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A Study on Learning How to Use the English Preposition *ON* by Applying Cognitive Approaches to Japanese Learners

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1. Introduction

Many Japanese people who study English think learning English prepositions is difficult. According to Sano's (2009) research, 95% of college students answered "difficult" to her question, "Do you think learning English prepositions is difficult?" However, Yamada (2008) points out that in general, compared to other grammatical items, there are fewer chances to teach prepositions systematically at schools in Japan. That is why students are likely to just memorize Japanese equivalents for each English preposition: for example, *on* is translated into *ue ni*. The present study was undertaken in order to find an effective way to learn English prepositions. *On* was dealt with in this research because it has a variety of meanings and is one of the most-used prepositions.

2. Cognitive approaches to learning prepositions

Cognitive approaches to learning English prepositions are of interest to a growing number of researchers. Yamaoka (1995, 1996) conducted studies using prototype theory, which according to him, predicts that category membership of central instances of preposition usage (prototype) is learned before membership of the peripheral instances in the hierarchy. Yamaoka claims that learners should be taught the prototype and peripheral instances of each preposition in order to deepen their understanding and usage of prepositions. Additional support comes from Hayashi (2001), Kodachi (2005), and Cho (2002), who are all of a similar attitude that cognitive approaches are important when prepositions are learned.

Another prototype theory researcher, Shiratani (1998), argues that the core meaning of *on* is "contact," and other peripheral meanings spread from it (as indicated in Figure 1). These *on* usages are more difficult to learn since they are

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less prototypical. Normally in the English classroom, teachers only follow what is found in their textbook. As noted by Yamada (2008) in the introduction, because the number of English classes at regular schools is limited, teachers often teach just textbook usages of prepositions. They deal with these at the moment instead of taking time to introduce the whole range of usages systematically. If teachers have a lot of things to teach in a limited number of classes, an effective teaching method is needed, and cognitive approaches should solve this problem.

