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Bilingual Cognition – Is English learned in Japan cognitively effective?

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1. Introduction

The aim of this research is to investigate whether English learned in Japan is cognitively effective. The participants were 293 Japanese high school students with different levels of English proficiency, who were asked to take part in an item categorization task. Two experiments were conducted with an interval of three months. Between the experiments, two types of tests were repeatedly administered in order to enhance the participants' English proficiency. The current research first examines whether it is possible to enhance the participants' English proficiency in a short period, and second examines whether there are any cognitive changes as their proficiency increases.

2. Materials

2.1 The Minimal English Test (MET)

The MET was developed by Maki, Wasada and Hashimoto (2003), and its reliability has been compared with other established English proficiency tests (Goto, Maki and Kasai, 2010, Kasai, Maki and Niinuma, 2005). The MET requires test takers to fill an English word of four letters or less into each of 72 gaps in sentences written on a piece of A4 paper, while listening to a CD recording of the full text. The reading materials are based on lessons 1 and 2 of a textbook for first year university students written by Sakamoto, Furuya, and Hubenthal (2001) and the CD that accompanies it. The MET lasts about 5 minutes, and the recording has a speaking speed of 125 words per minute. Before the test begins, test takers are given the following instructions and explanation verbally. (1) to write their name, grade and the date of the test taking on the top of the test sheet. (2) to fill an English word into each blank space while listening to the CD. (3) that the CD lasts about 5 minutes. (4) that there is about a three-second interval between Line 18 and Line 19. After the instructions are given, the volume of the CD is checked, and then the MET is administered. The MET used in the current research is an original version and is shown below.

The Minimal English Test

Name: _____ Date: Month____Day____Year_____ Score: _____/72

Please fill an English word with 4 letters or less into each blank spot, while listening to the CD.

1. The majority of people have at least one pet at ( ) time in their ( ).
2. Sometimes the relationship between a pet ( ) or cat and its owner is ( ) close
3. that ( ) begin to resemble ( ) other in their appearance and behavior.
4. On the other ( ), owners of unusual pets ( ) as tigers or snakes
5. sometimes ( ) to protect themselves ( ) their own pets.
6. Thirty years ( ) the idea of an inanimate ( ) first arose.
7. This was the pet ( ), which became a craze ( ) the United States and
8. spread ( ) other countries as ( ).
9. People ( ) large sums of money for ordinary rocks and assigned ( ) names.
10. They tied a leash around the rock and pulled ( ) down the street just ( ) a dog.
11. The rock owners ( ) talked ( ) their pet rocks.
12. Now ( ) we have entered the computer age, ( ) have virtual pets.
13. The Japanese Tamagotchi---( ) imaginary chicken ( )---
14. ( ) the precursor of ( ) virtual pets.
15. Now there ( ) an ever-increasing number of such virtual ( )
16. which mostly young people are adopting ( ) their ( ).
17. And ( ) your virtual pet ( ),
18. you ( ) reserve a permanent resting place ( ) the Internet in a virtual pet cemetery.

19. Sports are big business. Whereas Babe Ruth, the ( ) famous athlete of ( ) day,
20. was well-known ( ) earning as ( ) as the President of the United States, the average
21. salary ( ) today's professional baseball players is ( ) times that of the President.
22. ( ) a handful of sports superstars earn 100 times ( ) through their contracts
23. ( ) manufacturers of clothing, ( ), and sports equipment.
24. But every generation produces ( ) or two legendary athletes ( ) rewrite
25. the record books, and whose ability and achievements ( ) remembered ( ) generations.
26. ( ) the current generation Tiger Woods and Michael Jordan are two ( ) legendary
27. figures, ( ) of whom ( ) achieved almost mythical status.
28. The ( ) that a large number of professional athletes ( ) huge incomes
29. has ( ) to increased competition throughout ( ) sports world.
30. Parents ( ) their children to sports training camps ( ) an early age.
31. Such ( ) typically practice three to ( ) hours a day,
32. ( ) weekend ( ) during their school vacations
33. in order ( ) better their chances of eventually obtaining ( ) well-paid position
34. on a professional ( ) when they grow ( ).
35. As for the ( ) young aspirants who do ( ) succeed,
36. one wonders if they ( ) regret having ( ) their childhood.

After the above instructions are given, the volume of the CD is checked, and the MET is administered.

2.2 The Minimal English Test for Listening (M4L)

On a separate day, after administering the MET, the M4L was administered. At the beginning, following the same procedure taking the MET, test takers filled their information such as name and grade on the top of the test sheet. The M4L consists of two parts. The first section is half the length of the MET (i.e., having 36 gaps in the text and less than 2 minutes of audio), and used lessons 3 through 13 of the same textbook. As with the MET, students were given single listening. The second section consists of

three comprehension questions based on the preceding text: one 3-option multiple choice, and two true/false. Question content varied, and ranged from distinguishing near homophones to paraphrases of the text. The comprehension questions appeared below the gap-fill, and were read aloud by a native-speaking English instructor. An example of the M4L is shown below.

