

A Comparative Study of Illustrative Examples: Encoding vs. Decoding Purposes

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1. Introduction

Illustrative examples are important components of dictionaries, especially learner's dictionaries. Illustrative examples in learner's dictionaries play an important role for users, such as supplementing information about a headword's meaning, showing the behaviour of the headword in various contexts, and illustrating grammatical patterns utilizing the headword (Drysdale, 1987; Atkins & Rundell, 2008). Information provided by illustrative examples is implicit compared to more explicit grammatical codes or usage information. Therefore, dictionary users need to infer the meaning and functions of illustrative examples in terms of how the words are used. The quality of illustrative examples has been increasingly gaining attention, and research on dictionary examples has been conducted from several approaches, including (1) the extraction of good example candidates from corpora (Kilgarriff et al., 2008; Kosem et al., 2011) and (2) the investigation of a particular aspect of dictionary examples (Ishii, 2011; Ishii and Minn, 2015; Notohara, 2015). The extraction of example candidates has also been conducted in other languages (Kosem et al., 2011; Didakowski et al., 2012), and previous studies have even attempted to extract appropriate examples that are tuned to dictionary users' proficiency levels, especially elementary learners of English (Kawamoto et al., 2017). In addition, some research on illustrative examples has been done from user-study perspectives (Frankenberg-Garcia, 2015; Kawamoto, 2017). Kawamoto (2017) offers two studies — an observational study and an experimental study — to explore the criteria of 'good' illustra-

tive examples in learners' dictionaries. These studies specifically aimed to identify the factors that contributed to determining difficulty levels of examples. Although many studies already focus on the quality of illustrative examples, very few studies provide empirical data showing what characterizes the quality of examples for encoding purposes.

1.1. Formal properties of illustrative examples: phrase vs. sentence

The issue concerning formal properties of examples, that is, whether sentential examples should be provided or not, has long been discussed. Sentential examples have been preferred because of phrasal examples' unnaturalness and abstractness (Kharma, 1984; Fox, 1987; Williams, 1996). Atkins and Rundell (2008)'s criteria for good examples also stipulate that examples should be natural, as well as typical, informative, and intelligible to users.

There have been some attempts to semi-automatically extract illustrative examples due to the availability of larger corpora in compiling dictionaries. Sketch Engine is pioneering in this type of research, and it originally started as a tool used in compiling Macmillan's dictionaries (Kilgarriff, 2013). A web-based corpus portal site, Sketch Engine (Kilgarriff et al., 2004), provides a function named Good Dictionary EXamples (GDEX), which helps lexicographers choose examples under a particular headword. GDEX takes a rule-based approach to choose example candidates, extracting complete sentences from large corpora while filtering out non-sentences and spam, and sorting the examples based on how well they meet Atkins and Rundell (2008)'s aforementioned criteria: (1) natural and typical, (2) informative, and (3) intelligible to users. These three criteria were operationalized as objective, numerical variables, such as sentence length or the difficulty levels of vocabulary used in the given sentences, in order to determine the quality of the sentences from the corpora.

Lexicographers share a common view of illustrative examples: sentential examples should be provided in dictionaries. However, because of space limitations in bilingual dictionaries, in which lexicographers

are required to provide translations of illustrative examples in their first languages, lexicographers must also provide phrasal examples in their dictionaries. Kawamoto and Tono (2015)'s comparative study of illustrative examples shows these tendencies. In monolingual dictionaries, sentential examples were provided most often, while phrasal examples were often provided as well as sentential examples in bilingual dictionaries. Nevertheless, it can be said that lexicographers have attempted to provide an appropriate style of examples according to the proficiency of the target dictionary users.

Some studies on illustrative examples have been done with regard to the user's perspective, and results show that users prefer sentential examples. Xu (2006) conducted a needs analysis on whether Chinese EFL Learners prefer to use sentential examples rather than phrasal examples. The results showed that learners found it necessary to refer to sentential examples when they could not solve problems after looking at equivalents or definitions in dictionaries. Also, the results showed that when learners used dictionaries for encoding purposes, they found illustrative examples more useful to verify how a particular headword was used in actual contexts.

From this study, however, it is unclear whether learners actually prefer sentential examples in real situations, since the results were obtained based on learners' introspective comments. Additionally, it is also unclear whether learners performed better when they were provided with sentential examples or when they were provided with phrasal examples. In order to clarify this, Kawamoto (2017) employed a mixed-method (observation and experimental) study to explore 'good' illustrative examples by analyzing how Japanese EFL Learners actually use illustrative examples in L1-L2 translation tasks. The experiment showed that phrasal examples were significantly easier to use when less proficient learners, i.e. elementary and lower-intermediate learners, tried to extract a piece of information from examples to use in their translation tasks. On the other hand, when Japanese learners applied the information extracted from examples to their translation tasks, less proficient learners wrote significantly better when sentential

examples were provided. The formal properties of examples did not make any difference to how well the intermediate learners did on both the processes of extracting information from examples and applying the information to their L1-L2 translation tasks. These results support the use of sentential examples for encoding purposes is preferable, because sentential examples provide users with more abundant information in terms of syntax and context.

1.2. Purpose of the study

The present study aims to explore the criteria for 'good' illustrative examples in English learner's dictionaries for encoding purposes. Specifically, this study tries to explore how existing dictionaries deal with two types of illustrative examples: examples for encoding purposes vs. examples for decoding purposes, particularly putting focus on the formal properties (Phrase vs. Sentence). To this end, a comparative study of illustrative examples provided in dictionaries for encoding purposes and those in dictionaries for decoding purposes was conducted. The research questions are as follows:

- RQ1 What are some of the linguistic factors pertaining to the distinction between illustrative examples for encoding purposes and those for decoding purposes?
- RQ2 Are there any differences in the quality and quantity of illustrative examples, depending on the type of dictionary (monolingual vs. bilingual; decoding vs. encoding)?

2. Methodology

2.1. Selection of dictionaries

The target dictionaries in this study are two monolingual dictionaries and two bilingual dictionaries (see Table 1). The first is the 2nd edition of the *Longman Language Activator (LLA2)*, and in order to easily compare and explore how each publisher tries to help users encode their messages with illustrative examples, another monolingual learner's dictionary published by the same company was selected: the 6th edition of *Longman Dictionary of Contemporary English (LDOCE6)*.

Table 1 Monolingual and Bilingual Dictionaries Used in this Study

	Publisher	Type	Title
Monolingual Dictionaries	Pearson	Decoding	<i>Longman Dictionary of Contemporary English</i> (6th edition)
	Longman	Encoding	<i>Longman Language Activator</i> (2nd edition)
Bilingual Dictionaries	Obunsha	Decoding	<i>O-LEX English-Japanese Dictionary</i> (2nd edition)
		Encoding	<i>O-LEX Japanese-English Dictionary</i> (2nd edition)

The target monolingual production dictionaries (or *LLA2*) have been published to help users to encode natural expressions in the target language, being English. For bilingual dictionaries, the 2nd edition of *O-LEX Japanese-English Dictionary (O-LEX JE2)* and the 2nd edition of *O-LEX English-Japanese Dictionary (O-LEX EJ2)* were selected as the target dictionaries.

