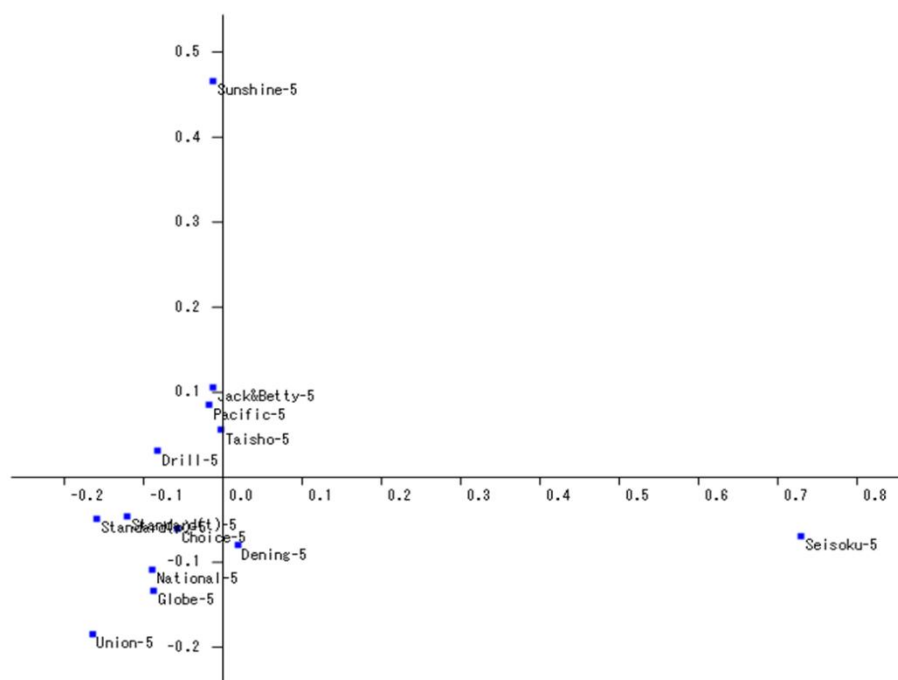
Table 6: Values on Dim 4

	Dim 4
Pacific-5	2.378
Union-5	1.31
Taisho-5	0.684
Standard(p)-5	0.392
Seisoku-5	0.186
National-5	0.101
Choice-5	-0.214
Sunshine-5	-0.288
Drill-5	-0.406
Standard(t)-5	-0.51
Globe-5	-0.952
Jack&Betty-5	-1.069
Dening-5	-1.508

On Dim 4, as it is clear in Table 6, the value is the highest for *Pacific-5* (2.378), the second highest for *Union-5* (1.31) and the third highest for *Taisho-5* (0.684), while it is the lowest for *Dening-5* (-1.508), the second lowest for *Jack&Betty-5* (-1.069) and the third lowest for *Globe-5* (-0.952), and the other textbooks are between the two groups. In decreasing order, the thirteen textbooks were: *Pacific-5 > Union-5 > Taisho-5 > Standard(p)-5 > Seisoku-5 > National-5 > Choice-5 > Sunshine-5 > Drill-5 > Standard(t)-5 >Globe-5 > Jack&Betty-5 > Dening-5.*

The features among these thirteen textbooks on Dim 4 could best be interpreted by teacher-assistance (+) vs. non-teacher-assistance (-). In *Pacific-5* (the highest) and other high-scoring textbooks, almost all the lessons are designed so that teachers can help learners understand the contents of the texts and discuss the topic dealt with in there, while in *Dening-5* (the lowest) and other low-scoring

textbooks there were few such features or intentions observed in the lessons. For example, in *Pacific-5* (the highest), the esoteric themes or stories are conveyed as if they are gently told to a child by his /her mother, by using "I" or "We" as the subject of a sentence, retelling, simplifying, and inserting questions on the topic, etc., generally giving a tone of "mother talk," while in *Dening-5* (the lowest) and the other low-scoring ones, there were very few such consideration or teacher-like assistance detected. For this reason, Dim 4 was named teacher-assistance vs. non-teacher-assistance, which was closely related to but slightly different from the titles of Dim 4 in the Book-1 (Honda et al., 2018) and Book-3 interpretations (Asai et al., 2019), i.e., "teacher-dominance (+) vs. non-teacher-dominance." The contribution rate of Dim 4 was 0.069 (6.9%).

