

A study of the effect of learners' L1 in the process of learning the usages of prepositions from the perspective of cognitive linguistics

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Abstract

The purpose of this study is to investigate the effect of learners' L1 in the process of learning the usages of the prepositions in the semantic network. In Kodachi (2005), we examined what the prototypical meanings of our target prepositions (at, in, on) are in the mind of Japanese and Filipino subjects, and found that the prototypical meaning of all of the target prepositions is the basic spatial usages. We also considered the constraints of subjects' L1 on the construction of the prototypes, and found that it has a positive effect on the construction of the prototypes both in the mind of Japanese and Filipino learners. Based on these findings, we examine the effect of learners' L1 more deeply on learning the usages of the target prepositions.

1. Introduction

1.1. The Semantics of Prepositions

As mentioned in Kodachi (2005), a great amount of research has been done on the semantic factoring of English prepositions (e.g., Bennett (1975)). He advocated localistic theory, as mentioned in Kodachi (2005), which is about the relationship between the sub-concepts of the concept of space. Based on the core meaning theory, the cognitive processing of the functional structure in this localistic theory stays constant. Concerning prepositions, in this theory, three types of meanings are considered as meanings of preposition; namely, spatial, temporal, and abstract. Bennett (1975) claimed that the centre (core) of the meaning is spatial, and the other two meanings are derived from the spatial meaning. Since then, many researchers including L2 researchers, confirmed his theory, and as a result, they consider temporal and abstract relations as extensional usages of spatial relations.

Rice (1996), however, experimentally investigated this claim, and found that the locative meaning was not necessarily the prototype for other meanings. She suggested, based on her findings, that "at the least, in case of 'at' 'on' and 'in', we are dealing with a minimum of two central reference points, a spatial one and a temporal one"(pp. 159). Based on this research, Cho (2002) raised the question that what the mental reality of the L2 learners is and the constraint of L1 is now considered to be a key factor of this problem.

2. Preliminary Study

In Kodachi (2005), we examined what the prototypical meanings of the target prepositions are in the mind of Japanese subjects and Filipino subjects, and found that the prototypical meaning of all of the target prepositions is the spatial usages, confirms the theory of Bennett.

Also, corresponding the question in Cho (2002), we considered the constraints of learners' L1 (Japanese and Filipino in the study) acquiring the meanings of English prepositions, from the viewpoint of the usage of correspondence to English prepositions in each L1. Table 2.1 shows the correspondences of particle in three languages.

Table 2.1. Correspondences of Particles in Three Languages

	English	Japanese	Filipino
Space	at<in<on	-ni/-de -no naka (ni/de) -no ue (ni/de)	sa
Time	at<in<on	-ni	sa (present/future) noon (past)

In English prepositions, all of our target prepositions are used to express space or time, but Native speakers of English distinguish the meanings with different prepositions; “at,” “in” and “on,” in each usage. In Japanese spatial particles, we distinguish these meanings with different spatial nouns such as *-no naka (ni/de)* or *-no ue (ni/de)*. It corresponds to the distinction of spatial usages of English prepositions. However, as for the Japanese time particles, there is no distinction of meanings as with English prepositions.

On the other hand, there is no distinction of spatial usages in the Filipino marker *sa*; however, the temporal usages have a distinction of tenses, which is different from the distinction of temporal usages of English prepositions. From the result of the experiment, we found that it has a positive effect on the construction of the prototypes both in the mind of Japanese and Filipino subjects, although there some differences between the particles in their own languages corresponding the usage of English prepositions.

Moreover, we also examined the extensions of the meanings of the target prepositions and lexical knowledge in the minds of subjects, and our data appeared to confirm Dirven (1993)'s theory called *radical network*.

3. Experiment

3.0. Research Questions

Based on the findings in the preliminary study, we examine the effect of learners' L1 more deeply on learning the usages of the target prepositions. This study focuses on the following questions:

- 1) Does learners' L1 have a positive effect on learning the basic usages of prepositions, following the formation process of the constructing the prototypes?
- 2) Does Learners' L1 have any negative effect on learning the peripheral usages of them?