Some might argue that even L2-L1 dictionaries provide useful information to help the users encode language, and it is often said in Japan that one has to consult English-Japanese dictionaries to encode messages in English. In the field of lexicographical typology, the direction from L1 to L2 (target language), is considered to be encoding, and the other direction, L2 to L1, is considered to be decoding. This study adopts this typology, and the Japanese-English dictionary was considered to be the bilingual dictionary for encoding, while the English-Japanese dictionary was considered to be the bilingual dictionary for decoding. These criteria are also applied to the selection of monolingual dictionaries. The monolingual learner's dictionary was considered to be the monolingual dictionary for decoding to contrast *Longman Language Activator*, which specifically attempts to help learners choose the best words among other synonyms when expressing the idea that they want.

2.2. A collection of illustrative examples

In preparation for this study, illustrative examples were extracted manually from each of the target dictionaries. During the study itself, illustrative examples from the monolingual production dictionary and the Japanese-English dictionary were classified as illustrative examples for encoding purposes, while those from the regular monolingual dictionary and the English-Japanese dictionary were considered to be illustrative examples for decoding purposes.

2.3. Selection of headwords

In this study, all illustrative examples were extracted under randomly picked headwords/keywords. Table 2 shows the process of extracting examples.

Table 2 Example of How to Extract Examples

LDOCE6	LLA2		O-LEX EJ2	O-LEX JE2
English Headwords	Keyword	English Headwords	English Headwords	Japanese Headwords
choose pick select	CHOOSE	choose pick select go for make a choice take your pick	choose pick select	えらぶ (<i>erabu</i>)

2.4. Linguistic annotation of examples

Each of the target illustrative examples was annotated in terms of information related to the examples themselves and the information regarding their vocabulary (see Table 3).

To answer both RQ1 and RQ2, each of the target illustrative examples has information on (1) from which dictionaries the examples are from (**Dictionary**): a bilingual dictionary for decoding (**BD** or [BILING/DECOD]), a bilingual dictionary for encoding (**BE** or [BILING/ENCOD]), a monolingual dictionary for decoding (**MD** or [MONO/DECOD]), or a monolingual dictionary for encoding (**ME** or [MONO/

Table 3 List of Annotation Tags

Example-related Information:	
Dictionary (Dictionary)	Bilingual Decoding dictionary (BD or [BILING/DECOD]) Bilingual Encoding dictionary (BE or [BILING/ENCOD]) Monolingual Decoding dictionary (MD or [MONO/DECOD]) Monolingual Encoding dictionary (ME or [MONO/ENCOD])
Type of Dictionary (DicType)	Bilingual (BILING) vs. Monolingual dictionaries (MONO)
Type of Example (ExamType)	Decoding (DECOD) vs. Encoding examples (ENCOD)
FORM	Phrasal examples (Phrase) vs. Sentential examples (Sentence)
Length (LENG)	the number of words per example
Lexical Item-related Information:	
A1_Per	the percentage of A1 level-words per example
A2_Per	the percentage of A2 level-words per example
B1_Per	the percentage of B1 level-words per example
B2_Per	the percentage of B2 level-words per example
A1Only	whether the example consists of only A1-level words or not
A1A2Only	whether the example consists of only A1-level & A2-level words
AveVLevel	the average vocabulary levels of words per example

ENCOD]), (2) from which type of dictionaries (**DicType**) the examples are from: monolingual dictionaries (**MONO**) or bilingual dictionaries (**BILING**), and (3) which type of examples they are: examples for encoding (**ENCOD**) or those for decoding (**DECOD**). Each of the target illustrative examples also has information on **FORM**: either the examples are phrasal (**Phrase**) or sentential (**Sentence**). **LENGTH** was operationalized as the number of words in an example. Contractions were counted as two words (i.e., don't = do not).

Each of the target sentences was lemmatized using Wmatrix (Rayson, 2009), and each lemmatized word was annotated in terms of its vocabulary levels. The vocabulary levels were determined based on the

CEFR-J Wordlist version 1.3 (Tono, 2013). Information related to word difficulty has often been used in attempts to automatically extract example candidates (Kilgarriff et al., 2018; Ljubešić & Peronja, 2015) and in the investigation of examples (Ishii, 2011), because the level of vocabulary is considered to be a factor in determining the intelligibility of examples. In the field of pedagogical lexicography, it seems that there have been no consistent policies on how to moderate the difficulty levels of vocabulary in examples so that users can understand them; however, vocabulary was a factor which made differences to how well low-proficiency learners performed in L1-L2 translation even though bilingual dictionaries provided Japanese translations of the examples (Kawamoto, 2017).

The percentages of words belonging to a particular word difficulty level indicated by CEFR levels (e.g., **A1_Per** and **A2_Per**) were calculated, excluding proper nouns, numbers, and off-list words. The average vocabulary level of the target examples (**AveVLevel**) was the mean score of the vocabulary levels in an example, where A1 to B2-level words were weighted with scores from 1 to 4 respectively.

2.5. Conditional inference trees

This study used the conditional inference trees (`ctree`) function in the R package **partykit** (Hothorn et al., 2006; Hothorn and Zeileis, 2015). `Ctree` is a non-parametric class of regression trees, and it estimates a regression relationship. Again, the present study tried to explore which linguistic features provided in Table 3 would contribute to determining the type of illustrative examples, illustrative examples for encoding purposes and those for decoding purposes (RQ1) and the type of dictionary (RQ2). For the first research question, the author used the `ctree` function to construct a model predicting a dependent variable, **ExamType**, as a function of all independent variables as predictors. To answer the second research question, the author constructed a model for predicting a dependent variable, **Dictionary**, as a function of all independent variables.

3. Results

3.1. Overall tendency

Before presenting the results of conditional inference trees, this section will introduce some overall tendencies of how illustrative examples differ among the four dictionaries: a bilingual decoding dictionary ([BILING/DECOD]), a bilingual encoding dictionary ([BILING/ENCOD]), a monolingual decoding dictionary ([MONO/DECOD]), and a monolingual encoding dictionary (MONO/ENCOD).

