The purpose of this paper is to suggest the effective and systematic learning system concerning English phrasal verbs under the framework of the Cognitive Grammar advocated by Ronald W. Langacker (1987). Namely, in order to link the L2 (second language) learners’ cognitive abilities to their language faculty, we have developed sense-stimulating lessons with several visual images and self-learning materials preserved by Javascript. In our experimental lessons, we employed moving pictures of spatial particles in combination with frequently used verbs such as “call”, “come”, “take”, “get”, “give”, “go”, and “look”. We required our subjects to review the lessons through the Javascript self-learning materials. Furthermore, we measured the effectiveness of our cognitive-based lessons and self-learning system statistically: We have proven that the exposure to visual images of phrasal verbs and self-learning via Javascript motivates L2 learners to acquire these lexical items which are very important in English pedagogy but at the same time difficult to learn.

Keywords: cognitive linguistics, English phrasal verbs, second language acquisition

Introduction

Necessity for the Study

The purpose of our paper is to prove the effectiveness of systematic teaching of phrasal verbs with the help of visual images: We will apply the Cognitive Grammar point of view advocated by Langacker (1987) to English pedagogy and will show the results of our experimental lessons of English phrasal verbs to Japanese college students by means of computer-assisted lessons using several visual images. For many years, English phrasal verbs have been considered idiomatic and arbitrary; therefore, learners of English have had to memorize them mechanically. In line with studies of English prepositions, however, several researchers have analyzed English phrasal verbs systematically from the perspective of Cognitive Grammar (Dirven, 2001; Kurtyka, 2001; Lindner, 1983; Rudzka-Ostyn, 2003); Lindner (1983) made a systematical analysis of phrasal verbs with only two particles such as “out” and “up”. Rudzka-Ostyn (2003) did not refer to any statistical data. We conducted experimental lessons dealing with more particles of spatial positions in combination with frequently used verbs such as “call”, “come”, “take”, “get”, “give”, “go”, and “look”. In addition, we measured the effectiveness of our cognitive-based lessons statistically.

Moreover, we believe that visual aids can effectively facilitate learners’ retention. As for memory research, Stevick and Paivio propose the “dual-code theory”. Namely, upon listening to a word, the two-memory system,
verbal and visual, emerges automatically. Therefore, visualization accelerates the retention of the word. In order to enhance the understanding and the retention of learners, phrasal verbs need to be presented both verbally and visually. From the perspective of human perception and behavior, Kordys proposes presenting English particles as sets of “dichotomy” with opposite spatial orientations, such as “up-down”, “front-back”, and “left-right”.

With our method, we prove that the exposure to visual images of phrasal verbs motivates L2 (second language) learners to acquire these lexical items which are important in English pedagogy and difficult to learn (Kurtyka, 2001).

**Research Questions**

We have set up the following two research questions: (1) Do computer-assisted lessons with visual images help learners’ retention? and (2) Do learners’ English levels influence the rate of improvement? Since our main focus was the retention, we did not measure the production effect of our experiment (the research question (1)). At the same time, we are interested in how the students’ proficiency levels influence the effect (the research question (2)).

**Method**

Fifty-two Japanese college students participated in this study. We divided them into two groups: a control group and an experimental group. A conventional teaching style was applied to the students of the control group; these students were given printed materials of phrasal verbs and oral explanations by their teachers, while the students of the experimental group were taught the same phrasal verbs with computer-assisted visual images and self e-learning tools. First, we focused on the basic meaning of each particle by presenting them as sets of “dichotomy” with opposite spatial orientations, such as “up-down”, “in-out”, and “on-off” with visual images. Then, we introduced some phrasal verbs with example sentences (see Appendix 1). We distributed self e-learning files preserved by Javascript and required the subjects to review each lesson at home, using the files. The students’ English levels were measured with the TOEIC (Test of English for International Communication) Reading Section Test Part 5, a standardized test commonly used to assess their English proficiency. The “Part 5” section tests grammar and vocabulary knowledge. Before and after the experiment, we conducted both a pretest and a posttest to prove the effects statistically.

