# The Relationship between the Vocabulary Size and the Knowledge of Lexical Choice of Japanese Learners of English 

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#### Abstract

本研究の目的は，日本人英語学習者の語彙サイズと語彙の使い分け能力の関係を調査 することである。語彙サイズとは，学習者が知っている単語の総数のことである。語彙 の使い分け能力とはコンテクストに応じて意味の類似した単語（例：big／large）を適切に使い分けることのできる能力のことを指す。本研究では，日本人英語学習者の語彙サイ ズと語彙の使い分け能力の関係を明らかにするために，日本の中学 3 年生から高校 3 年生を対象に語彙サイズテストと語彙の使い分け能カテストを実施した。調査の結果，語彙サイズと語彙の使い分け能力の間には中高程度（middle－high）の相関がみられた。ま た，学習者の語彙サイズの伸び率の方が語彙の使い分け能力の伸び率よりも有意に傾き が大きいことが確認され，学年が上がるにつれて，語彙サイズは伸びるが語彙の使い分 け能力はあまり伸びていないことが明らかになった。


Key Words：L2 vocabulary learning，vocabulary size，knowledge of lexical choice，Japanese learners of English

## 1．Introduction

Vocabulary acquisition has attracted great attention for more than twenty years in the field of second language acquisition．As a consequence of the increased interest in the research on vocabulary knowledge，many attempts to capture different aspects of vocabulary knowledge have been made．The aim of this thesis is to clarify the relationship between vocabulary size and knowledge of lexical choice of Japanese learners of English and to examine how the relationship changes as one＇s grade in school advances．Vocabulary size is the total number of words learners know regardless of how well they know them．In assessing learners＇vocabulary size，it is important to consider the definition of knowing a word．Knowing a word consists of various aspects of vocabulary knowledge．Nation $(1990,2001)$ describes what is involved in knowing a word（see Appendix 1）．Daller，Milton and Treffers－Daller（2007）explain that the concept of vocabulary size would include the＇Form＇and the form and meaning elements of Nation＇s table
shown in Appendix 1. In the past research, there were largely two types of vocabulary size tests. One is to assess the ability to recognize word forms as in Yes/No type tests. Another is to assess the knowledge of word forms and some understanding of their meanings as in multiple-choice type tests. However, as for the former test, there is an obvious problem with this task in that it is a self-report task, and there is no way to verify whether learners really have some knowledge of the words they claim to know. Therefore, the definition of the latter case is now widely adopted. In addition, Ishii (2005) points out that "assessment tools of vocabulary size are designed in order to test a relatively large number of words in a limited time. Consequently, the tasks tend to be simple, which do not require the learners to show much of their knowledge. Recognition of the word form and initial understanding of its most frequent meaning sense often suffice to complete the task." Following these ideas on the criteria for knowing a word, in the present study, "knowing a word" in a vocabulary size test is defined as being able to recognize a word form and have at least some understanding of its meaning. The way of counting words should be also taken into account in assessing learners' vocabulary size. There are two major ways of counting the number of words; lemmas and word families. A lemma consists of a headword and its inflected and reduced (e.g. $n t$ ) forms. On the other hand, a word family consists of a headword, its inflected forms, and its closely derived forms. The vocabulary size test and the lexical choice test used in the present study are both lemma based. Knowledge of lexical choice is the ability to discriminate semantically close words. Semantically close words in this study refer to synonyms whose differences are subtle and which are often associated with the same or similar L1 translations, such as big and large translated into the same Japanese word "ookii." This type of knowledge can be classified into the depth of understanding words' meanings. To measure to what extent learners can really understand the subtle differences between L 2 synonyms is not an easy task. One possible approach to capture this type of knowledge would be to give some brief context to learners and make them choose a word which is more appropriate to use in a given context, because this type of knowledge matters in language use in context. Consequently, asking learners whether they know about the differences between two or more semantically close words with this approach can be considered to make more sense than asking them how well they know about each word's meaning. L2 words sometimes have different semantic domain from L1 words, which leads to the difficulty of describing words' meanings verbally. It is true that we can communicate with each other at the minimum level even though we cannot discriminate synonyms. However, for a sophisticated use of the language, it is important to be able to use synonyms appropriately in context.