Table 4 Overall Tendencies of Illustrative Examples

	DicType	Bilingual Dictionaries (BILING)		Monolingual Dictionaries (MONO)	
		ExamType	Decoding (DECOD)	Encoding (ENCOD)	Decoding (DECOD)
Number of Examples	Total	173	210	245	422
	Phrase	104 (60.12%)	33 (15.71%)	34 (13.88%)	27 (6.40%)
	Sentence	69 (39.88%)	177 (84.29%)	211 (86.12%)	395 (93.60%)
Average Length	Total	6.15	8.53	8.79	10.84
	<i>s.d.</i>	3.45	3.54	3.23	3.71
	Phrase	4.02	4.27	5.62	6.11
	<i>s.d.</i>	1.57	1.96	2.30	2.74
	Sentence	9.36	9.32	9.30	11.16
	<i>s.d.</i>	2.99	3.19	3.07	3.55
AveVLevel	Total	1.58	1.34	1.30	1.35
	<i>s.d.</i>	0.49	0.34	0.27	0.31
	Phrase	1.72	1.64	1.53	1.77
	<i>s.d.</i>	0.55	0.61	0.34	0.63
	Sentence	1.37	1.28	1.26	1.32
	<i>s.d.</i>	0.30	0.22	0.24	0.25
A1ONLY	Total	14 (8.09%)	23 (10.95%)	32 (13.06%)	32 (7.58%)
	Phrase	10 (9.62%)	1 (3.03%)	4 (11.76%)	2 (7.41%)
	Sentence	4 (5.80%)	22 (12.43%)	28 (13.27%)	30 (7.59%)
A1A2ONLY	Total	43 (24.86%)	61 (29.05%)	71 (28.98%)	84 (19.91%)
	Phrase	29 (27.88%)	8 (24.24%)	8 (23.53%)	9 (33.33%)
	Sentence	14 (20.29%)	53 (29.94%)	63 (29.86%)	75 (18.99%)

Table 4 provides information on (1) the number of target illustrative examples, (2) the average length of examples, (3) the average vocabulary levels of examples, (4) the number of examples consisting of A1-level words only, (5) the number of examples consisting of A-level (A1 and A2) words only. Percentages are also given for the number of examples, the number of examples consisting of A1-level words only, and the number of examples consisting of A-level words only. The standard deviations are provided in terms of (2) the length of examples and (3) the vocabulary levels of examples.

In terms of the formal properties of illustrative examples, the bilingual dictionary for decoding purposes ([BILING/DECOD]) provided many phrasal examples (104 examples), which accounted for more than 60 percent of the total number of examples (60.12%). On the other hand, the percentages of phrasal examples provided in the other three types ([BILING/ENCOD], [MONO/DECOD], and [MONO/ENCOD]) were relatively small: 15.71%, 13.88%, and 6.40%, respectively. In addition, examples for encoding purposes were more likely to be comprised of sentential examples than those prepared for decoding purposes in both bilingual dictionaries (39.88% < 84.29%) and monolingual dictionaries (86.12% < 93.60%). This result indicates that the formal properties of examples can be a predictor that contributes to determining the type of illustrative examples.

Table 4 shows a prominent tendency in the length of illustrative examples. The average length of encoding examples was longer than that of decoding examples in both bilingual dictionaries (6.15 < 8.53) and monolingual dictionaries (8.79 < 10.84). This was also true for both phrasal and sentential examples, except for the bilingual sentential examples. The average length of sentential examples provided in the two bilingual dictionaries was relatively similar, but the average length of sentential examples provided in the decoding dictionary was slightly longer (9.36 > 9.32). However, the difference in average length was not very large; therefore, it is still unclear whether or not such a difference contributed to determining the type of examples.

In addition to the difference in the average length of examples

between encoding and decoding dictionaries, it is worth mentioning here that phrasal examples provided in monolingual dictionaries were slightly longer than those in bilingual dictionaries. The average length of phrasal examples was 4.02 words per example in the bilingual dictionary for decoding, and 4.27 words per example in the bilingual dictionary for encoding. On the other hand, the average length of phrasal examples was 5.62 words in the monolingual dictionary for decoding and 6.11 words in the monolingual dictionary for encoding. Although the differences must be statistically tested, there is a possibility that phrasal examples in monolingual dictionaries provide additional information that those in bilingual dictionaries do not. When compared to the average length of phrasal examples, there was no striking difference in the length of sentential examples among the bilingual dictionary for decoding, the bilingual dictionary for encoding, and monolingual dictionary for decoding (9.36, 9.32, 9.30, respectively). On the other hand, Table 4 shows that sentential examples provided in the monolingual dictionary for encoding were relatively longer than those in the other dictionaries (11.16).

The average vocabulary level of examples in the bilingual dictionary for decoding was relatively higher than those of the other three types of dictionaries (1.58 > 1.34, 1.30, 1.35). The average vocabulary levels of phrasal examples and sentential examples also show the same tendency observed in the comparison of the average lengths of examples: examples in the bilingual dictionary are slightly higher than those in the other three kinds of dictionaries. This tendency might be explained by the larger number of phrasal examples in the bilingual decoding dictionary.

Table 4 seems to show only random tendencies for the difficulty levels of words used in the examples. The percentages of illustrative examples with only A-level words were random in both phrasal examples and sentential examples. However, when comparing the percentage of examples with A1-level and A2-level words, the numbers remained consistent. Those examples accounted for between 20 and 30 percent across three dictionaries: the two bilingual dictionaries and the

monolingual dictionary for decoding.

The basic statistics in Table 4 show some prominent tendencies, which indicate that some of the linguistic features selected for quantitative analysis of the examples can serve as possible predictors in said analysis. These will help determine the example types: [ENCOD/DECOD], and the dictionary types: [BILING/MONO] x [ENCOD/DECOD]. The following sections will present the results of conditional inference trees, and use them to discuss which features described above can serve as significant factors for determining the example types.

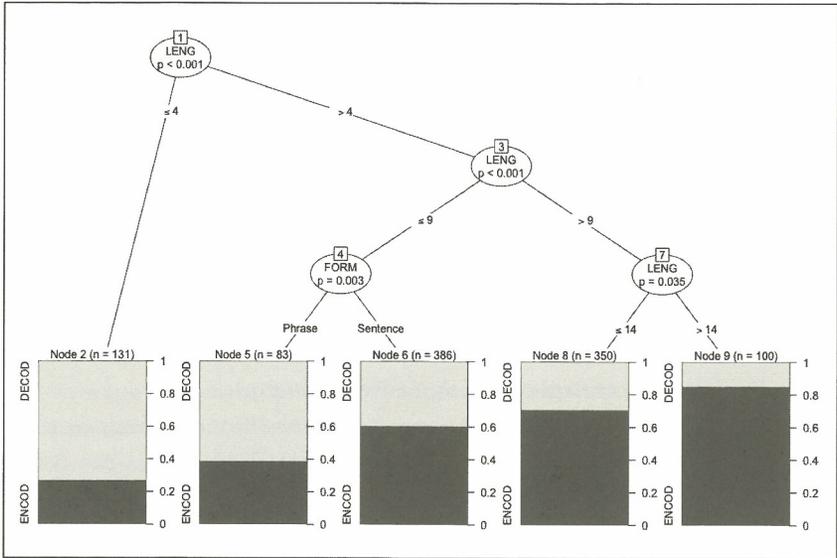
3.2. Encoding examples vs. decoding examples

This section will introduce the results of conditional inference trees for types of illustrative examples (**ExamType**). Figure 1 is the result of conditional inference trees that model the types of illustrative examples: examples for encoding purposes (**ENCOD**) vs. those for decoding purposes (**DECOD**) as a function of all predictors.