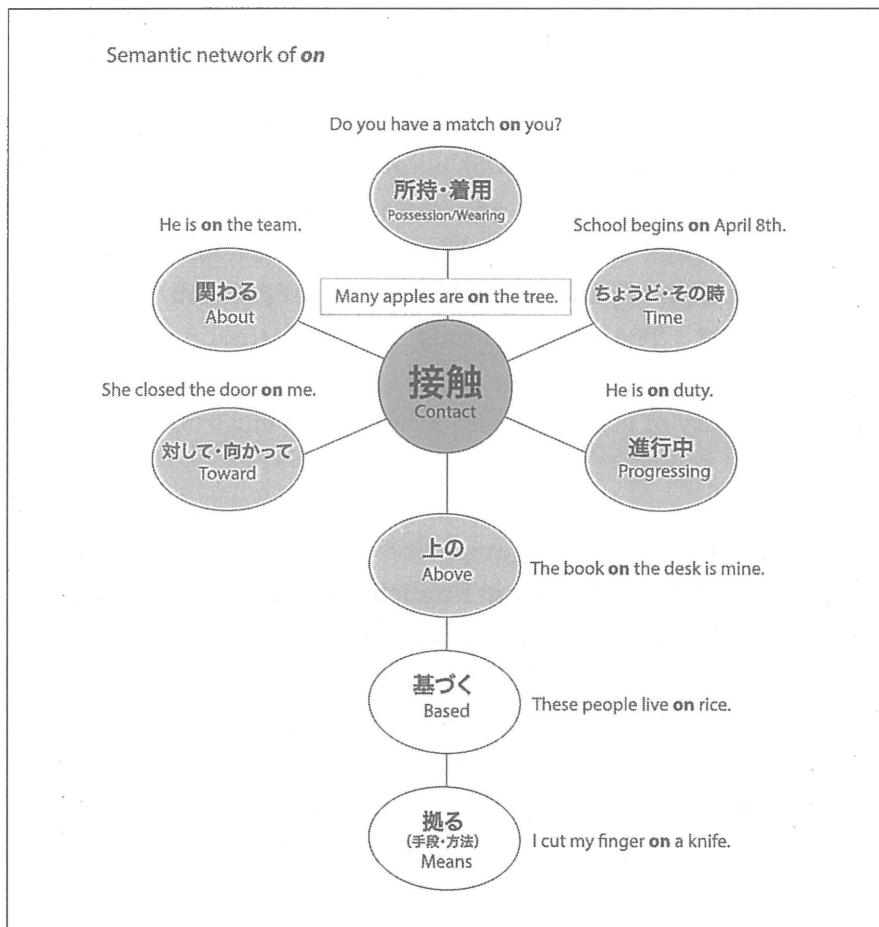


Figure 1. Semantic network of *on* (adapted from Shiratani, 1998)

3. Research and experiment on an effect of a cognitive approach

3.1 Participants

The participants in this study were from two departments (the Department of Sports and Health Science and the Department of Nursing) and consisted of 58

Japanese college students. Their first language was Japanese, and they had no experience living in an English speaking country for more than a month.

3.2 Methods

First, the participants took a pre-test to determine their current level of understanding prepositions. In this pre-test, the participants looked at sentences using *on* and were asked to answer whether each usage of *on* was correct. If they did not know whether it was correct or not, they were allowed to answer “not sure.” Furthermore, they were asked to give the reasons for each answer if they could. The semantic network which Shiratani (1998) made for *on* was adopted for this study, and it had nine meanings. Each of them was used twice, and 18 questions were made. Seven fake questions were also included, and the number of the questions in the pre-test was 25 in all.

Then, the participants were divided into a control group and an experimental group. Both groups were told to move through a set of slides (“slide-lectures”) on their computer monitors. The slides which participants in the control group studied consisted of translation-based instruction (Figure 2), and the ones for the experimental group consisted of instruction with the core meaning and its peripheral meanings (Figure 3). The same example sentences from Shiratani’s research were used in both sets of slides and the participants of the two groups watched them during the same period.

Finally, the participants went on to a post-test immediately after completing the slide-lectures. The form of the post-test was identical with the pre-test, although there were 30 questions in the post-test as opposed to 25 in the pre-test. There were 18 questions which had the same usages of *on* as the pre-test, but they were not the same sentences. The same sentences were not used because the aim of this test was to examine whether the participants could apply what they learned to another case and how they changed the way to use *on*. In addition to them, 12 fake questions were also included in the post-test.




<p>前置詞onは多義語であり、 多くの用法がある。 その例を以下に挙げる。</p> <p>1/11</p>	<p>①「上の」</p> <p>The book <u>on</u> the desk is mine. (机の上の本は私のだ。) Look at the man <u>on</u> the bench. (ベンチにいる男性を見て。)</p> <p>★前置詞onは「～の上の」という状況を表す意味がある。</p>  <p>2/11</p>
<p>②日・時を特定：「～に」</p> <p>We left for U.K. <u>on</u> the morning of May 5th. (5月5日の朝、イギリスへ出発した。) School begins <u>on</u> April 8th. (学校は4月8日から始まる。)</p> <p>★onは日時を特定する意味がある。</p>  <p>3/11</p>	<p>③所持・着用：「～を身につけて」</p> <p>Do you have a match <u>on</u> you? (マッチを持っていますか?) She puts a ring <u>on</u> her finger. (彼女は指輪をしている。)</p> <p>★onを使って、所持や着用を表現できる。</p>  <p>4/11</p>

Figure 2. The slides for the control group





<p>この「接触」という 中心的な意味をもとに 多くの意味が派生する。</p> <p>5/11</p>	<p>★onの中心的な意味は「接触」である。</p> <p>Many apples are <u>on</u> the tree. (木にたくさんリンゴがなっている。) →木とリンゴが接触</p>  <p>There is a nice restaurant <u>on</u> this street. (この通り沿いに良いレストランがある。) →通りとレストランが接触</p>  <p>6/11</p>
<p>①「接触」→「上の」</p> <p>物体同士の接触は重力の関係で一方の物体が土台となり、その上にもう一つの物体があるという位置関係を意味できる。</p> <p>The book <u>on</u> the desk is mine. (机の上の本は私のだ。) Look at the man <u>on</u> the bench. (ベンチにいる男性を見て。)</p>  <p>7/11</p>	<p>④「接触」→「所持」・「着用」</p> <p>身体への「接触」から「所持」・「着用」の意味が派生する。</p> <p>Do you have a match <u>on</u> you? (マッチを持っていますか?) She puts a ring <u>on</u> her finger. (彼女は指輪をしている。)</p>  <p>8/11</p>