Until now, there have been various studies on the interrelationship between vocabulary size and different aspects of vocabulary knowledge. Schmitt and Meara (1997) is probably the first
study which systematically investigated the interrelationship between different types of vocabulary knowledge in L2. Their findings show that three aspects of vocabulary knowledge - vocabulary size, knowledge of derivative suffixes, and word associations - are related to each other. Mochizuki and Aizawa (2000) investigated the relationship between learners' vocabulary size and their knowledge of affix. They obtained higher coefficients of correlation between vocabulary size and affix knowledge than Schmitt and Meara (1997). Shimamoto (2000) focused on the knowledge of spoken form, written form, paradigmatic relationship, and syntactic relationship, and compared the results of four different tests with those of Nation's (1990) Vocabulary Levels Test. Shimamoto concludes that "the four kinds of receptive knowledge are indeed interrelated with each other and grow as the learners' vocabulary size" (p.75). On the other hand, with regard to knowledge of lexical choice, some researchers had conducted the lexical choice test in their experiments (e.g. Ijaz, 1986; Jiang, 2002; 2004; Strick, 1980). However, these studies did not investigate the relationship between knowledge of lexical choice and other aspects of vocabulary knowledge such as vocabulary size. In addition, the subjects of these studies are all ESL speakers. Based on the problems of the previous studies, this study will attempt to investigate the relationship between vocabulary size and knowledge of lexical choice of Japanese EFL learners. Japanese learners tend to learn English words by matching them with its Japanese translation equivalents in order to understand the meanings of these words. Schmitt (1997) reported in his research on vocabulary learning strategies that the most popular strategy among Japanese learners was the use of bilingual dictionary. The use of word lists or wordbooks is also quite common among them to enlarge their vocabulary. However, an English word and its Japanese translation sometimes do not match exactly in their meaning. Although translation equivalents share many conceptual features, they do not always share all of them (Van Hell \& de Groot, 1998), which leads to become a source of confusion. Consequently, it can be assumed that many Japanese learners will have difficulty in telling the difference between two or more English words for which the same or similar translations are given, though they can increase their vocabulary size with these strategies. In order to clarify the relationship between vocabulary size and knowledge of lexical choice of Japanese learners of English, the following research questions were constructed:

1. How strong are the correlations between the result of vocabulary size test and the one of lexical choice test?
2. How does the knowledge of lexical choice change according to vocabulary size as one's grade in school advances?

## 2. Method

### 2.1 Subjects

Thirty $9^{\text {th }}$ grade students, ninety-seven $10^{\text {th }}$ grade students, sixty-four $11^{\text {th }}$ grade students and fifty-six $12^{\text {th }}$ grade students from a junior and a senior high school in western Japan were involved in the study. In this study, I removed the $7^{\text {th }}$ and $8^{\text {th }}$ grade students from the subjects. This is because all subjects take the same vocabulary tests in this study, and the tests would be too easy for $12^{\text {th }}$ grade students if $7^{\text {th }}$ and $8^{\text {th }}$ grade students were included. Generally, we can say that most $7^{\text {th }}$ grade and $8^{\text {th }}$ grade students do not know a reasonable number of words, so even the test of vocabulary size would be too demanding for $7^{\text {th }}$ and $8^{\text {th }}$ grade students, let alone the test of lexical choice. Therefore, the subjects in this study were from $9^{\text {th }}$ grade to $12^{\text {th }}$ grade.

### 2.2 Materials

In this study, Mochizuki's (2003) Test was used for assessing learners' vocabulary size and Ishii's (2005) Test for assessing learners' knowledge of lexical choice (see Appendix 2 and 3). Test instructions in Mochizuki's Test and Ishii's Test were in Japanese. Mochizuki's Test is a receptive vocabulary size test developed for Japanese learners of English based on the word frequency information of Hokkaido University English Vocabulary List (Sonoda, 1996). It is lemma based and consists of seven sections: the 1,000 word level for junior high school students, the 2,000- 4,000 word level for senior high school students, the 5,000-7,000 word level for university students. In this study, the $2,000,3,000$, and 4,000 word levels were adopted. Each level has 15 sections and consists of 30 test items. In Mochizuki's Test, the participants were asked to choose the right word to go with each definition written in Japanese.