Figure 1 shows that examples were divided into five terminal nodes. At the highest level, the examples were divided into two groups according to the length of illustrative examples (**LENG**): ≤ 4 or > 4 ($p = .001$). After this branching, Node No.2 (bottom left) was decided as a terminal node (the final class), below which there is a box chart showing the proportion of encoding and decoding examples allocated to this class. The number attached to each internal node (non-terminal symbol) and the terminal node show the order of decisions. The next branching represents the length of illustrative examples (**LENG**) again: ≤ 9 or > 9 ($p = .001$). Illustrative examples which consist of more than 4 words but not more than 9 words were further divided into two terminal nodes (cf. Nodes No.5 and No.6) according to the formal types of examples (**FORM**): Phrase or Sentence ($p = .003$). Illustrative examples composed of more than 9 words were further divided into two terminal nodes on the basis of the length of examples (**LENG**): ≤ 14 or > 14 ($p = .035$).

According to Figure 1, the length of illustrative examples (**LENG**)

Figure 1 Tree for Types of Examples: Encoding vs. Decoding



is one factor which contributes to determining the example types: illustrative examples for encoding purposes or those for decoding purposes. First, terminal node No.2 shows that shorter illustrative examples (**LENG** ≤ 4) are more likely to be found in decoding examples. In addition, the longer the illustrative examples are, the more likely it is that the examples originate from encoding dictionaries. According to terminal node No.2, sentences shorter than four words seldom originate from the encoding dictionaries. On the other hand, when the examples are made up of nine words or more, the longer the examples are, the more likely it is that the examples originate from encoding examples (see terminal nodes No. 8 and 9).

In addition to length, an example's formal type (**FORM**) also serves as a significant factor for determining the example types when the examples consist of more than four words but not more than nine words. When such examples were phrasal (i.e. not sentential), it was likely that they derived from decoding dictionaries (terminal node No.5). The box chart at Node No.6, on the other hand, shows that

with respect to examples provided in complete sentences, it is equally likely or more likely that they come from dictionaries for encoding purposes.

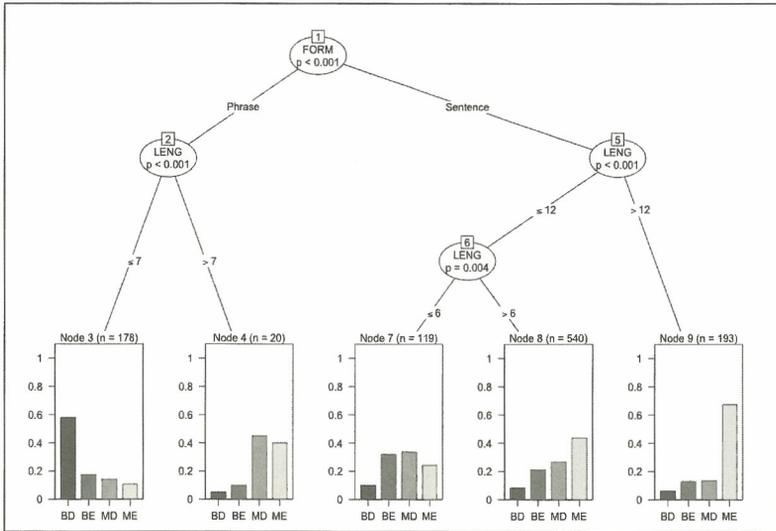
Although Figure 1 shows that formal type may be a key factor, it is possible that formal properties of dictionaries do not actually contribute to determining the following types of examples: those for encoding or those for decoding in the case of monolingual dictionaries as seen in Table 4 and discussed in the section 3.1. This result was possibly caused by the abundant number of phrasal examples in the [BILING/DECOD]. Therefore, one has to be careful about how to interpret this data. This result does not necessarily mean that many phrasal examples are provided in decoding dictionaries. Rather, it is possible that this result was obtained simply because of the abundance of phrasal examples in the bilingual dictionaries for decoding purposes.

3.3. Four dictionaries

This section will introduce the results of conditional inference trees for four dictionaries to answer the second research question. Figure 2 is the result of conditional inference trees that model the type of dictionaries: the bilingual decoding dictionary (**BD**; *O-LEX EJ2*), the bilingual encoding dictionary (**BE**; *O-LEX JE2*), the monolingual decoding dictionary (**MD**; *LDOCE6*), and the monolingual encoding dictionary (**ME**; *LLA2*) as a function of all predictors.

Figure 2 shows that examples have been divided into five terminal nodes. At the highest level, examples were divided into two internal nodes according to the formal properties of examples (**FORM**): Phrase or Sentence ($p = .001$). Then, phrasal examples were divided into two terminal nodes, based on the length of phrasal examples (**LENG**): ≤ 7 or > 7 ($p = .001$). On the other hand, after the first branching, sentential examples were divided into two nodes on the basis of sentence length (**LENG**) as well: ≤ 12 or > 12 ($p = .001$). Sentential examples that consisted of fewer than 12 words were further divided into two terminal nodes according to the length of sentential examples (**LENG**): ≤ 6 or > 6 ($p = .004$).

Figure 2 Tree for Four Types of Dictionary: BD, BE, MD, vs. ME



According to Figure 2, among phrasal examples, for illustrative examples consisting of fewer than seven words, it is more likely that the examples are from the bilingual dictionary for decoding ([BILING/DECOD]). On the other hand, for phrasal examples that consist of more than seven words, it is more likely that those examples are from monolingual dictionaries. These results suggest that in both monolingual dictionaries and bilingual dictionaries, some phrasal examples are provided; however, the bilingual decoding dictionary provides the user with shorter phrasal examples, compared to the other three dictionaries. Also, as Table 4 shows, phrasal examples in monolingual dictionaries are relatively longer than those in bilingual dictionaries (see Node No.4). In addition, the chart at Node No.9 shows that for sentential examples that are made up of more than 12 words, it is more likely that those examples are from the monolingual dictionary for encoding. The charts at Nodes No.7 and 8 also show similar tendencies. When the sentential examples consist of fewer than 12 words, it is equally likely that those examples are from either the bilingual dictionary for encoding or the monolingual dictionary for decoding.

3.4. Types of dictionary: a monolingual dictionary vs. a bilingual dictionary

Exploring the differences between examples provided in bilingual dictionaries and examples in monolingual dictionaries was not the original objective of this study. However, as the aforementioned results of the conditional inference trees indicate, it is challenging for people to draw conclusion about the differences between examples for encoding and those for decoding without considering the differences between dictionary types: monolingual or bilingual. Therefore, this section will introduce the results of conditional inference trees with regard to dictionary types (**DicType**).

