

Osaka Gas Co., Ltd. and Tohoku University
has proven for the first time in the history of the world that
“cooking stimulates human brain functions”

In 2005, Osaka Gas Co., Ltd. and TOHOKU UNIVERSITY performed a joint study, headed by Professor Ryuta KAWASHIMA, on the effect of cooking on brain activity. In this study, 21 retired males were tested. The male subjects all participated daily in cooking exercises. The subjects’ brain activity was monitored and measured before and after the program. The results indicate that cooking stimulates brain activity, thus improving human various brain functions.

Prior to the above study, Tohoku University has already shown in a separate experiment that reading aloud and basic calculation also stimulate, develop, and improve brain functions.

In conclusion, in the above mentioned cooking study, it was demonstrated for the first time in the history of the world that daily participation in cooking also improves human brain functions.

In 2004 Osaka Gas also conducted another joint study with Professor KAWASHIMA to test the effects of cooking on brain activity, using the Optical Topography System of The Hitachi Medical Corporation. Measurements were taken in an actual kitchen in 4 stages: planning a menu for dinner, prepping and cutting the various ingredients, frying the cut ingredients with the use of a gas stove, and serving the dishes.

In this study, it was proven that various cooking tasks improve brain activities. It can be concluded by the results of these two joint studies that “cooking activates and improves brain functions.”

Osaka Gas Co., Ltd. and Tohoku University are going to analyze the results of these studies in an attempt to create an effective way to improve human health, with a particular focus on the effects of the brain functions of the elderly.

In autumn of 2005, Osaka Gas began a program, “Cooking School for Active Brain Functions” in its existing schools. This program targeted middle-aged and elderly males in an attempt to establish a habit of cooking in their daily life.

Recently, cooking and eating habits are changing. People depend more and more on prepared food and cook less and less at home. Osaka Gas would like to present to you the importance of the role of cooking, which has already been proven in our studies, hoping that it will help you lead a healthy life.

Professor KAWASHIMA and Osaka Gas Co., Ltd. presented the results of this study at the 12th International Conference on Functional Mapping of the Human Brain, held in June 2006 in Florence, Italy.

<http://refs012.securesites.net/snap001/clientuploads/HBM2006OnsiteProgram.pdf>

<Effects of daily participation in the cooking program: Main results of the measurements of human brain functions>

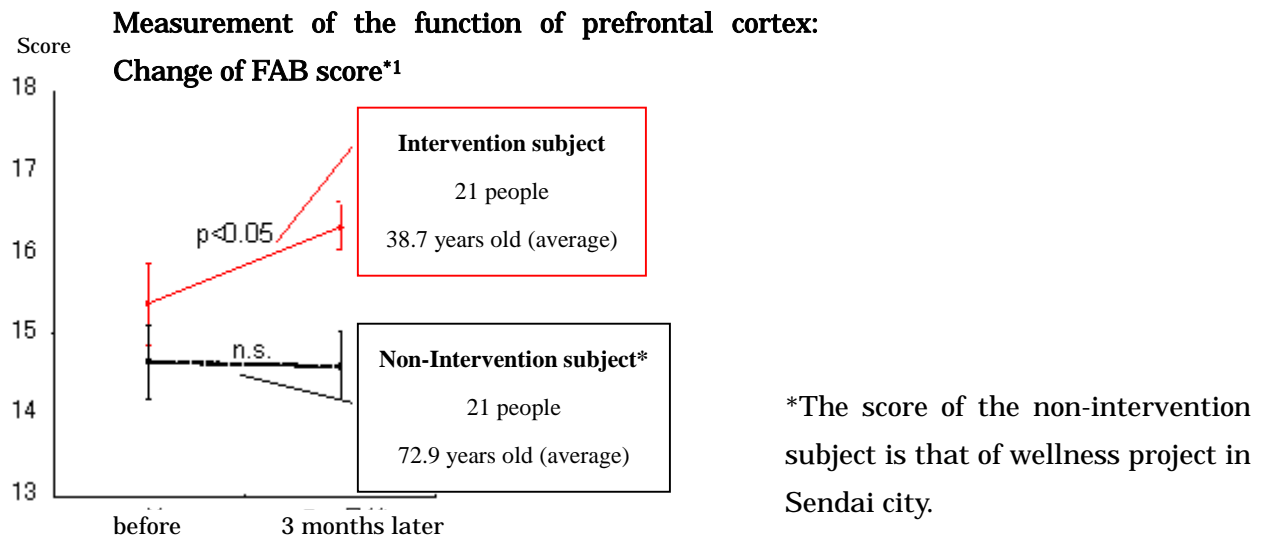


Figure 1: by Professor Ryuta KAWASHIMA, Tohoku University

1. In a FAB test, which measures the functions of the prefrontal cortex, healthy people under 60 years old usually can attain a perfect score of 18, while for those people of over 60 years old, the score generally decreases with age. The results of our test, which showed an increase in the score of elderly people after the 3-month program period, indicates that the function of the prefrontal cortex improves with participation in cooking.