Figure 3. The slides for the experimental group

All participants completed a questionnaire after taking the post-test. The questionnaire includes five questions that request information about their level of English, experiences living in an English-speaking country, study experience about English prepositions and their comments about the present study they had participated in.

4. Results and Analysis

4.1 The result of the pre-test

In the pre-test, there were 25 questions, and one point was given to each of

them. The 58 participants were divided into two groups randomly: the experimental group had 29 participants as did the control group. The average scores and the SD (standard deviation) are in Table 1.

Table 1

The average scores and the SD (standard deviation) of the pre-test

	Average	SD
Experimental group	13.55	6.18
Control group	12.90	9.06
Total	13.22	7.73

The score of the experimental group was slightly better than that of the control group, but this study focuses on not the total average score but the change of each participant's knowledge and the way to learn prepositions, so these score gaps have no effect on the experimental design.

4.2 The result of the post-test and the comparative analysis

The slide-lectures lasted for about five minutes for each group. Immediately after that, the post-test was given. The average scores and standard deviations are found in Table 2. Once again, the control group scored lower than the experimental group and had a greater spread of scores.

Table 2

The average scores and the SD (standard deviation) of the post-test

	Average	SD
Experimental group	22.66	6.92
Control group	21.14	8.39
Total	21.90	8.23

Table 3 below shows the numbers of the participants who chose each answer about the four sentences (A, B, C, and D) in the experimental (white cells) and control (gray cells) groups.

“Contact” *on* (接触) [Proto-type]

Pre-test

A) Many apples are on the tree. (木にたくさんのリンゴがなっている。)

B) There is a nice restaurant on this street. (この通りに良いレストランがある。)

Post-test

C) The dog is on the chain. (犬が鎖につながれている。)

D) I stayed in a hotel on the lake. (湖のそばのホテルに泊まった。)

Table 3

The results of "contact" on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	21	24	24	20	28	21	4	9
not sure	3	2	1	3	0	2	1	0
wrong	5	3	4	6	1	6	24	20

Sentences C and D were used as equivalent questions in that the apples contacted a point (a branch of a tree) in sentence A, and the restaurant contacted a line (a street) in sentence B. These described scenes can be applied to sentences C and D: the chain is a point, and the edge of the lake is a line.

First, the results of sentences A and C can be compared. As shown in Table 3, for the experimental group, 21 students chose the correct answer in sentence A, and 28 chose the correct answer in sentence C: more participants chose the correct answer after the experimental lecture. On the other hand, the number of the control group's participants who chose the correct answer was 24 in sentence A, but it slightly decreased to 21 after the lecture. While the key word "contact," the core meaning of *on*, was often used in the experimental slides-lecture, the idea of core meanings was not mentioned at all in the traditional slides-lecture. Due to the idea of core meanings, the experimental group probably reacted differently from the traditionally instructed group.

As for sentence B, it was thought to correspond to sentence D, but it did not. While 24 participants in the experiment group gave a correct answer to sentence B, there were only four people who did in sentence D. A similar result happened to the control group. The cause of this could be that Japanese students are likely to think "湖のそばの" (*mizuumi no soba no*: on the lake) should be *by* the lake or *near* the lake not *on* the lake. The slides used in the lecture did not work for the participants.

The results that follow are for responses to test questions with respect to the peripheral varieties of *on*, as depicted in Figure 1 and noted in section 3.2 above. These include "above" *on*, "based" *on*, "means" *on*, "possession/wearing" *on*, "time"

on, “progressing” on, “toward” on, and “about” on.