Figure 3 Tree for Dictionary Types: Monolingual vs. Bilingual

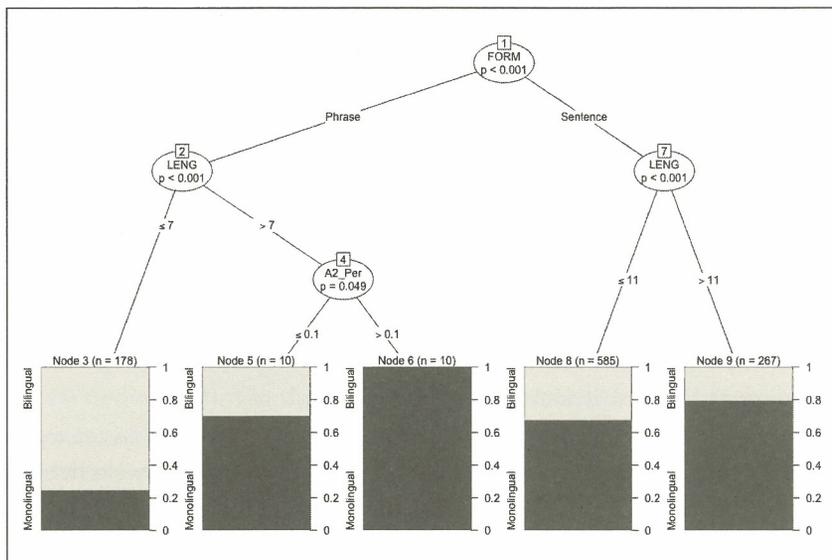


Figure 3 shows the results of conditional inference trees that model the type of dictionary: bilingual dictionaries (**BILING**) vs. monolingual dictionaries (**MONO**). At the highest level, examples were divided into two nodes according to the formal properties of examples (**FORM**): Phrase or Sentence ($p = .001$). At the next branching, phrasal examples

were divided into two nodes on the basis of length (**LENG**): ≤ 7 or > 7 ($p = .001$). Phrasal examples that were made up of more than seven words were further divided into two nodes according to the percentage of A2-level words in the phrasal examples: ≤ 0.1 or > 0.1 ($p = .049$). Sentence examples were also further divided after the highest branching into two terminal nodes based on sentence length (**LENG**): ≤ 11 or > 11 ($p = .001$).

Figure 3 shows some prominent tendencies. First, monolingual dictionaries also provide phrasal examples, and such phrasal examples are longer than those in bilingual dictionaries. The chart at Node No.3 shows that when examples are provided in the form of phrases and consist of fewer than seven words, it is more likely that the examples are from bilingual dictionaries. In addition to the tendency of shorter phrasal examples to originate from bilingual dictionaries, it is also a fact that it is more likely that longer sentential examples (see terminal nodes No. 8 and 9) are from monolingual dictionaries.

The charts at Nodes No.5 and 6 also show a striking tendency between the two types of dictionaries. With regard to relatively longer phrasal examples (**LENG** > 7) with a percentage of A2 that is higher than 0.1 (**A2_Per** > 0.1), it is more than likely that the examples come from monolingual dictionaries (see terminal node No.6). However, the percentage of A2-level words per sentence was a factor that only differentiated ten examples from ten others. Therefore, the interpretation of these results requires careful consideration.

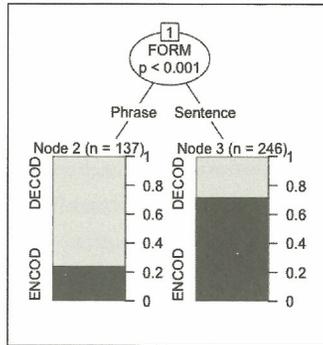
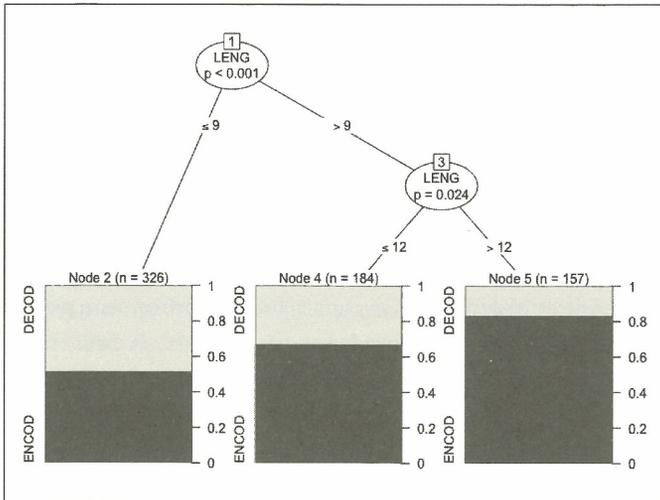
Figures 2 and 3 show that the formal properties of illustrative examples, **Phrase** vs. **Sentence**, played a role in the very first branching and served as a significant factor. The descriptive analysis (Table 4) shows that the percentage of phrasal examples in the [BILING/DECOD] is much higher than that in the other three dictionaries, and there are no striking differences with regard to the percentages of the phrasal examples in the other three dictionaries. Therefore, it is possible that although examples were divided into two nodes according to the formal properties as a predictor to classify the four dictionaries (Figure 2), the first branching was only made because of differentiat-

ing phrasal examples in the [BILING/DECOD] from examples provided in the other three dictionaries. In addition, it is also possible that the first branching in Figure 3 was also made in order to differentiate examples in the [BILING/DECOD] from those in the other three dictionaries, but not to differentiate examples in the [BILING] from those in the [MONO].

Therefore, in order to acquire a comprehensive understanding of illustrative examples for different purposes, (1) a model for a dependent variable, i.e. the type of examples (**ExamType**) in the bilingual dictionaries only and (2) a model for the type of examples (**ExamType**) in the monolingual dictionaries only were both constructed using the *ctree* function. Figure 4 is the result of the conditional inference trees for the types of illustrative examples in bilingual dictionaries, and Figure 5 is the result of the conditional inference trees for the types of examples in monolingual dictionaries.

Figure 4 shows only one branching of illustrative examples in bilingual dictionaries resulting in two terminal nodes. These nodes formed based on the formal properties of examples (**FORM**): Phrase or Sentence ($p = .001$). According to this figure, only one predictor served as a significant factor for determining the types of examples: either examples for encoding purposes or those for decoding purposes. When examples were provided in the form of phrases, it was much more likely that the examples were provided for decoding purposes (see terminal node No.2). On the other hand, it was more likely that examples were for encoding purposes when examples were provided in the form of complete sentences (see terminal node No.3).