Ishii's (2005) Test is a lexical choice test developed for Japanese learners of English. According to Ishii (2005, p.166), the test items are chosen from the first 2,000 most frequent lemmas in the British National Corpus and the pairs of words in this test were found in the following resources:

- vocabulary textbook for EFL learners (Rudzka et al. 1981; 1982)
- specialized dictionaries for the use of words (Swan, 1995; COBUILD,1992)
- Some data from Japanese learners' writings (specific details not given)
- Experience of EFL teachers in Japan (specific detail not given)

Ishii's Test has 18 word pairs (three questions in each cluster), that is, 54 test items in total. The test items of Ishii's (2005) test are shown in Table 1.

Table 1: Test items used in Ishii's Test

| above | over | damage | hurt | offer | suggest |
| :--- | :--- | :--- | :--- | :--- | :--- |
| accept | admit | defend | protect | personal | private |
| argue | discuss | develop | grow | powerful | strong |
| arise | rise | early | soon | refuse | reject |
| below | under | gain | get |  |  |
| center | middle | hope | wish |  |  |
| complete | perfect | learn | study |  |  |

These words are all included in the 1,000-3,000 word level of Hokkaido University English Vocabulary List which Mochizuki's Test is based on, and it is premised that test takers can understand the meaning of these test items. In Ishii's test, the participants were asked to choose a word that best fits in a blank in brief sentential context. The rationale for using this kind of test is that the knowledge of lexical choice matters in language use in context as mentioned in the previous chapter. Learners can possibly fail to choose an appropriate word from two or more synonyms in a certain context when they do not know the differences between synonyms. The question to be asked in the test for assessing learners' knowledge of lexical choice is, therefore, whether they can decide which word to use in which context. Based on this idea, it was decided to use Ishii's Test as a test of lexical choice in this study.

### 2.3 Procedure

Mochizuki's Test for assessing students' vocabulary size was given first, followed by Ishii's Test for assessing their knowledge of lexical choice. These tests were conducted in an English class. The subjects were asked to write the answers on a separate answer sheet. They were told that the purpose of the research was to measure Japanese English learners' vocabulary knowledge and the results would be analyzed for research purposes. They spent about 60 minutes on these two tests.

## 3. Results

In this study, the author integrated the possible maximum scores of all tests into 100 points in order to compare on the same scale in the same way as in the pilot study.

Correlation coefficients between the raw scores of the vocabulary size test and lexical choice test were calculated and are shown in Table 2.

Table 2: Correlations between Mochizuki's Test \& Ishii's Test

|  | $9^{\text {th }}$ grade <br> $(\mathrm{N}=30)$ | $10^{\text {th }}$ grade <br> $(\mathrm{N}=97)$ | $11^{\text {th }}$ grade <br> $(\mathrm{N}=64)$ | $12^{\text {th }}$ grade <br> $(\mathrm{N}=56)$ |
| :--- | :---: | :---: | :---: | :---: |
| Correlation between <br> vst21\&Ishii's Test | $.492^{* *}$ | $.699^{* *}$ | $.757^{* *}$ | $.470^{* *}$ |
| Correlation between <br> vst31\& Ishii's Test | $.420^{*}$ | $.679^{* *}$ | $.744^{* *}$ | $.535^{* *}$ |
| Correlation between <br> vst41\& Ishii's Test | $.495^{* *}$ | $.747^{* *}$ | $.667^{* *}$ | $.583^{* *}$ |
| Correlation between <br> vst total \& Ishii's Test | $.546^{* *}$ | $.766^{* *}$ | $.758^{* *}$ | $.555^{* *}$ |

$(* * \mathrm{p}<.01 * \mathrm{p}<.05)$

These results showed that these two aspects of vocabulary knowledge are interrelated to each other, though the coefficients of correlation are not considerably high and the strength of the correlation varies substantially in each grade. Although we have substantially lower coefficients of correlation in $9^{\text {th }}$ and $12^{\text {th }}$ grade, we can still see that these two tests interrelate with each other. The mean scores of vocabulary size test and lexical choice test were scatter plotted in Figure 1, 2, 3,4 , and 5 .


Figure 1: Scatter Plots of Mochizuki's Test (total) and Ishii's Test in all grades


Figure 2: Scatter Plots of the two tests in 9th grade


Figure 4: Scatter Plots of two tests in 11th grade


Figure 3: Scatter Plots of two tests in 10th grade


Figure 5: Scatter Plots of two tests in 12th grade

The mean scores of all the tests with standard deviation, maximum score, minimum score, and reliability in each grade are shown in Tables 3, 4, 5, 6, and 7.