3.1. Subjects

Subjects for the experiment were the same as the ones in Kodachi (2005). However, three students of high school group did not answer any questions at all; the number of subjects of this group was 111.

3.2. Procedure

The subjects were asked to fill in the blanks in the sentences with the prepositions that they thought to be appropriate. The test consists of 101 sentences, which correspond to each usage of the three target prepositions (See Appendices A and B)¹. As for the temporal usages, each usage has two test sentences whose tense was different in order to examine the effect of tense differences in their answers. Table 3.1 shows the examples of pairs of the test sentences with different tenses.

Table 3.1. Examples of the Pairs of the Test Sentences that Have Different Tenses

No.	Test Sentence	Answer	Type
19)	The film starts () 8 o'clock.	at	TM1pr
75)	The film started () 8 o'clock last night.	at	TM1pt
41)	My husband often works () night.	at	TM2pr
92)	My husband often worked () night when he was young.	at	TM2pt
89)	It will be warmer () the spring.	in	TM1ft
88)	It became much warmer () the spring.	in	TM1pt
90)	He will learn to drive () six months.	in	TM2ft
7)	He learnt to drive () six months.	in	TM2pt
69)	We will arrive there () April 10th.	on	TM1ft
80)	Carol was born () April 10th.	on	TM1pt
23)	I'm looking forward to seeing several people () the voyage.	on	TM2ft
57)	I met several people () the voyage.	on	TM2pt

Note. 1) Not all of the test sentences which have different tenses were shown in the table. The subscript "pr" stands for "Present tense," "pt," "Past tense," and "ft," "Future tense."

2) The abbreviations in the column of "Type" are the same ones in Kodachi (2005). See Appendix B of it.

¹ When we asked Japanese high school students, we gave Japanese translations to some difficult words since we used the same test materials to all the groups, and some words were difficult for high school students. They were underlined in Appendix A.

They were asked to choose their answers from these five choices: “at,” “in,” “on,” “others,” and “X.” When the subjects consider other prepositions except the target ones to be appropriate, they were to choose “others”². When they thought no preposition is needed in the blanks, they were to choose “X.” This test examines their lexical knowledge of the meanings of the target prepositions and the effect of their L1. The data were analysed from the viewpoint of the percentage of the correct answers. We examined the correct ratio first, and then examined the response results of each sentence.

4. Results and Data Analysis

4.1. Correct Ratio Analysis

Table 4.1 shows the average percentage of the questions answered correctly by each group and each target preposition.

Table 4.1. Average of the Percentage of the Correct Answers

%	at	in	on
WU(Waseda University students)	51.02	48.36	39.32
HS(High school students)	29.47	28.43	22.57
DLSU(De La Salle University students)	73.41	69.66	56.15

The average percentage of Filipino university students were the highest of the three groups, followed by Japanese university students, and Japanese high school students were the lowest. The results of one-way ANOVA show that there are significant differences between the averages of the groups. Tables 4.2, 4.3, and 4.4 show the results of it.

Table 4.2. The Result of One-Way ANOVA of "at"

	SS	df	MS	F	p
Between Groups	20339.873	2	10169.936	19.344	.000
Within Groups	31545.045	60	525.751		
Total	51884.918	62			

Table 4.3. The Result of One-Way ANOVA of "in"

	SS	df	MS	F	p
Between Groups	32322.843	2	13161.422	47.606	.000
Within Groups	37682.505	111	339.482		
Total	70005.349	113			

² When subjects choose “others” as an answer, they were also asked to answer the preposition that they thought appropriate. The variation of answers by subjects were analysed in detail in the following sections; however, when we count and calculate them, all the variations were counted as the same answer as “others”.

Table 4.4. The Result of One-Way ANOVA of "on"

	SS	df	MS	F	p
Between Groups	23687.555	2	11843.777	27.478	.000
Within Groups	53017.310	123	431.035		
Total	76704.865	125			

As we can see from the results of One-Way ANOVA, since there are significant differences of the proficiency of English among the three groups, we are able to say that the proficiency affects the percentage of subjects' correct answers.