On the other hand, Figure 5 shows two branchings of examples in monolingual dictionaries resulting in three terminal nodes. At the highest level, illustrative examples in monolingual dictionaries divided into two nodes according to the length of examples (**LENG**): ≤ 9 or > 9 ($p = .001$). After the first branching, the illustrative examples that were composed of more than nine words were further divided into two terminal nodes on the basis of the length of examples (**LENG**): ≤ 12 or > 12 ($p = .024$). According to Figure 5, unlike bilingual dictionaries,

Figure 4 Tree for **ExamType** in Bilingual Dictionaries: Encoding vs. DecodingFigure 5 Tree for **ExamType** in Monolingual Dictionaries: Encoding vs. Decoding

the length of illustrative examples (**LENG**) was a contributing factor for determining the example types of monolingual dictionaries. When examples consisted of fewer than nine words, it was equally likely that the examples were provided either for encoding purposes or for decoding purposes (see terminal node No.2). The terminal nodes No.4 and 5 show that the longer the examples were, the more likely it was that the examples were for encoding purposes.

4. Discussion

4.1. Summary of the results

The results of descriptive statistics (Table 4) and conditional inference tree analyses (Figures 1–5) showed some tendencies of how the examples for encoding and decoding purposes and the examples provided in the four types of dictionary differ from each other. The following is a summary of the results of the conditional inference tree analyses:

- (1) Encoding vs. Decoding: **LENG** > **FORM** (> **LENG**)
- (2) Encoding vs. Decoding in [BILING]: **FORM**
- (3) Encoding vs. Decoding in [MONO]: **LENGTH**
- (4) Dictionary type: **FORM** > **LENG**
- (5) Monolingual vs. Bilingual dictionary: **FORM** > **LENG** > **A2_Per**

For instance, in (1), when the dictionaries for encoding and decoding purposes were compared, the length (**LENG**) was the most salient predictor, followed by forms (**FORM**). The symbol (>) indicates that the item on the left of the symbol (in this case, **LENG**) was used as the primary predictor, compared to the item on the right.

These results showed that two factors: the length of illustrative examples (**LENG**) and the formal types of examples (**FORM**) contributed to determining whether examples were for encoding purposes or for decoding purposes (RQ1) and to determining which of the four dictionaries those examples came from (RQ2). A variable related to vocabulary levels (**A2_Per**) was a contributing factor only for differentiating the examples provided in the monolingual dictionaries (**MONO**) from those in the bilingual dictionaries (**BILING**). Each of the target examples had information related to vocabulary, including the percentage of a particular level of words in an example (e.g., **A1_Per** and **A2_Per**) and the average vocabulary levels (**AveVLevel**), as well as the formal properties of examples (**FORM**) and the length of examples (**LENG**). In spite of this, the level of vocabulary (or the percentage of A2-level words in a sentence, to be specific) was a contributing factor

for the type of dictionary: [MONO] vs. [BILING], but not for the type of examples: [ENCOD] vs. [DECOD] or for the distinction of the four dictionaries: [BILING/DECOD], [BILING/ENCOD], [MONO/DECOD], vs. [MONO/ENCOD].

In the following sections, the characteristics of the four existing target dictionaries will be discussed from the perspective of (1) the formal properties of illustrative examples (**FORM**) and (2) the length of illustrative examples (**LENG**).

4.2. **FORM: Phrasal examples vs. sentential examples**

The formal properties of illustrative examples have always been a complex issue, that is, whether or not the use of phrasal examples should be avoided because of their unnatural and abstract nature. Also, learners seemed to prefer sentential examples (Xu, 2006), and an experimental study (Kawamoto, 2017) has shown that whether illustrative examples were phrasal or sentential made differences to how well learners performed in L1-L2 translation tasks. The present study aimed to explore the criteria for 'good' illustrative examples for encoding purposes by contrasting illustrative examples provided in encoding dictionaries and those in decoding dictionaries.

The results of this study showed that formal properties of illustrative examples (**FORM**) served as a significant factor for determining whether or not the examples were from encoding dictionaries. The formal properties of examples were used as a predictor when identifying (1) whether or not examples were for encoding examples (Figure 1). As discussed earlier, it is too early to conclude that the formal types of illustrative examples are a contributing factor when considering the percentage of phrasal examples in the [BILING/DECOD]. However, Figures 4 and 5 provided the evidence to answer this question. Figures 4 and 5 both produced trees which classified example types based on encoding versus decoding, and also as functions of all predictors in the target bilingual dictionaries and monolingual dictionaries, respectively. The formal properties of examples (**FORM**) were used to predict if the examples in the bilingual dictionaries were from encoding

dictionaries, while the formal properties of examples (**FORM**) were not a contributing factor in determining whether examples in the monolingual dictionaries were from the dictionary for encoding or from the dictionary for decoding. In fact, the descriptive statistics (Table 4) showed that the percentage of phrasal examples in the [BILING/DECOD] was much higher than that of the phrasal examples in the other three dictionaries: [BILING/ENCOD], [MONO/DECOD], or [MONO/ENCOD] (60.12% > 15.71%, 13.88%, 6.20%). These results indicate that although the formal properties of examples seemed to be a determining factor (Figures 1, 2, 3), this predictor was mainly used to differentiate examples in the [BILING/DECOD] from the other three dictionaries: [BILING/ENCOD], [MONO/DECOD], or [MONO/ENCOD].

The bilingual dictionary for encoding purposes seems to provide more sentential examples in order to help the users encode messages in English, unlike the bilingual dictionary for decoding. On the other hand, it seems that the monolingual dictionaries have a consistent policy of providing sentential examples whenever possible irrespective of the type of dictionary: [MONO/DECOD] or [MONO/ENCOD]. Sentential examples have long been preferred because of the possible unnaturalness and abstractness of phrasal examples (Kharma, 1984; Fox, 1987; Williams, 1996). There is little to no opposition to the claim that sentential examples are more natural; however, it is doubtful that sentential examples should always be provided. Illustrative examples have several functions, and one of their important functions is to show how a particular word is used in a context (Drysdale, 1987; Atkins & Rundell, 2008). Considering possible illustrative examples to fulfill this role, sentential examples prove to be preferable to phrasal examples because of sentential examples' rich contextual information. Another important function that examples have is to show the syntactic behavior of a particular headword (Drysdale, 1987; Atkins & Rundell, 2008). This is also a reason why sentential examples should be provided, especially when a particular word is used with very specific syntactic patterns.

Sentential examples fulfill particular functions as illustrative examples, while it is possible to say that phrasal examples may have limited functions in comparison. However, if there are cases where phrasal examples serve the same functions as sentential examples, then phrasal examples should be preferred for economic reasons, especially in printed dictionaries. It is also possible that phrasal examples allow lexicographers to include more examples. Furthermore, another function of illustrative examples in general is to provide collocation patterns (Drysdale, 1987). There are several types of collocations: adverb + verb, adjective + noun, verb + noun, etc. Some types of collocation patterns, such as adverb + verb and verb + noun, might be illustrated more clearly in sentential examples than phrasal examples. However, when examples provide technical words such as terminology in a specific field, information on how to use those words might be not needed for learners. It is even possible that there are cases where some information related to syntactic structure is unnecessary for particular users — advanced learners, for example.