① “Above” on (上の)

Pre-test

- A) The book on the desk is mine. (机の上の本は私のだ。)
- B) Look at the man on the bench. (ベンチにいる男性を見て。)

Post-test

- C) My cat is sleeping on the bed. (私の猫がベッドの上で寝ている。)
- D) Ice floats on water. (氷は水に浮かぶ。)
- E) We got on a bus. (私たちはバスに乗った。)

Table 4

The results of “above” on

sentence	A		B		C		D		E	
pre/post	pre-test				post-test					
group	experi.	control	experi.	control	experi.	control	experi.	control	experi.	control
correct	29	26	25	24	29	28	26	26	28	28
not sure	0	0	2	0	0	0	2	1	1	0
wrong	0	3	2	5	0	1	1	2	0	1

As is shown in Table 4, both groups performed well on the pre-test, and the results hardly changed on the post-test. Because Japanese students often rely on the translation of *on* as *ue ni* “above,” it was predicted that a mistake would happen when the word *ue ni* was not used. However, the results showed that both groups’ participants had already apprehended this meaning, and the experiment did not affect their understanding.

② “Based” on (基づく)

Pre-test

- A) I like a novel based on facts. (私は事実に基づいた小説が好きだ。)
- B) These people live on rice. (この人々は米を常食とする。)

Post-test

- C) He acted on her advice. (彼は、彼女の忠告に従って行動する。)
- D) I can’t fight on an empty stomach. (腹が減っては戦はできぬ。)

Table 5

The results of "based" on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	19	15	11	11	24	22	22	21
not sure	0	2	6	7	2	2	2	2
wrong	10	12	12	11	3	5	5	6

As Table 5 indicates, both groups improved their score after the slide-lectures. Some participants in the experimental group wrote "He acted BASED ON her advice and this is why I judged sentence C correct." While some of the experimental group did apply the meaning to each sentence, others could not and answered that the reason was they thought *kanojo no chuukoku ni shitagatte* "on her advice" should be translated into *by* her advice.

③ "Means" on (抛る)

Pre-test

A) I can play "Let It Be" on a piano. (私はピアノで "Let It Be" が弾ける。)B) I cut my finger on a knife. (ナイフで指を切ってしまった。)

Post-test

C) She played "Yesterday" on a piano. (彼女はピアノで "Yesterday" を弾いた。)

Table 6

The results of "means" on

sentence	A		B		C	
pre/post	pre-test				post-test	
group	experi.	control	experi.	control	experi.	control
correct	12	9	6	8	29	28
not sure	2	2	3	2	0	0
wrong	15	18	20	29	0	1

Table 6 shows that both participants performed better after the slides-lectures. However, it is difficult to say whether their comprehension improved due to the meaning of *on* taught in the slide-lectures or if they had just memorized the phrase by rote (both the post-test and the slide-lectures contained the identical

phrase “on a piano.”)

④ “Possession” *on* / “Wearing” *on* (所持・着用)

Pre-test

- A) Do you have a match on you? (マッチを持っていますか?)
 B) She puts a ring on her finger. (彼女は指輪をしている。)

Post-test

- C) I got some money on me. (私はお金をいくらか持っている。)
 D) The dress looks good on you. (そのドレスは君によく似合っている。)

Table 7

The results of “possession/wearing” on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	2	2	16	18	26	25	26	25
not sure	7	4	4	8	1	0	2	0
wrong	20	23	9	3	2	4	1	4

On in sentences A and C means “possession”, and *on* in sentences B and D means “wearing”. As shown in Table 7, both groups improved a lot especially in their understanding of “wearing.”