Table 3: The results of Mochizuki's Test (2,000 word level: vst21)

| vst21 | 9th grade | 10th grade | 11th grade | 12th grade |
| :--- | ---: | ---: | ---: | ---: |
| Mean Score | 58.00 | 64.23 | 74.95 | 82.68 |
| Standard Deviation | 15.13 | 18.69 | 19.07 | 19.5 |
| Maximum Score | 77 | 100 | 100 | 100 |
| Minimum Score | 10 | 27 | 23 | 37 |
| Reliability (Cronbach $\alpha$ ) | .79 | .87 | .89 | .92 |
| Number of students | 30 | 97 | 64 | 56 |

possible maximum score $=100$

Table 4: The results of Mochizuki's Test ( 3,000 word level: vst31)

| grade | 9th grade | 10th grade | 11th grade | 12th grade |
| :--- | ---: | ---: | ---: | ---: |
| Mean Score | 47.44 | 54.09 | 63.59 | 71.61 |
| Standard Deviation | 11.96 | 16.31 | 18.28 | 19.08 |
| Maximum Score | 67 | 93 | 97 | 97 |
| Minimum Score | 20 | 20 | 13 | 13 |
| Reliability (Cronbach $\alpha$ ) | .62 | .82 | .86 | .89 |
| Number of students | 30 | 97 | 64 | 56 |

possible maximum score $=100$

Table 5: The results of Mochizuki's Test ( 4,000 word level: vst41)

| grade | 9th grade | 10th grade | 11th grade | 12th grade |
| :--- | ---: | ---: | ---: | ---: |
| Mean Score | 37.44 | 43.13 | 54.9 | 62.62 |
| Standard Deviation | 13.55 | 17.82 | 17.93 | 21.36 |
| Maximum Score | 60 | 87 | 90 | 97 |
| Minimum Score | 10 | 0 | 13 | 0 |
| Reliability (Cronbach $\alpha$ ) | .68 | .81 | .83 | .89 |
| Number of students | 30 | 97 | 64 | 56 |

possible maximum score $=100$

Table 6: The results of Mochizuki's Test (total)

| grade | 9th grade | 10th grade | 11th grade | 12th grade |
| :--- | ---: | ---: | ---: | ---: |
| Mean Score | 47.63 | 53.81 | 64.48 | 72.3 |
| Standard Deviation | 11.71 | 16.3 | 17.58 | 19.11 |
| Maximum Score | 66 | 93 | 96 | 98 |
| Minimum Score | 19 | 21 | 18 | 20 |
| Reliability (Cronbach $\alpha$ ) | .87 | .94 | .95 | .96 |
| Number of students | 30 | 97 | 64 | 56 |

possible maximum score $=100$

Table 7: The results of Ishii's Test

| grade | 9th grade | 10th grade | 11th grade | 12th grade |
| :--- | ---: | ---: | ---: | ---: |
| Mean Score | 54.69 | 55.92 | 61.37 | 63.26 |
| Standard Deviation | 11.08 | 16.76 | 18.87 | 20.54 |
| Maximum Score | 74 | 93 | 94 | 94 |
| Minimum Score | 33 | 15 | 6 | 0 |
| Reliability (Cronbach $\alpha$ ) | .66 | .87 | .9 | .93 |
| Number of students | 30 | 97 | 64 | 56 |

possible maximum score $=100$

Both mean scores of Mochizuki's Test and Ishii's Test go up, as one's grade in school advances. All of the reliabilities except the one of $9^{\text {th }}$ grade in Ishii's Test are more than 0.8 and we can say that we obtained very high reliabilities though the reliability of $9^{\text {th }}$ grade in Ishii's Test is low: it was 0.66 .

The changes in the mean scores of Mochizuki's Test and Ishii's Test in each grade are visually shown in Figure 6 and 7.