Printed dictionaries should and always do include information that is adjusted to their intended, target users, as well as the target users' projected proficiency levels. Some syntactic information might be apparent to highly proficient learners. In this case, even phrasal examples may provide them with enough syntactic information to apply to their tasks. It is even possible that a larger number of phrasal examples is sometimes more useful because the larger number of examples means that there is a greater possibility that learners can locate the appropriate examples they want. In printed dictionaries, making the choice to provide users with phrasal examples might be one way to provide a larger number of examples. Therefore, although sentential examples have long been preferred as effective illustrative examples, there are undeniable cases where phrasal examples can also fulfill the function of showing the syntactic behavior of headwords in advanced learners' dictionaries as effectively as sentential examples.

4.3. Length of illustrative examples

The second predictor was the length of illustrative examples (**LENG**). An overall tendency showed that the longer the examples were, the more likely it was that the examples were provided for encoding purposes (Table 4 and Figure 1). The length of examples (**LENG**) is closely related to the formal properties of examples, and therefore one cannot discuss the length of examples without also considering their formal properties. As such, the following sections offer a discussion on length in terms of phrasal examples and sentential examples.

4.3.1. Phrasal examples

Table 4 showed the subtle differences between the bilingual dictionaries and the monolingual dictionaries in terms of the average length of phrasal examples (4.02 in the [BILING/DECOD], 4.27 in the [BILING/ENCOD] < 5.62 in the [MONO/DECOD], 6.11 in the [MONO/ENCOD]). The results of conditional inference tree analyses indicate that there were significant differences in the length of phrasal examples between the bilingual dictionaries and the monolingual dictionaries, and the threshold in the difference of length was around seven words per examples. Both Figures 2 and 3 showed that when phrasal examples were composed of more than seven words, it was more likely that those phrasal examples were from monolingual dictionaries. On the other hand, among shorter phrasal examples (**LENG** ≤ 7), there seemed to be no big difference among the three dictionaries: [BILING/ENCOD], [MONO/DECOD], or [MONO/ENCOD]. However, it is not clear if this result means phrasal examples in the [BILING/DECOD] were far shorter than those in the other three dictionaries. Moreover, the threshold for the levels does not necessarily indicate that phrasal examples in the monolingual dictionaries were as long as sentential examples. This result rather means that the bilingual dictionaries do not provide the user with many longer phrasal examples that are made up of more than seven words. Even so, the threshold for the length, seven words per example, might seem very surprising. When imagining what phrasal examples look like, many

people think of very short phrasal examples which do not provide any grammatical structure in them. Although the target illustrative examples in the monolingual dictionaries include some phrasal examples, the results suggest that those examples possibly provide the user with much more information than expected.

Also, it is worth mentioning that the length of phrasal examples seems to depend on the part of speech of the target headword when looking at individual illustrative examples. Table 5 shows the average length of illustrative examples for each part of speech. This shows some striking facts which one cannot verify only when looking at the average length of phrasal/sentential examples in Table 4. Table 5 shows that there are no big differences in terms of the average length of phrasal examples for adjectives among all of the four dictionaries (3.94 in [BILING/DECOD], 3.67 in [BILING/ENCOD], 4.42 in [MONO/DEOCD], and 4.86 in [MONO/ENCOD]).

Table 5 Average length of examples (POS)

FORM	POS	BD	BE	MD	ME
Phrase	adjective	3.94	3.67	4.42	4.86
	noun	3.93	5.25	6.21	7.71
	verb	4.89	6.40	6.67	7.50
	average	4.02	4.27	5.62	6.11
Sentence	adjective	9.00	8.74	9.02	11.88
	noun	8.83	9.94	9.93	10.60
	verb	11.50	9.94	9.09	10.95
	average	9.36	9.32	9.30	11.16

However, when comparing the length of phrasal examples for nouns and verbs, the phrasal examples in the bilingual dictionary for decoding are much shorter than those in the other three dictionaries (3.93 < 5.25, 6.21, 7.71 for nouns and 4.89 < 6.40, 6.67, 7.50 for verbs). This finding suggests that the lower average of phrasal examples in [BILING/DECOD] in Table 4 seems to be caused by the length of phrasal examples for nouns and the length of phrasal examples for verbs.

This is a promising topic for future development. However, the present study has not been designed to explore the correlations between illustrative examples and the parts of speech of target headwords, so the number of illustrative examples for each of part of speech was not regulated. Therefore, one cannot conclude that there are particular correlations between the lengths of phrasal examples and the parts of speech of headwords from Table 5 alone.

4.3.2. Sentential examples

In terms of sentential examples, one can verify from Figures 1, 2, 3, and 5 that the longer the sentences were, the more likely it was that the examples were from encoding dictionaries in both types of dictionaries: [BILING] and [MONO]. These figures show that the lengths of illustrative examples (**LENG**) were repeatedly used as variables to classify examples into smaller groups, and the charts at every node show that sentential examples in the dictionaries for encoding were longer than those provided in the dictionaries for decoding.

As discussed in section 3.4, the length of examples (**LENG**) was a contributing factor in determining if the examples in the monolingual dictionaries were for encoding purposes (Figure 5). Figure 5 showed that the longer the sentences were, the more likely the examples were derived from encoding dictionaries, and that it was more likely that examples were provided for encoding purposes when examples consisted of more than 12 words. This result could also be seen in Figure 2. The terminal node No.9 showed that when sentential examples were made up of 12 words, it was much more likely that the examples were from the monolingual dictionary for encoding, [MONO/ENCOD]. In addition to the fact that there were more examples that were composed of 12 words in the [MONO/ENCOD] than the [MONO/DECOD], the terminal node No.9 also showed that there were more examples in the [BILING/ENCOD] than in the [BILING/DECOD]. The terminal node No.8 also showed the same tendencies. However, when sentential examples were shorter than six words, it was equally or less likely that examples in the monolingual dictionaries were for encoding

examples, although the bilingual dictionaries still showed the same tendencies as the terminal nodes No.7 and 9. This result gave stronger evidence that sentential examples in the [MONO/ENCOD] were comparatively long.

Also, the terminal nodes No. 7, 8 and 9 in Figure 2 showed that it was equally likely that examples were from either [BILING/ENCOD] or [MONO/DECOD]. This result suggests that the length of sentential examples in those two dictionaries were relatively similar. Of course, it is possible that there were some differences in length because the number of the target illustrative examples in the two dictionaries was not the same. However, these two dictionaries seemed to have similar tendencies regarding the length of examples.