Generally speaking, the title or characterization of the dimensions in the present CA was not an easy job as it had been expected. This was because the fifth-year textbooks were distinctively different from the first-year and third-year textbooks referred to above in that they were so homogeneous in nature that few of their differences could have been observed. More specifically, the first-year and third-year textbooks tended to place emphasis on their instructional aspects, such as how to introduce and help learn the materials, etc., while the fifth-year ones tended to be more focused on the contents of the reading materials themselves than their instructional aspects. This might have been the main factor that made the dimension-naming work difficult.

X-axis (Dim 1): speech-oriented (+) vs. exposition-oriented (-) discourse (46.8%)

Y-axis (Dim 2): easy (+) vs. difficult (-) texts (22.1%)

Figure 1: CA Map of 13 Textbooks

The CA map in Figure 1 visualizes the 68.9% of the spatial relationships among the thirteen textbooks, where the *x*-axis stands for Dim 1 (speech-oriented (+) vs. exposition-oriented (-) discourse) and the *y*-axis Dim 2 (easy (+) vs. difficult (-) texts). (Because these dimensions are the top two among the four dimensions specified, covering almost 70% of the whole contribution rates, they can be regarded as the major dimensions among the four dimensions representing the present CA results.) As it is clear in Figure 1, all of the thirteen textbooks were grouped into two groups, i.e., (1) neutral(x)-slightly-plus(y) group and (2) neutral / slightly-minus(x)-slightly-minus(y) group, and two independent variants, i.e., *Seisoku-5* and *Sunshine-5*, as in the classification of Table 7.

Table 7: Classification of 13 textbooks

Group 1	Group 2
neutral(x)-slightly-plus(y)	neutral / slightly-minus(x)-slightly-minus(y)
Jack&Betty-5	Standard(t)-5
Pacific-5	Standard(p)-5
Taisho-5	Choice-5
Drill-5	National-5
	Gobe-5
	Union-5
	Dening-5
Independent 1	**Independent 2**
Seisoku-5	Sunshine-5

As it is clear in the classification of Table 7, Group 1, which is characterized by neutral texts in speech/exposition orientation and slightly easy texts, was comprised of four textbooks, i.e., *Jack&Betty-5*, *Pacific-5*, *Taisho-5*, and *Drill-5*. Group 2, which is characterized by slightly expository and slightly difficult texts, was comprised of seven textbooks, i.e., *Standard(t)-5*, *Standard(p)-5*, *Choice-5*, *National-5*, *Globe-5*, *Union-5*, and *Dening-5*. In addition to these groups, two independent textbooks were confirmed, which are different from each other as well as from those belonging to the two groups.

Clearly, it was both Dim 1, i.e., *x*-axis, the axis of speech-oriented vs. exposition-oriented discourse and Dim 2, i.e., *y*-axis, the axis of easy vs. difficult texts that differentiated the thirteen textbooks from among each other. This will prove that both of the two axes, both the *x*-axis and the *y*-axis, are also efficient and powerful differentiators of the thirteen EFL textbooks in focus, although the *y*-axis proved to be far more powerful than the *x*-axis.

It is to be noted in this respect that in the above CA map, only two textbooks, *Sunshine-5*, a current textbook, and *Seisoku-5*, a historical textbook for primary school, were located at two different zones (neutral (x)-highly plus (y)) and (highly plus(x)-neutral (y)), distinctively different from the other eleven

historical textbooks in terms of the two dimensions, i.e., speech/exposition and easy/difficult. Although *Sunshine-5* and *Seisoku-5* proved to be different from the other eleven textbooks, they also proved to be different from each other; *Sunshine-5* was neither speech- nor exposition-oriented (neutral) and extremely easy in difficulty while *Seisoku-5* was very speech-oriented and neither easy nor difficult (neutral).