Figure 6: Changes in the mean score of Mochizuki's Test (total) by each grade


Figure 7: Changes in the mean score of Ishii's Test by each grade

Regression analysis was conducted to compare the rate of increase of Mochizuki's Test and Ishii's Test. The grade was chosen as the independent variable. In this analysis, we obtained that the following standardized partial regression coefficients $(\beta)$ : $\beta=.45$ in Mochizuki's Test ( $95 \%$ confidence interval 0.34 to 0.56 ) and $\beta=.18$ in Ishii's Test ( $95 \%$ confidence interval 0.06
to 0.31 ). This result showed that the slope of the mean score of Mochizuki's Test is significantly steeper than that of Ishii's Test. Therefore, it was revealed that the speed of improvement of knowledge of lexical choice is slower than that of vocabulary size.

## 4. Discussion

The first research questions asked how strong the correlations between the result of vocabulary size test and the one of lexical choice test are. We observed a middle-high correlation between the result of vocabulary size test and that of lexical choice test in each grade, though there are some differences among the tests in each grade in the strength of correlation. The reason why we obtained a middle high correlation could be due to learners' insufficient understanding of words' meanings. Learners cannot discriminate semantically related words unless we know their meanings in the first place. If they know only its superficial and limited meanings, it is natural for them not to be able to use the word in context successfully. If they know sufficient understanding of words meaning, it can be assumed that the results of these two tests correlate highly. For these reasons, it is suspected that we obtained a middle-high correlation between the vocabulary size and the knowledge of lexical choice in this study.

As for the second research question, it was revealed that the speed of improvement of knowledge of lexical choice is slower than that of vocabulary size. Then, what makes the development of knowledge of lexical choice difficult? The difficulty to discriminate semantically related words in L2 could be attributed to incomplete semantic development. Jiang (2004) has proposed that the process of L2 vocabulary acquisition can be divided into two stages for most L2 words: the comprehension stage and the development stage. The former is the initial understanding of a word's meaning or the initial mapping of new word forms to existing meanings or concepts in the learner's mind, while the latter is the gradual elaboration and modification of the meanings. If learners' vocabulary knowledge remains in the comprehension stage, incorrect use of L2 words can often occur because it is not unusual that the semantic domain of L2 is different from that of L1. Only memorizing its L1 translation of an L2 word is insufficient for L2 learners to use L2 words correctly, though the use of L1 translation is an efficient way to associate L2 words with pre-existing L1 semantic knowledge and understand the meanings of L2 words. Japanese learners of English tend to rely on Japanese translations so heavily that they cannot capture the difference between semantically close words in L2, which often leads to inappropriate choice of L2 words. L1 translations commonly used cannot clearly show the difference between semantically close words and cannot express the meanings of L2 words completely. When semantically close words in L2 share one L1 translation, it is difficult for them to notice the difference between them and grasp its precise semantic concept of L2
words. Jiang (2004, pp.102-103) mentions that "the understanding of a word's semantic properties, including its core, peripheral, figurative, connotational meaning, its semantic differences from L1 translation and other semantically related L2 words, is probably the most challenging task that many L2 learners face." For these reasons, it can be assumed that it is hard for some Japanese learners of English to distinguish semantically close words in English. Jiang (2004, p.101) points out that "existing research evidence suggests that semantic development is a slow, and often incomplete process in adult L2 learning and even advanced adult L2 learners continue to rely on their L1 semantic system in L2 use". It is reasonable to conclude that incorrect use of L2 words could come from incomplete semantic development and limited contextualized exposure to L2 words. As Jiang (2004) suggests, more precise understanding of a word's meaning and semantic restructuring is required for the successful use of L2 words.

## 5. Conclusion

This study clarified that there were middle-high correlations between the test of vocabulary size and that of lexical choice, though there were some differences in the strength of correlation in each grade. Also, we observed that the speed of improvement of knowledge of lexical choice is slower than that of vocabulary size though the mean scores of both the vocabulary size test and the lexical choice test go up, as one's grade in school advances.

In future research, more detailed analysis will be needed to find out what kinds of clue Japanese learners of English use when they distinguish semantically related words. Moreover, further research will be required to reveal the developmental factors and the developmental process of knowledge of lexical choice for successful semantic development and restructuring.