From these results, some may want to conclude that the length of sentential examples was longer in the following order: [MONO/ENCOD] > [MONO/DECOD], [BILING/ENCOD] > [BILING/DECOD]. However, the author must mention that Table 5, which was provided to show the average length of examples for each of POS, showed some conflicting results. First, when comparing the average length of sentential examples for adjectives and nouns, the differences in length were not very big. The average length of sentential examples in the [BILING/DECOD] was actually longer than that of examples in the [BILING/ENCOD] or [MONO/DECOD]. Furthermore, although phrasal examples for verbs in [BILING/DECOD] were the shortest among the four dictionaries, and sentential examples seem to be shorter than any other dictionaries, sentential examples in the bilingual dictionary for decoding were the longest among the four dictionaries (11.50 > 9.94, 9.09, 10.95 for verbs). The results of conditional inference trees seemed to show that there were not very many lengthy sentences in the [BILING/DECOD]. However, these results were skewed again by the abundance of phrasal examples. The terminal nodes appeared to indicate that the longer the examples were, the less likely it was that the examples were for decoding purposes. However, the tree diagrams only showed that the number of target sentential examples was much smaller than that in the other three dictionaries.

In this section, illustrative examples were discussed in terms of the formal properties of examples and the length of phrasal/sentential examples. The present study shows the following overall tendencies:

Table 6 Summary of Overall Tendencies

Dictionary		Number		Length	
		Phrase	Sentence	Phrase	Sentence
[BILING/DECOD]	Phrase > Sentence	many	few~some	shorter	long
[BILING/ENCOD]	Phrase < Sentence	some	some~many	shorter	long
[MONO/DECOD]	Phrase < Sentence	a few	many	longer	long
[MONO/ENCOD]	Phrase < Sentence	few	many	longer	longer

[BILING]

The formal properties of illustrative examples served as a significant factor for determining the types of examples: [DECOD] vs. [ENCOD]. The bilingual dictionary for encoding provided many more sentential examples, while the bilingual dictionary for decoding provided the users with many phrasal examples. The length of examples seemed to depend on part of speech. However, phrasal examples in the bilingual dictionaries were relatively shorter than those in the monolingual dictionaries. In terms of sentential examples, the length of the examples in the bilingual dictionaries was as long as that of the examples in the monolingual dictionary for decoding ([MONO/DECOD]), but shorter than that of the examples in the monolingual dictionary for encoding ([MONO/ENCOD]).

[MONO]

The length of examples served as a significant factor for determining example types: [DECOD] vs. [ENCOD]. Both the monolingual dictionary for decoding and the monolingual dictionary for encoding provided users with sentential examples whenever possible. Although phrasal examples were provided, the phrasal examples were relatively long and seemed to have much more information than expected. In terms of the length of sentential examples, the monolingual dictionary

for encoding provided the users with longer examples than those in the monolingual dictionary for decoding.

4.4. Limitations

The present study has several limitations in terms of the number of target illustrative examples and selection of predictors.

4.4.1. Extraction of examples

In this study, the target illustrative examples were extracted under the same headword. This is why the number of illustrative examples in each dictionary was quite different, and this difference may have influenced the results derived from the illustrative examples. Therefore, the means of selecting the target illustrative examples should be carefully considered for further studies. In addition, as this study suggests, the results could be changed by variables brought about by the headwords themselves (e.g. POS). This study totally ignored such influences from the headwords. In addition, this study also ignored the dictionaries' microstructural design due to the process of extracting examples. Each dictionary has its own characteristic design at the microstructural level to help dictionary users decode/encode messages in English, but the present study did not put focus on such structures.

4.4.2. Predictor variables

In this study, formal types of illustrative examples and vocabulary levels were mainly considered as predictors that contributed to determining the types of examples. Formal types of illustrative examples have always been a matter of concern in the field of lexicography, and the results of Kawamoto (2017) showed that phrasal/sentential examples contributed to how well Japanese EFL learners, especially less proficient learners, performed in their L1-L2 translation tasks. Therefore, it was worth verifying whether or not the formal properties of examples actually contribute to determining the illustrative examples' types. However, illustrative examples consist of many other components related to syntactic structures, and some research in the field of Natu-

ral Language Processing and Computational Linguistics has attempted to quantify the readability of texts, using several syntactic features as well as vocabulary difficulty levels. In spite of this, the present study ignored the influences of syntactic features on the types of illustrative examples.

5. Conclusion

The present study was conducted in order to explore the criteria of ‘good’ examples for encoding purposes, by verifying which types of illustrative examples were provided to help the target users encode messages in English using the dictionaries in question. This study indicates that dictionaries for encoding purposes provided longer examples than those for decoding purposes. Also, in the bilingual dictionaries, which face stricter space limitations than monolingual dictionaries because of the necessity of providing Japanese translations, the encoding dictionary was found to provide more sentential examples, compared to the decoding dictionary, whose percentage of phrasal examples was high. However, this study calls for further research on additional variables, including syntactic and headword information, in order to gain a deeper understanding of criteria for ‘good’ illustrative examples.

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- LDOCE6*: Delacroix, Laurence. *Longman Dictionary of Contemporary English*. 6th ed. Harlow: Pearson Education, 2015. Print.
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投 稿 規 定

(1) 投稿は岩崎研究会会員に限る。但し、非会員であっても論文審査委員から推薦のあった場合は特別に認める。(2) 論文の内容は未発表のものに限る。(3) 用語は英語に限り、原則として native check を受けたものとする。(4) 注 (note) は後注とし、章ごとに通し番号を付ける。(5) ギリシャ字、ロシア字以外の特殊文字はできるだけローマ字化してほしい。音声記号は国際音声学協会 (IPA) 所定のものを用いる。(6) 引用文献：書式は MLA Style に従う。(7) 枚数：論文はワープロ原稿で、1行はアルファベットの小文字で 70 字、450 行以内。(8) 原稿はすべて論文審査委員による審査の上採否を決定する。共同執筆論文を別として、論文の掲載は毎号 1 人 1 篇とする。(9) 都合により短縮を求めることがある。印刷上の体裁および論文の掲載年度については編集委員に一任する。(10) 抜刷は 20 部までを無料で、別に本誌 1 部を呈上する。(11) 原稿は随時受付ける。(12) なお、詳細は別に定める。

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編集後記 本号の掲載論文は 2 編である。1 編は計量文体論に関する論文である。作品の authorship を統計的な手法で分析しているが、著者はこのようなテーマに焦点を絞って研究を積み重ねていることがうかがえる。

もう一つの論文は、英語学習辞書の用例についての研究である。辞書学の研究者は研究が第一で、例えば用例についての研究成果が辞書の用例をより良くすることに役立つとはあまり考えないかもしれない。一方、辞書の執筆者、特に学習辞書の執筆者は学習者にとって良い用例を提示することを最重要課題の一つと考える。この論文で指摘されているように、執筆者は用例について decoding 用か encoding 用か、文か句か、用例の長短・難易度などを常に判断しなければならない。この論文は良い用例の基準を明確化しようとしている点で、執筆者が参考にするべきものがある。

(2019 年 5 月 1 日 S. M.)