What is noticeable with this result is the fact that only two textbooks, *Sunshine-5* and *Seisoku-5*, one current and the other historical, were separated from the other eleven historical textbooks by two features, i.e., speech/exposition (Dim 1) and easiness/difficulty (Dim 2). However, what characterized these two textbooks in terms of the two categories or dimensions must be further closely examined from a qualitative as well as quantitative perspective, especially focusing on the unique design and structure of *Seisoku-5*, where lessons are comprised of a part of a story like "Ali Baba and Forty Thieves" and dialogue related to the contents of the story.

Certainly, the CA map based on the two selected major dimensions (axes) can differentiate the major features of the thirteen 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 the two dimensions, Dim 1 and Dim 2, can only display 68.9% of the whole features, leaving the rest (31.1%) of the features untouched. To overcome this weakness, an 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. Figure 2 is a dendrogram that visually summarizes the degree of homogeneity among the thirteen textbooks, based on the values (distances) of all of the twelve dimensions computed in the present analysis, not based on the results of the two selected dimensions as in Figure 1 (for a detailed explanation of dendrogram, see Asai et al., 2019, p. 42).
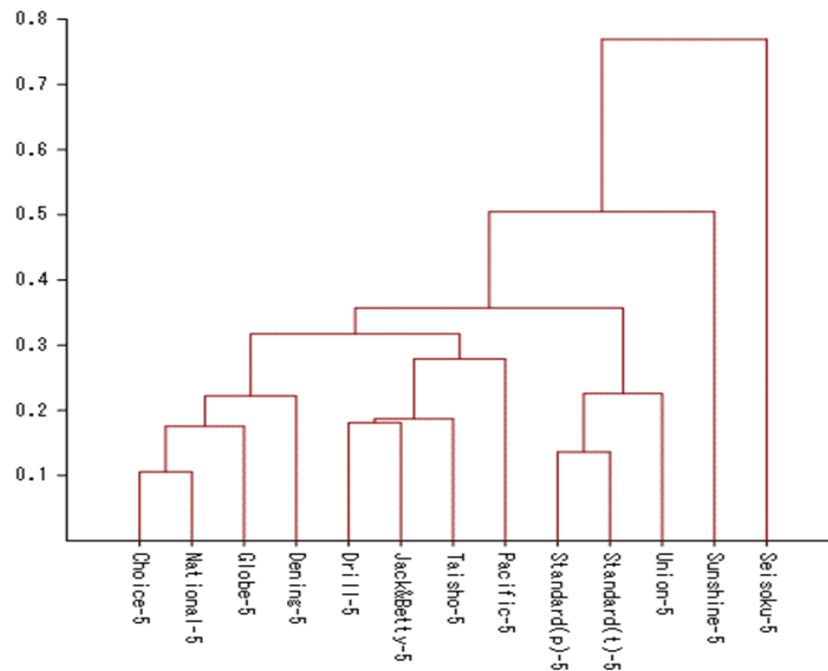
Figure 2: Dendrogram by Ward Method

As Figure 2 shows, the whole features specified in the present analysis were visually summarized in the dendrogram, which can also be described as in the following combination of brackets.