## Notes

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## Appendix 1: What is involved in knowing a word

| Form | spoken | R What does the word sound like? |
| :---: | :---: | :---: |
|  |  | P How is the word pronounced? |
|  | written | R What does the word look like? |
|  |  | P How is the word written and spell? |
|  | word parts | R What parts are recognizable in this word? |
|  |  | P What word parts are needed to express the meaning? |
| Meaning | form and meaning | R What meaning does this word form signal? |
|  |  | P What word form can be used to express this meaning? |
|  | concept and referents | R What is included in the concept? |
|  |  | P What items can the concept refer to? |
|  | association | R What other words does this make us think of? |
|  |  | P What other words could we use instead of this one? |
| Use | grammatical functions | R In what patterns does the word occur? |
|  |  | P In what patterns must we use with this one? |
|  | collocations | R What does or types of words occur with this one? |
|  |  | P What does or types of words must we use with this one? |
|  | constraints on use | R Where, when, and how often would we expect to meet this word? |
|  |  | P Where, when, and how often can we use this word? |

$\mathbf{R}=$ receptive knowledge, $\quad \mathbf{P}=$ productive knowledge
(Nation, 2001:27)

## Appendix 2：Mochizuki＇s（2003）Test（excerpts）

語彙サイズ測定テスト

日本語の意味を表す英語を $(1) \sim(6)$ の中から選び，その番号を解答欄に書き入れなさい。
1．旗
2．丸く大きい緑色野菜
（1）cabbage
（2）campus
（3）flag
（4）railway
（5）tin
（6）tournament
3．賞与
4．盤上で白黒の駒を動かして，勝敗を競らゲーム
（1）attention
（2）bonus
（3）chess
（4）hook
（5）pride
（6）union

29．分かれた，分離した 30．緊急の，差し迫った
（1）bright
（2）frequent
（3）initial
（4）safe
（5）separate
（6）urgent

語彙サイズ測定テスト

日本語の意味を表す英語を $(1) \sim(6)$ の中から選び，その番号を解答欄に書き入れなさい。
1．巻き毛
2．肉，肉体
（1）beach
（2）curl
（3）economy
（4）flesh
（5）glory
（6）worker
3．警察
4．重さの単位
（1）baggage
（2）circuit
（3）fool
（4）poet
（5）poet
（6）ton

日本語の意味を表す英語を $(1) \sim(6)$ の中から選び，その番号を解答欄に書き入れなさい。
1．顕微鏡
（1）cube（2）kilometer（3）license（4）microscope（5）studio（6）telescope
（1）cube（2）kilometer（3）license（4）microscope（5）studio（6）telescope
2．望遠鏡
3．化学者

## 4．消費者

（1）chemist（2）consumer
（3）emperor
（4）membership
（5）surgent
（6）sovereign

## Appendix 3：Ishii＇s（2005）Test（excerpts）

例に従って，空欄に適する語を選び，別紙の解答用紙に答えなさい。答えが分からない場合は推測 せず，［c］の「分からない」を選びなさい。

例）
［a］empty［b］free［c］分からない
例 1 He has a lot of $\qquad$ time．

例 2 They drink fast，and the bottle is already $\qquad$ ．
例 3 The family is away on holiday，and the house is $\qquad$ －
それぞれの空所に，empty／free のうち，より適する語を選びます。この例では例1＂free＂，例2 ＂empty＂，例3＂empty＂が正解ですので，以下のように解答します。

| 例 1 | b |
| :---: | :---: |
| 例 2 | a |
| 例 3 | a |

［a］discuss［b］argue［c］分からない
1．We should $\qquad$ possible solutions．

2．These students often $\qquad$ against the teacher＇s ideas．

3．They decided to $\qquad$ their plans for the trip tomorrow．
［a］gain［b］get［c］分からない
4．I tried hard to $\qquad$ weight．
5．I did not $\qquad$ what he said．

6．The children $\qquad$ lots of presents every year．
［a］damage［b］hurt［c］分からない
4．Drugs $\qquad$ your body．

5．The storm can $\qquad$ crops．

6．Her words sometimes $\qquad$ his feelings．
［a］offer［b］suggest［c］分からない
49．These two hotels $\qquad$ equally good services．

50．Tom was kind enough to $\qquad$ me a place to stay．

51．I $\qquad$ that you lie down if you are not feeling well．
［a］center［b］middle［c］分からない
52．He was walking in the $\qquad$ of the street．

53．I＇m going to America in the $\qquad$ of July．
54．Tokyo is the $\qquad$ of Japanese economic system．