**Results**

First, we attempted to prove that our pretest and posttest, both of which require the subjects to fill in 20 blanks with appropriate phrasal verbs, have the same difficulties via a $t$-test (see Appendix 2). Specifically, this $t$-test sets the null hypothesis ($H_0$) and the alternative hypothesis ($H_1$) as follows: The former assumes that the sample mean of the pretest ($\mu_1$) is equal to that of the protest ($\mu_2$), that is, $\mu_1 = \mu_2$. The latter hypothesizes that the sample mean of the pretest ($\mu_1$) differs from that of the protest ($\mu_2$), that is, $\mu_1 \neq \mu_2$. According to the result of the $t$-test, the probability value ($p$) is 0.771331, which is over the level of significance ($\alpha$) ($\alpha = 0.005$). Thus, $H_0$ cannot be rejected, which means that both of them have the same difficulties and are reliable. Second, we compared the results of the TOEIC Test Part 5 of the control group and the experimental group. The average test score of the control group was 24.31818, while that of the experimental group was 25.26667 out of 40 points. With the difference of 0.84449, the grammatical and vocabulary competences were proved to be
consistent from the control group to the experimental group.

Then, under the control group design, we conducted the pretest and posttest on our experimental and control groups: The former and the latter consist of 30 students and 22 students, who are learning English as an L2 at the university, respectively. Then we conducted a t-test concerning the difference of the mean of the two dependent samples, the experimental group and the control group. On the one hand, this t-test sets H₀, where the sample mean of the experimental group (μ₁) is the same as that of the control group (μ₂): μ₁ = μ₂. On the other hand, it places H₁ that μ₁ differs from μ₂: μ₁ ≠ μ₂. As a result of this t-test, we obtained 0.002461658 as the probability value, which is below the level of significance (α = 0.005). Consequently, H₀ is rejected and H₁ is accepted. In short, our teaching method and self e-learning tool help when adult L2 learners acquire English phrasal verbs.

Finally, we examined the correlation between the subjects’ proficiency and the effectiveness of our model lesson and self-learning materials. As shown in Example 1 below, our analysis by the Pearson correlation coefficient reveals a certain correlation between them regardless of their proficiency. Specifically, we may say that the less proficient the students are, the more successfully our learning system with images work in the acquisition of English phrasal verbs (see Examples 2-3).

Example (1) Pearson correlation coefficient (r) I (overall): 0.411655047
Example (2) Pearson correlation coefficient II (0-25): 0.43378847
Example (3) Pearson correlation coefficient III (26-40): 0.15182577

The first figure shows the correlation of the TOEIC test results of the whole experimental group students and their improvement. The figures in each parenthesis show the range of the TOEIC test scores the students obtained.

Conclusions and Limitation
To recapitulate, we clarified that the cognitive-oriented learning device accelerates the acquisition of English phrasal verbs to some extent. Specifically, we may infer that less proficient students understand the core meaning of English phrasal verbs by way of images of prepositions. As noted in the results of our assessment test, the experimental group students belong to the intermediate level. This is why we could not investigate the correlation between our methodology and the lower/higher level subjects.

References
Appendix 1: Moving Pictures of Particles

“Up”

You should at least **look up** when your name is called.

You should **fill up** with gas before you start your trip.

Let’s leave Tokyo and **go up** to Hokkaido for the vacation.

What time do you usually **get up** every morning?

A little boy **came up** to me and asked my name.

None of my friends **showed up** at the party yesterday.
“Down”

The airplane **touched down** just now.

Some of the trees in my garden **came down** because of the typhoon last night.

You must **write down** your name and your address on this document.

Mary is going **down** from New York to Florida.

“In”

It’s raining heavily. Let’s **eat in** rather than go to the restaurant.

You need to lower your head to **get in** this small car.

He **majored in** literature at Harvard and studied Shakespeare.

My mother always **cups in** when we are talking.
“Out”

I am supposed to go out with my mother this afternoon.

The search light gave out a clear and sharp beam.