4.2. Positive Effects of L1

From the results of the experiment, we found that the questions of the prototypical meanings unsurprisingly received high correct ratio, and they also answered correctly the questions that might be learnt as chunks or set phrases. As for the other questions which yielded high percentages of their correct answers, we considered the positive effects of subjects' L1 towards the basic usages of the target prepositions. That is, the high correct ratio by Japanese subjects is due to the one-to-one correspondence or direct translation of Japanese, and the high correct ratio by Filipino subjects is due to the effect of the usages of Filipino counterpart *sa* as a locative marker or its original grammatical function to co-occur with indirect object. Table 4.5 shows the usages with high percentage of correct answers by each group.

Table 4.5. The Usages of Each Target Preposition with High Percentage of Correct Answer by each group

	at	in	on
WU	①TM1pr (89.1%)	①AB11 (85.9%)	①SP1 (81.3%)
	②TM1pt (87.5%)	②AB3/AB12/SP2 (79.7%)	②AB7 (75.0%)
	③TM3pt/TM2pr (81.3%)	③SP1 (75.0%)	③SP3 (73.4%)
HS	①TM1pr (56.8%)	①AB3 (55.0%)	①SP5/AB8 (41.4%)
	②TM2pr (55.0%)	②SP2 (52.3%)	②AB26 (40.5%)
	③TM1pt (48.6%)	③SP1 (50.5%)	③AB1 (38.7%)
DLSU	①TM1pt/TM2pt (100%)	①AB18 (100%)	①SP3 (100%)
	②TM1pr/TM2pr/TM3ft/ TM3pt (97.2%)	②AB7/AB1 (97.2%)	②AB14 (97.2%)
		③AB22 (94.4%)	③AB13 (94.4%)

Note. The abbreviations in the column of "Type" are the same ones in Kodachi (2005). See Appendix B of it.

4.3. Negative Effects of L1

Next, we will analyse the results of the questions which yielded lower correct ratio. Table 4.6 shows the usages with low correct ratio by each subject group.

Table 4.6. The Usages of Each Target Preposition with Low Percentage of Correct Answer by each group

	at	in	on
WU	①AB2 (9.00%)	①AB17 (1.56%)	①AB9 (4.69%)
	②AB6 (17.2%)	②AB8 (6.25%)	②AB25/AB19 (5.25%)
	③TM4pr (20.3%)	③AB9 (7.81%)	③SP6 (10.9%)
HS	①AB2 (13.5%)	①AB4 (13.9%)	①AB2/AB17/TM3ft (8.11%)
	②SP3/AB3 (18.0%)	②SP8 (14.4%)	②AB9 (9.91%)
	③SP6 (18.9%)	③AB5 (15.3%)	③AB18/SP6 (11.7%)
DLSU	①AB3 (8.30%)	①TM3ft (13.9%)	①AB9 (0.00%)
	②SP3 (25.0%)	②TM3pt (22.2%)	②AB26 (2.78%)
	③AB6(36.1%)	③AB13 (25.0%)	③AB25/SP6 (16.7%)

Note. The abbreviations in the column of “Type” are the same ones in Kodachi (2005). See Appendix B of it.

From this result, we found that the subjects’ L1 also has some negative effects on learning the usages of the prepositions. Furthermore, their limited lexical knowledge towards the usages of each preposition are also the crucial factor for their errors, as we have seen in the Experiment in Kodachi (2005). That means that their proficiency is also important in interpreting their erroneous use of prepositions as the combined effects of learners’ L1 and prototypes in learners’ mind.

One more thing we need to consider in this experiment is the preference to use “at” or “in” rather than “on” for the peripheral spatial usages of prepositions among Filipino learners. It is difficult for them to use these two prepositions, “at” and “in,” appropriately except for the prototypical meanings.