The Minimal English Test for Listening (M4L)

Name: _____ Date: Month____Day____Year_____ Score: _____/72

Please fill an English word with 4 letters or less into each blank spot, while listening to the CD.

1. Many people ( ) experienced the ( ) of standing on a
2. moving ( ) and watching a group ( ) dolphins swim alongside.
3. Dolphins are ( ) only playful animals ( ) they are also highly
4. intelligent. They ( ) mammals that can be found in ( ) of
5. the world's oceans ( ) well as ( ) fresh water.
6. Dolphins ( ) swim at speeds of ( ) to
7. 56 k.p.h., and ( ) can dive ( ) depths of 200 meters
8. and ( ) under water ( ) 5-8 minutes without resurfacing
9. for ( ). They are well-known for ( ) unique
10. clicking sound they ( ) like sonar to locate ( ) as
11. well ( ) obstacles. Every dolphin ( ) has
12. its ( ) individual whistling sound ( ) for communication.
13. ( ) dolphins sleep, they sleep in ( ) semi-alert
14. state ( ) resting one side of their brain ( ) a time.
15. They ( ) help sick or injured dolphins as ( ) as
16. they can, and they ( ) as a team ( ) there is danger.
17. It ( ) because of these ( ) other human-like
18. qualities ( ) people have a special feeling ( ) dolphins.

Choose a correct answer.

19. What are dolphins?

A	B	C
Playful fish	Enjoying swimming	Intelligent mammals

20. Dolphins have good eyes to find food under water.

○ ×

21. Dolphins are helpful and work in teams; that is why people like them.

○ ×

2.3 Participants

292 first year Japanese high school students participated in this research. They all attend the same municipal high school in Hiroshima prefecture. The students tested included 106 males and 186 females, with an average age of 15.5 years.

3. Results

Figure 3.1 Distribution of the MET 1 and the MET 2 scores

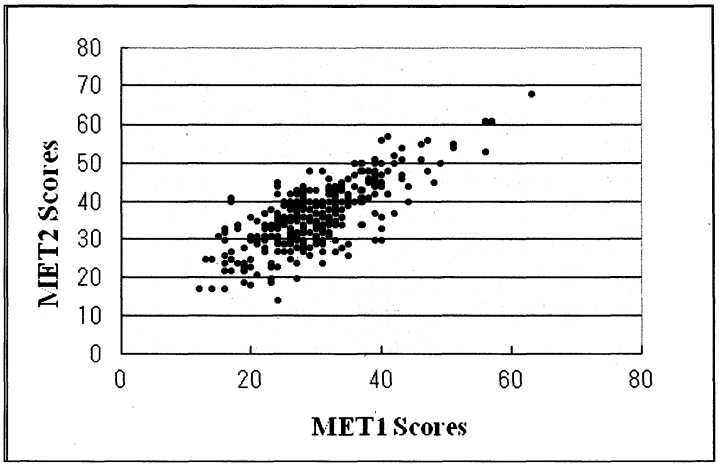

Table 3.1 Pared data

				95% Confidence Interval				
	Mean	SD	Mean Standard Error	Lower	Upper	t-Score	Degree of Freedom	Sig. Level (two-tailed)
MET1 - MET2	-6.573	5.858	.342	-7.247	-5.900	-19.208	292	.000

Table 3.1 shows pared data between the MET 1 and the MET 2. The students showed significantly better performance for the MET test in the second trial that was held three months after the first trial. The average score improved from 30.04 to 36.61 (N=292, p<.000, t=-19.208). Figure 3.1 visualises score distributions of the two tests.