Cherry blossoms are coming out now.

The sun came out.

The fire went out.

I found out some defects of this new-brand car.

Her beauty stands out in her class.

The search light gave out a clear and sharp beam.

“On”

In a rainy day, you can always count on me for help.

You should get on the bus for Shibuya.
The party went on all night so that many people enjoyed it.

“Off”

John got off the train at Shinjuku station.

Turn off Inokashira street at the next corner and go straight.

Would you please put off the light?
Appendix 2: Pretest and Posttest

<Pretest Questions>
Name:
No.: /20

選択肢から動詞と前置詞を一つずつ選び、組み合わせたものを、適切な形にして、それぞれの空白を埋めなさい。ヒントとして動詞の初めの文字が空白のところに記してあります。

1. Let’s start today’s meeting. Has everyone s__________ yet?
2. What time does the plane for New York t__________?
3. You should f__________ this application form and send it with two recommendation letters to our admission office.
4. Why does this photocopy machine k__________? I can’t make any copies for the conference.
5. I would like to f__________ when my car will be repaired. I need to use my car for work.
6. You should p__________ a sweater because it is very cold today.
7. It’s really hot in here. Why don’t you t__________ the air-conditioning?
8. You should show the tickets at the airport when you c__________.
9. When you have finished, t__________ your test and then you may go home.
10. C__________ after the news is our weekend weather report.
11. Remember, all the books you c__________ today are due back on April 15th.
12. The alarm will g__________ several times in the course of the morning.
13. Welcome you to our department store. The sale g__________ through the 16th.
14. I have been looking for my English textbook for a few hours now, I g__________!
15. When you get to Hong Kong, are you going to c__________ Mr. Wang?
16. The sale ends tomorrow, so you’d better g__________ there as soon as possible.
17. It’s hard to t__________ a job like this. It is really difficult.
18. Whatever you say, I’ll never g__________ to your idea. I’ve already made up my mind.
19. The university c__________ scholarship by 25% to save money.
20. I t__________ three days and went to Korea.

<Verb>
break, call, check, come, cut, fill, find, get, give, go, go, go, put, show, take, take, take, turn, turn

<Preposition>
don, down, down, in, in, in, off, off, off, off, on, on, on, on, on, out, out, out, up, up

<Posttest Questions>
Name:
No.: /20

選択肢から動詞と前置詞を一つずつ選び、組み合わせたものを、適切な形にして、それぞれの空白を埋めなさい。ヒントとして動詞の初めの文字が空白のところに記してあります。

1. Are you looking for a blouse? They c__________ various sizes and colors right now.
2. She b__________ her four children by herself after the divorce.
3. The company president c__________ his secretary during the meeting.
4. He’s p__________ five kilograms since he got married.
5. My earring c__________ my left ear while I was dancing in the hall.
6. “Hi, Yukio. You look sleepy. What’s up?”
   “I g__________ till 3:00 this morning writing two papers due today.”
7. I’ll make tea. Could you fill the kettle with water?
8. Brian told his wife to look for his favorite sweets in the bakery.
9. All the students listened to the professor’s lecture and wrote the important points.
10. “May I turn on the TV, Mom? There is an interesting comedy show starting today.”
11. Please call us whenever you visit Tokyo.
12. Because of her flu, Mary’s birthday party was canceled.
13. Fill the blanks with the words below. This test takes only 10 minutes.
14. The bank robbers immediately put their guns when the police officers arrived.
15. Prof. Brown told us to hand in the assignment by Friday.
16. After work he got a taxi and went to Ginza.
17. According to the news, a private jet went in the residential area a few minutes ago.
18. The ship gave radio signals for help.
19. The airplane has just taken off for New York.
20. The government published the latest information on the tsunami as soon as the earthquake occurred.

<Verb>
  bring, call, call, come, come, fill, fill, get, give, go,
  hand, look, put, put, put, sit, take, turn, write,
<Preposition>
  down, down, down, in, in, in, off, off, on, on, on,
  out, out, out, up, up, up, up,