5. Conclusion

In this study, we examined the two hypotheses: 1) Learners’ L1 has a positive effect on learning the basic meanings of prepositions, in accordance with the prototype formation process, and 2) learners’ L1 also has a negative effect on leaning the peripheral usages of the prepositions. As a conclusion of this experiment, we are able to say that these hypotheses may be reasonable. The effect of Learners’ L1 in the process of learning the usages of the preposition is different, depending on whether the usage is the basic or the peripheral one of the prepositions. Furthermore, as we have mentioned before, learners’ proficiency is also important in interpreting some enormous use of prepositions as learners’ L1 and prototypes interact to each other in learners’ mind.

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Appendix A: Questionnaire (2) for Japanese subjects

<質問2> 次の英文 1)~101)について、at, on, in の中から最も適当だと思う前置詞を選んで「回答」の欄に記入してください。なお、他の前置詞が入ると思った場合はその前置詞を、ここでは前置詞が不要と思っただ場合は×をそれぞれ記入してください。(→回答は次の中より選んでください[at /in /on /others=他の前置詞を記入 /×])

No.	Sentence	回答	Type
1)	You can call me () 0181 530 3906.	on	AB26
2)	I love apricots () white wine.	in	SP5
3)	New firms take on workers () dozens.	in	AB15
4)	She was asking him () the matters of education.	on	AB4
5)	Place it () the corner of the room.	at	SP4
6)	We are () a position to advise our Indian friends.	in	AB6
7)	He learnt to drive () six months.	in	TM2pt
8)	He was () the plane from New York.	on	AB3
9)	I discuss the relationship between sport and politics () chapter 7.	in	SP6
10)	My father worked () a farm.	on	SP6
11)	<u>Burglar alarms</u> operate () a variety of principles.	on	AB5
12)	This is one of the finest <u>beetles</u> () my collection.	in	AB3
13)	Women hold a very strong position () American society.	in	AB11
14)	I could <u>apply</u> for the job () their advice.	on	AB19
15)	The drinks are () me.	on	AB12
16)	We were driving () California freeway.	on	SP9
17)	Scientists are working () <u>microchips</u> which will hold a <u>milliwords</u> .	on	AB23
18)	He cut the cake () two.	in	AB22
19)	The film starts () 8 o'clock.	at	TM1pr
20)	I've wasted too much money () her.	on	AB13
21)	One () every 10 children now suffers from that disease.	in	AB5
22)	My father sat () my right.	on	SP6
23)	I'm looking forward to seeing several people () the voyage.	on	TM2ft
24)	He couldn't bear looking at his own face () the mirror.	in	SP4
25)	Beth cried out () pain.	in	AB7
26)	She is () computers.	in	AB13
27)	I will meet him () arriving home.	on	TM3ft
28)	She had a puzzled expression () her face.	on	AB1
29)	He will leave school () the age of 16 next year.	at	TM3ft
30)	I forgot to tell him the news () all the upset	in	TM3pt
31)	She looked at me () horror.	in	AB14
32)	I was () holiday in Italy.	on	AB8
33)	He lived () junk food.	on	AB10
34)	Kenji is a <u>genius</u> () English.	at	AB3
35)	He left school () the age of 16.	at	TM3pt
36)	The students sit () a circle.	in	AB16
37)	The house was sold () a price of £250,000.	at	AB5
38)	He cut himself () the window.	on	AB16
39)	Planes are taking off () ninety-second intervals.	at	TM4pr
40)	No one took any interest () the <u>exhibition</u> .	in	AB12
41)	My husband often works () night.	at	TM2pr
42)	Mr Hanson is () Boston this week.	in	SP2
43)	He dipped his towel () the cool water.	in	SP7
44)	() arriving home I discovered they had gone.	on	TM3pt
45)	Can you read a car number plate () fifty metres?	at	SP6
46)	Mary attended the dinner party () her mother's <u>command</u> .	at	AB6
47)	She hated the bully () him.	in	AB8
48)	The item was not () the agenda.	on	SP8
49)	President Bush will appear () television later this week.	on	AB7