(((((((*Choice-5*, *National-5*)*Glob-5*)*Dening-5*)(((*Drill-5*, *Jack&Betty-5*) *Taisho-5*)*Pacific-5*)) ((*Standard(p)-5*, *Standard(t)-5*)*Union-5*))*Sunshine-5*)*Seisoku-5*)

As it is clear in Figure 2, there were three clusters formed in this dendrogram, and two independent textbooks; Cluster A is comprised of *Choice-5*, *National-5*, *Globe-5,* and *Dening-5*, Custer B is comprised of *Drill-5*, *Jack&Betty-5*, *Taisho-5* and *Pacific-5*, Cluster C is comprised of *Standard(p)-5*, *Standard(t)-5* and *Union-5*, and independent variables are *Sunshine-5* and *Seisoku-5*. Cluster A and Cluster B were combined to form a larger cluster AB, and Cluster AB and Cluster C were further combined to form a larger cluster, Cluster ABC, which suggests that the two independent variants were distinctively different from the other eleven variants, all of the specified features (categories) considered.

It is interesting to note that on the two-dimensional coordinate representation (CA map), only two textbooks, *Sunshine-5* and *Seisoku-5*, were separated as distinctively different from the other eleven textbooks by the two features, i.e., speech/exposition (Dim 1) and easiness/difficulty (Dim 2), while on the dendrogram covering all of the twelve features or categories specified, again the same two textbooks, *Sunshine-5* and *Seisoku-5* were separated as distinctively different from the others. These facts may suggest that all categories considered,

two textbooks, *Sunshine-5* and *Seisoku-5*, should be considered as distinctively different from the other eleven variants.

5. Answers to the RQs

So far, the results of the CA have been described, focusing on the characteristic features among the thirteen textbooks, which proved that CA is powerful enough to quantitatively analyze their features. 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 twelve Japanese historical EFL textbooks (Book-5) and their current counterpart to/from each other? The CA results proved capable of differentiating the features of the thirteen textbooks quantitatively, specifying their similarities and differences. In particular, the CA map comprised of the Dim 1 and Dim 2 data proved powerful enough to differentiate *Sunshine-5* and *Seisoku-5* from the other eleven historical textbooks and each of the thirteen textbooks from each other. It was both speech-oriented (+) vs. exposition-oriented (-) discourse (Dim 1) and easy (+) vs. difficult (-) texts (Dim 2) that differentiated the thirteen textbooks from among each other. This will prove that both of the two axes, ("speech/exposition-oriented" axis and "easy/difficult" axis) are also efficient and powerful differentiators of the thirteen EFL textbooks in focus. It is also to be noted that only two textbooks, *Sunshine-5* and *Seisoku-5*, one current and the other historical, are separated from the other eleven historical textbooks by the same two features described above.

RQ 2. What kinds of dimensions explain the similarities/differences among the thirteen textbooks? Their features or the similarities/differences (distances) among the thirteen textbooks were explained 84.4 percent by the four dimensions, i.e., speech/exposition-oriented discourse (Dim 1), easy/difficult texts (Dim 2), variety-rich variety-poor textbooks (Dim 3), teacher assistance/non-teacher assistance (Dim 4).

RQ 3. How similar/different in contents are the thirteen Japanese fifth-year EFL textbooks to/from their first- and third-year counterparts? The similarities/differences of the thirteen Book-5 textbooks were explained by the dimensions (categories) closely related to but slightly different from those of the Book-3 and Book-1 results up to the fourth dimension, as in Table 8.

Table 8: Dimensions of 3 CAs

	Book-1	Book-3	Book-5
Dim 1	difficult vs. easy texts	difficult vs. easy texts	speech-oriented vs. exposition-oriented discourse
Dim 2	natural-sounding vs. artificial-sounding discours	natural-sounding vs. artificial-sounding discourse	easy vs. difficult texts
Dim 3	passage-based vs. dialogue-based texts	dialogue-based vs. passage-based texts	variety-rich vs. variety-poor textbooks
Dim 4	teacher dominance vs. non teacher dominance	teacher dominance vs. non teacher dominance	teacher assistance vs.non-teacher assistance
Dim 5	strictly-controlled vs. loosely-controlled texts	strictly controlled vs. loosely controlled texts	
Dim 6	concise vs. redundant texts	redundant vs. concise texts	
Dim 7	connected vs. disconnected contents	connected vs. disconnected contents	

Table 8 shows the titles of the dimensions of the three CA solutions of the Japanese historical EFL textbooks, eighteen first-year textbooks (Honda, et al., 2018), eighteen third-year textbooks (Asai et al., 2019) and thirteen fifth-year textbooks (present paper). As it is clear in Table 8, the CA of the Book-1 and Book-3 textbooks needed seven dimensions to explain about 85 % of the data since the number of the textbooks analyzed was large (18),[2] while the CA of the Book-5 textbooks only needed four dimensions to achieve the same goal.