⑤ “Time” *on* (時間)

Pre-test

- A) We left for the U.K. on the morning of May 5th.
 (5月5日の朝、イギリスへ出発した。)
 B) School begins on April 8th. (学校は4月8日から始まる。)

Post-test

- C) My baby was born on the evening of November 9th.
 (11月9日の夕方に子供が生まれた。)
 D) We got married on Christmas Eve. (私たちはクリスマスイブに結婚した。)

Table 8

The results of "time" on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	12	14	16	17	29	26	25	26
not sure	1	0	2	3	0	0	0	0
wrong	16	15	11	9	0	3	4	3

On which denotes time is one of the most difficult uses for Japanese people since the translations of all prepositions denoting time such as *on*, *in*, and *at* can be *ni* in Japanese. As table 8 shows, in the pre-test, about half of the participants of both groups made a mistake because, as some of their comments indicated, they thought that *in* was needed before the name of a month or before "the morning." They acquired how to use prepositions denoting time by rote learning and that caused them to make a wrong decision. However, the participants in both groups performed better in the post-test.

⑥ "Progressing" *on* (進行中)

Pre-test

A) The house is on fire. (その家は火事だ。)B) He is on duty. (彼は勤務中だ。)

Post-test

C) They are on strike. (彼らはストライキ中だ。)D) The goods are on sale. (その商品は売り出し中だ。)

Table 9

The results of "progressing" on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	12	10	16	16	28	28	27	29
not sure	7	7	3	2	1	0	1	0
wrong	10	12	10	11	0	1	1	0

Table 9 indicates that the participants of both groups scored higher in the post-test than in the pre-test. Almost all participants chose the correct answer.

⑦ “Toward” *on* (対して・向かって)

Pre-test

- A) She closed the door on me. (彼女に扉を閉められた。)
 B) I spend much money on books. (私は本に多くのお金を使う。)

Post-test

- C) They made an attack on the enemy. (彼らは敵に攻撃をした。)
 D) The storm is on us. (嵐が迫っている。)

Table 10

The results of “toward” on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	4	3	8	9	21	20	20	20
not sure	8	4	5	4	2	4	5	2
wrong	17	22	16	16	6	5	4	7

As shown in Table 10, though it seemed like the participants of both groups did not comprehend *on* denoting direction in the pre-test, they were able to understand it after the lecture.

⑧ “About” *on* (関わる)

Pre-test

- A) This is the book on musical instruments. (これは楽器に関する本だ。)
 B) He is on the team. (彼はチームに所属している。)

Post-test

- C) She takes a lecture on modern art. (彼女は近代美術の講義をとっている。)
 D) He spoke on international affairs. (彼は国際情勢について語った。)

Table 11

The results of “about” on

sentence	A		B		C		D	
pre/post	pre-test				post-test			
group	experi.	control	experi.	control	experi.	control	experi.	control
correct	5	6	15	10	25	20	17	15
not sure	8	3	0	4	3	2	0	2
wrong	16	20	14	15	1	7	12	12

According to Table 11, many participants chose the wrong answer because they thought *on* should be changed into *about* in sentence A, and *on* should be changed into *in* in sentence B. These ideas were not wrong, but they had not known *on* could be used in these sentences. As for the post-test, the participants in both groups had better scores in the post-test. However, they did not perform better than had been expected in sentence D even though the Japanese translation *kokusai jousei ni tsuite* (*on* international affairs) showed a clearer meaning of “*about*” (*ni tsuite*) than that of sentence C. The participants who chose the wrong answer wrote the following reasons:

“*Speak to* should be here.”

“*Speak about* should be here not *Speak on*.”

They felt *Speak on* was unfamiliar and replaced it with *Speak to* without any good reason, or eliminated the usage they did not know. The results of these questions implied that there were some limits in the effect of the slide-lectures; since they were only about five minutes long, it would be difficult for the participants to greatly deepen and apply their understanding of *on* usage.

4.3 The questionnaire results

The questionnaire was administered to both groups after the post-test. The results of question #1 are found in Figure 4 below.