50) She has been () a member of <u>committees</u> .	on	AB9
51) Many children are still () risk from <u>abuse</u> .	at	AB1
52) The parents' <u>divorce</u> has had a particularly bad effect () the children.	on	AB14
53) Hang your coat () that hook.	on	SP2
54) She spoke () a calm, friendly voice.	in	AB10
55) Two cushions lay () the floor.	on	SP1
56) I'm sorry, Tom is () lunch just now.	at	AB4
57) I met several people () the voyage.	on	TM2pt
58) We put up curtains () yellow and orange.	in	AB19
59) Planes were taking off () ninety-second <u>intervals</u> .	at	TM4pt
60) We're going to build () a large scale.	on	AB20
61) We're losing a first-rate <u>editor</u> () Kathy.	in	AB9
62) There was a really nice dress () the shop window.	in	SP3
63) We'll meet () my house.	at	SP1
64) My mother was () the kitchen.	in	SP1
65) It seems much smaller () the map	on	SP10
66) What are you looking () ?	at	SP5
67) They have to pay fines () their books.	on	AB11
68) This car is more economical () <u>fuel</u> .	on	AB24
69) We will arrive there () April 10th.	on	TM1ft
70) Most cars run () <u>petrol</u> .	on	AB17
71) He made his opening address () a <u>press conference</u> .	at	SP2
72) Don't forget to tell him the news even () the upset.	in	TM3ft
73) He had £300 million () cash.	in	AB18
74) I could not sleep because of the pain () my feet.	in	SP8
75) The film started () 8 o'clock last night.	at	TM1pt
76) I didn't have any money () me.	on	AB2
77) I applied for a job () the railway.	on	AB21
78) It's amazing what you can do () these new word processors.	on	AB6
79) The children all laughed () his jokes.	at	AB7
80) Carol was born () April 10th.	on	TM1pt
81) They agreed () three points.	on	AB15
82) The country is now () war.	at	AB2
83) We had a break at a cafe () the river	on	SP7
84) He is () a play at the Theatre Royal next month.	in	AB2
85) Computers have recently <u>shrunk</u> () size.	in	AB4
86) He's been () the bank longer than anyone else.	at	SP3
87) The peach trees were all () blossom.	in	AB21
88) It became much warmer () the spring.	in	TM1pt
89) It will be warmer () the spring.	in	TM1ft
90) He will learn to drive () six months.	in	TM2ft
91) You've got a very good friend () Pat.	in	AB17
92) My husband often worked () night when he was young.	at	TM2pt
93) She kissed him () his mouth.	on	SP4
94) I bought it () credit.	on	AB18
95) She was concentrating () her personal life.	on	AB22
96) Bob will be () bandages for at least three more weeks.	in	AB20
97) The sales of this store are 10% up () last year.	on	AB25
98) They were () their fifties.	in	TM4pt
99) She was dressed () a blue dress.	in	AB1
100) He dropped it () the floor.	on	SP3
101) They are () their fifties.	in	TM4pr

Note. Japanese translations were given to underlined words for high school students. Only the test sentences and Japanese instruction were given to the subjects.

Appendix B: Questionnaire (2) for Filipino subjects

Student ID(No)<MUST!!!>[

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<Question2> Please fill in the blanks in the sentences below with appropriate prepositions.

You should choose the answers from "at", "in", and "on". However, if you think any other preposition is appropriate, please write down **the one you think appropriate**. And, if you think no preposition is needed, please **write down "X"** mark in the answer cell.