A comparison of the features of the dimensions among the three sets of the textbooks, Book-1, Book-3 and Book-5 revealed interesting findings. First, the features of the dimensions proved to be the same between the Book-1 results and the Book-3 results up to Dim 7 except for the location of the plus/minus on Dim 3 and Dim 6. However, the Book-5 solutions proved to be closely related to but slightly different from the Book-1 and Book-3 results. More specifically, the first dimension of the Book-5 solution was related to the second dimensions of the Book-1 and Book-3 solutions and was termed in a way slightly different from them, i.e., "speech-oriented vs. exposition-oriented" in contrast with "natural-sounding vs. artificial-sounding"(Dim 2, Book-1, Book-3). Second, the features of the second dimensions in the Book-5 solution was the same as those of the first dimensions of the Book-1 and Book-3 results and so the same term, "easy vs.

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[2] Usually, in CA analyzing a large number of categorical variants, the contribution rate of each dimension becomes relatively low (Ishikawa, Maeda, & Yamazaki, 2010 (Eds.), p. 254).

difficult" was used with the plus /minus location reversed between the Book-1 and Book-3 solutions and the Book-5 one. Third, it was found that the features of the third and fourth dimensions in the Book-5 solutions were related to but slightly different from those of the Book-1 and Book-3 solutions and therefore their terms were modified depending upon the nature of each of the two dimensions.

The results of the present CA were graphically represented by two methods, (1) two-dimensional coordinate representation covering only two major dimensions, Dim 1 and Dim 2, and (2) cluster-analysis-based dendrogram covering all the features of the twelve dimensions. These representations revealed that on the two-dimensional coordinate representation, only two textbooks, *Sunshine-5* and *Seisoku-5*, were distinctively different from the other eleven historical textbooks in terms of the two dimensions, i.e., speech/exposition (Dim 1) and easy/difficult (Dim 2), separated as distinctively different from the others, while on the dendrogram covering all of the thirteen features or categories specified, again the same two textbooks, *Sunshine-5* and *Seisoku-5* were separated as distinctively different from the others. These facts could suggest that all the categories considered, two textbooks, *Sunshine-5* and *Seisoku-5* should be closely examined from the qualitative perspective as well as the quantitative one.

6. Conclusion (limitations of the present study and prospects of future research)

As demonstrated above, the present analysis has proved the correspondence analysis to be capable of differentiating the features of the thirteen textbooks quantitatively. On the other hand, it seems to be faced with some important problems in terms of its broader perspective and its methodology.

First, the solution of the present analysis proved that the CA with thirteen fifth-year EFL textbook variants was successful to some extent in specifying their distinctive features, discriminating the similarities and differences among them. However, it was also found out that the features of the four dimensions were slightly different from those of the solutions of the Book-1 and Book-3 CA. Clearly, this was not an ideal solution as it had been expected since all of the textbooks, Book-1, Book-3, and Book-5 could not be interpreted and classified from one set of perspectives. To solve this problem, new attempts have to be made to develop a new method, technique or model for the CA with a large corpus.

Finally, the present CA model, which is focused on the individual-year book rather than the one-to-five-year books of a textbook, did not succeed in describing and explaining the features of all years (volumes) of the textbooks. A new, innovative attempt must be attempted to overcome this limitation by developing a new CA model or procedure for processing large corpora covering first-to-five-year EFL textbooks.

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