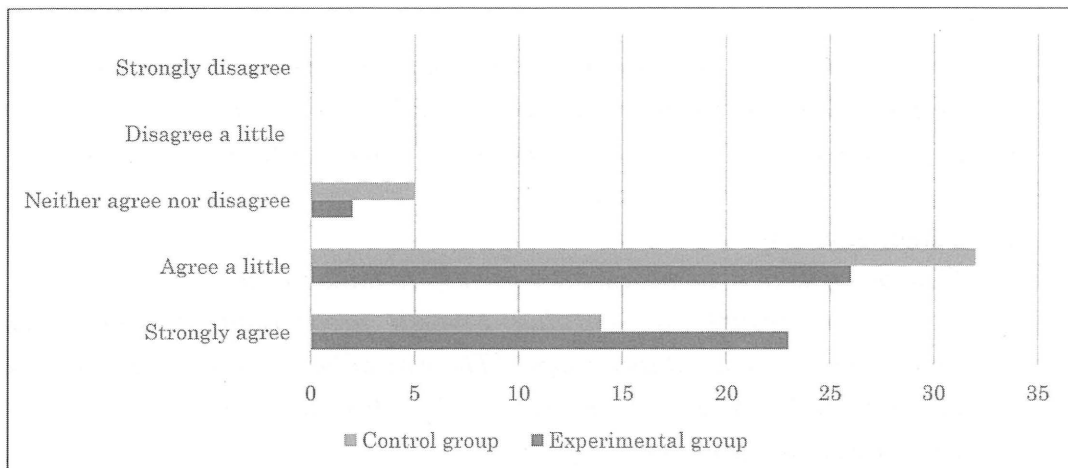


Figure 4. “Did you understand how to use *on* through today’s lecture using the slides?”

Question 1 asks students about the learnability of each lecture using different slides. The sentences on the slides used in both lectures were the same, and the pictures on the slides were almost the same. The biggest difference between the slides for the experimental group and the ones for the control group was the way to explain the meanings of *on*: whether the concept of the core meaning and the semantic network was introduced or not. As the chart indicates, more participants in the experimental group understood better than ones in the control group. There was not a significant gap between them, however, it became clear that the participants preferred this cognitive approach to learning by rote.

Responses to the second question (“Except for today’s lecture, have you ever heard the idea of relating other meanings to the core meaning when you learn English prepositions?”) show that only 12% of the participants had known about this approach; they had all learned it at a private evening school, not at regular school. The cognitive approach has not grown so popular yet.

The next question asks: “Would you like to learn other English prepositions in a similar way as today’s lecture?” It was asked only to the participants in the experimental group, and all of them answered “Yes.” It seems that there are high needs for this teaching method.

Finally, the participants made comments; some examples are provided below [original Japanese comments translated in English by the authors]:

Control group

- *Looking at many usages of on, I got confused and did not know which preposition to use in each sentence. It was difficult for me.*
- *The slides are just for the moment without lasting effects.*

Experimental group

- *This idea was new to me, and it was easy to understand.*
- *I had had trouble in learning English prepositions because each preposition has a lot of meanings. The way of learning on in this lecture made me understand it more easily. I wish I had learned this method when I was in high school.*
- *I did not understand how to use prepositions well before, but with the core meaning and the semantic network ideas, it is easy to learn them.*
- *I think it is useful, but I might not be sure which preposition is correct when I use it in an actual situation.*
- *I thought it was troublesome to learn all of the meanings of each preposition by rote before, but I found it easy to understand and memorize the meanings of them using what I learned in this lecture. I feel like I'm getting to like English more than before.*
- *I think the lecture was easy, but I do not understand how different on is from other prepositions.*
- *I think it is easier to apply the core meaning of on to another meaning by connecting them.*

5. Conclusion

This study suggests that cognitive approaches to language learning has positive effects on Japanese students. The cognitive approach we employed worked on some usages of *on* to a certain degree. Also, the participants in the experimental group showed a positive attitude to this method more than the participants in the control group.

The limited effects also suggests a need for further research. In this study, the gap between the improvement of the experimental group and the control group was not as large as it had been expected. One of the reasons for this is the limitation of the quality and quantity of the five-minute learning time. In general, learning something, especially acquiring a language, takes time and effort. More extended tasks of learning should be used in future studies. Besides

the improvement of the slides and how to use the semantic network better, a further study of how participants hold memory in long term or how other prepositions can be taught should be conducted.

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