No.	Sentences	Answer
1)	You can call me () 0181 530 3906.	
2)	I love apricots () white wine.	
3)	New firms take on workers () dozens.	
4)	She was asking him () the matters of education.	
5)	Place it () the corner of the room.	
6)	We are () a position to advise our Indian friends.	
7)	He learnt to drive () six months.	
8)	He was () the plane from New York.	
9)	I discuss the relationship between sport and politics () chapter 7.	
10)	My father worked () a farm.	
11)	Burglar alarms operate () a variety of principles.	
12)	This is one of the finest beetles () my collection.	
13)	Women hold a very strong position () American society.	
14)	I could apply for the job () their advice.	
15)	The drinks are () me.	
16)	We were driving () California freeway.	
17)	Scientists are working () microchips which will hold a milliwords.	
18)	He cut the cake () two.	
19)	The film starts () 8 o'clock.	
20)	I've wasted too much money () her.	
21)	One () every 10 children now suffers from that disease.	
22)	My father sat () my right.	
23)	I'm looking forward to seeing several people () the voyage.	
24)	He couldn't bear looking at his own face () the mirror.	
25)	Beth cried out () pain.	
26)	She is () computers.	
27)	I will meet him () arriving home.	
28)	She had a puzzled expression () her face.	
29)	He will leave school () the age of 16 next year.	
30)	I forgot to tell him the news () all the upset	
31)	She looked at me () horror.	
32)	I was () holiday in Italy.	
33)	He lived () junk food.	
34)	Kenji is a genius () English.	
35)	He left school () the age of 16.	
36)	The students sit () a circle.	

- 37) The house was sold () a price of £250,000.
- 38) He cut himself () the window.
- 39) Planes are taking off () ninety-second intervals.
- 40) No one took any interest () the exhibition.
- 41) My husband often works () night.
- 42) Mr Hanson is () Boston this week.
- 43) He dipped his towel () the cool water.
- 44) () arriving home I discovered they had gone.
- 45) Can you read a car number plate () fifty metres?
- 46) Mary attended the dinner party () her mother's command.
- 47) She hated the bully () him.
- 48) The item was not () the agenda.
- 49) President Bush will appear () television later this week.
- 50) She has been () a member of committees.
- 51) Many children are still () risk from abuse.
- 52) The parents' divorce has had a particularly bad effect () the children.
- 53) Hang your coat () that hook.
- 54) She spoke () a calm, friendly voice.
- 55) Two cushions lay () the floor.
- 56) I'm sorry, Tom is () lunch just now.
- 57) I met several people () the voyage.
- 58) We put up curtains () yellow and orange.
- 59) Planes were taking off () ninety-second intervals.
- 60) We're going to build () a large scale.
- 61) We're losing a first-rate editor () Kathy.
- 62) There was a really nice dress () the shop window.
- 63) We'll meet () my house.
- 64) My mother was () the kitchen.
- 65) It seems much smaller () the map
- 66) What are you looking () ?
- 67) They have to pay fines () their books.
- 68) This car is more economical () fuel.
- 69) We will arrive there () April 10th.
- 70) Most cars run () petrol.
- 71) He made his opening address () a press conference.
- 72) Don't forget to tell him the news even () the upset.
- 73) He had £300 million () cash.
- 74) I could not sleep because of the pain () my feet.
- 75) The film started () 8 o'clock last night.
- 76) I didn't have any money () me.
- 77) I applied for a job () the railway.
- 78) It's amazing what you can do () these new word processors.
- 79) The children all laughed () his jokes.
- 80) Carol was born () April 10th.
- 81) They agreed () three points.
- 82) The country is now () war.
- 83) We had a break at a cafe () the river

84)	He is () a play at the Theatre Royal next month.	
85)	Computers have recently shrunk () size.	
86)	He's been () the bank longer than anyone else.	
87)	The peach trees were all () blossom.	
88)	It became much warmer () the spring.	
89)	It will be warmer () the spring.	
90)	He will learn to drive () six months.	
91)	You've got a very good friend () Pat.	
92)	My husband often worked () night when he was young.	
93)	She kissed him () his mouth.	
94)	I bought it () credit.	
95)	She was concentrating () her personal life.	
96)	Bob will be () bandages for at least three more weeks.	
97)	The sales of this store are 10% up () last year.	
98)	They were () their fifties.	
99)	She was dressed () a blue dress.	
100)	He dropped it () the floor.	
101)	They are () their fifties.	

Note. All of the test sentences in Appendix A and Appendix B are the completely same.