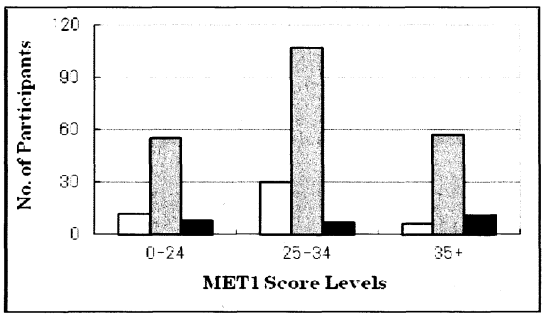

Figure 3.2
Responses to the Complex objects I

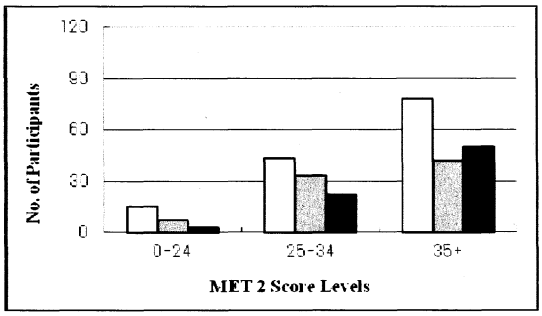

Figure 3.3
Responses to the Complex objects II

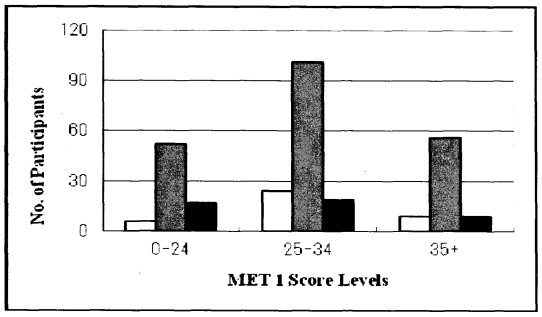

Figure 3.4
Responses to the Simple objects I

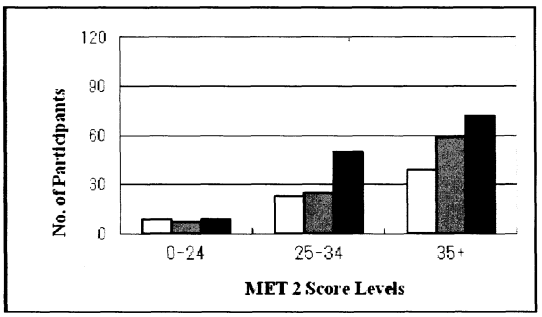

Figure 3.5
Responses to the Simple objects II

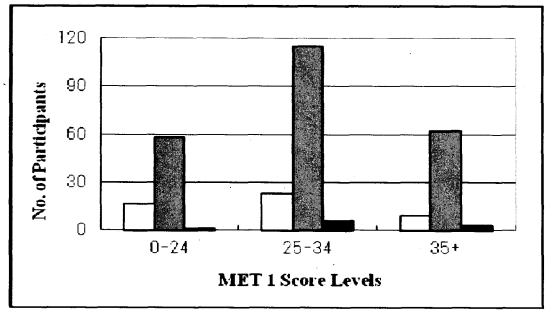

Figure 3.6
Responses to the Substance objects I

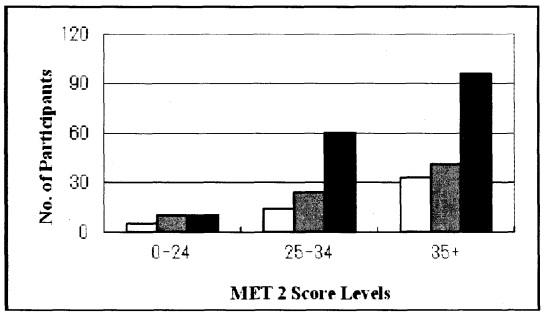

Figure 3.7
Responses to the Substance objects II

□ shape preference, ▩ non- preference, ■ material preference

Figures 3.2 and 3.3 compare how participants responded to the Complex objects after an interval of three months in between. On the first experiment, the most common response pattern indicated non-preference in all the proficiency groups. However, on the second experiment, such tendency was not seen: In all the proficiency groups, participants showed shape preference. The comparison of responses to Simple objects is shown in Figures 3.4 and 3.5. Again, the tendency for non-preference responses on the first test disappeared on the second experiment, and a preference for material emerged as the most chosen. For Substance objects, non-preference in the first experiment, shifted to materials preference for the second experiment, as indicated by Figures 3.6 and 3.7.

Shape/Material preferences of sub-groups divided according to their MET performance also varied significantly from each other. McNemar-Bowker Tests for the MET 1 groups are: Complex (101.614, $p<.000$), Simple (28.026, $p<.000$), and Substance (67.641, $p<.000$); and for the MET 2 groups are: Complex (46.701, $p<.000$), Simple (31.031, $p<.000$), and Substance (16.543, $p=.001$). All the groups showed significantly different responses after the three months learning periods.

4. Conclusion

The current research was designed firstly to investigate whether it was possible to enhance participants' English proficiency. Our results show that the participants' MET scores increased by 6.6 points on average. Secondly, we examined whether there would be any cognitive changes as the proficiency improves. As the results show, in all the

types of experimental objects, cognitive changes were seen between the first and the second experiment.

References

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Sakamoto, Furuya & Hubenthal (2001). *Thoughts into Writing*. Tokyo: Seibido.

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Notes

1. We follow Yanai (1998) in interpreting values of correlation coefficients. She assumes the following correspondence between correlation coefficients and their characteristics.

Correlation Coefficients	Characteristics
$0 \leq r < \|.2\|$	almost no correlation
$\|.2\| \leq r < \|.4\|$	weak correlation
$\|.4\| \leq r < \|.7\|$	moderate correlation
$\|.7\| \leq r < \|.9\|$	strong correlation
$\|.9\| \leq r < \|1\|$	extremely strong correlation

2. The version of the MET and the M4L are the original version of the MET, and Lesson 2 of the M4L.