1. A FAB score measures the functions of the prefrontal cortex, such as verbal conceptualization and planning, selection and ongoing regulation of behavior.

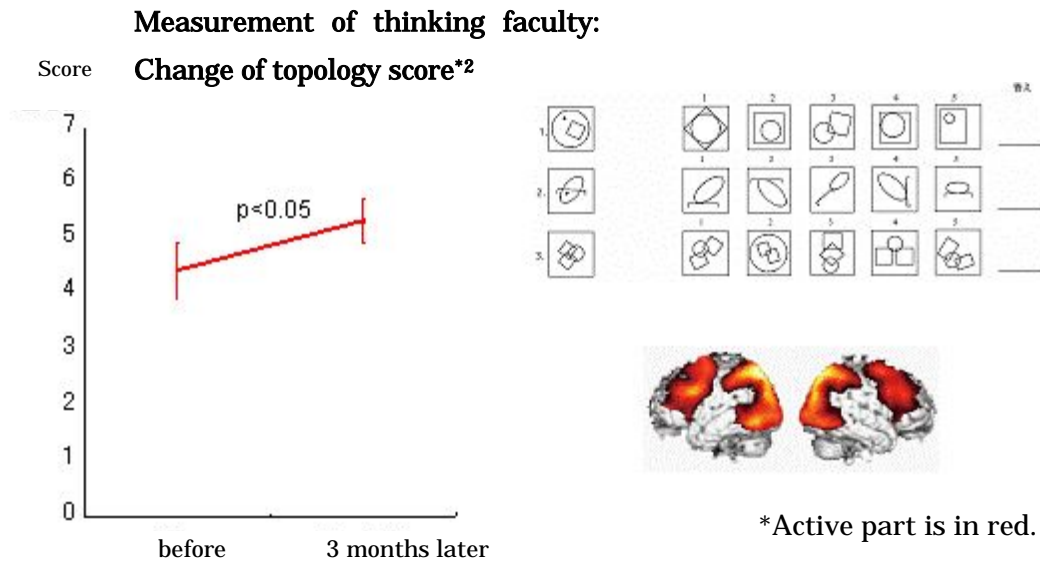


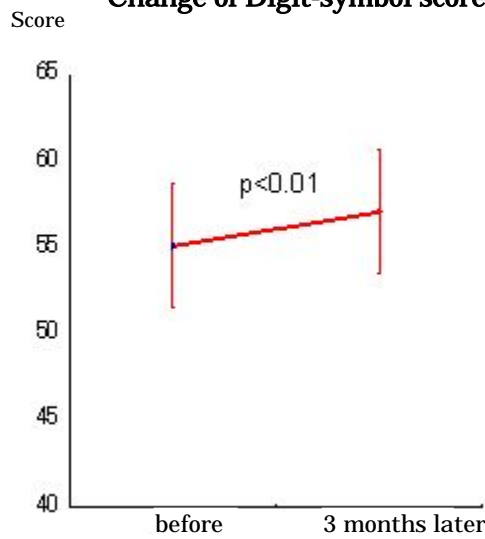
Figure 2: by Professor Ryuta KAWASHIMA, Tohoku University

2. In a topology test which measures the thinking faculty, the score of these 60 plus year old subjects was significantly increased. This result shows that the thinking faculty was improved by participation in cooking.

2. A topology score measures thinking faculty. In this test, subjects are asked to quickly choose a suitable figure composition, which matches a sample composition.

Measurement of the function of total task faculty:

Change of Digit-symbol score*³

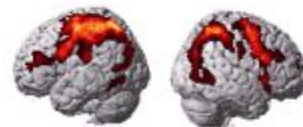


Rule: Each figure corresponds to the sign below.

1	2	3	4	5	6	7	8	9
-	⊥	⊃	L	U	O	Λ	x	=

Subject: Write down suitable signs following the above rule.

3	5	8	1	2	7	9	4	6	2



*Active part is in red.

Figure 3: by Professor Ryuta KAWASHIMA, Tohoku University

3. In a digit-symbol test, which measures total task faculty, the score of the subjects was significantly increased. This result indicates that total task faculty was improved by the participation in cooking.

3. A digit-symbol score measures total task faculty. Subjects are asked to quickly write down suitable signs, following the given rules.



Pre-test of brain functions (March 10th, 2005)



Cooking School (March 17th, 2005)

[Details of the Study]

1. Objective

To test the effects of cooking on brain functions by measuring the brain functions of subjects prior to and after participation in a cooking program.

2. Method of testing

The Subjects' brain functions were measured in test interviews prior to the start of the program (pre-test, baseline). The same measurements were also performed after the 3-month program period (post-test, follow-up). The two separate measurements were then analyzed and compared.

1) Title: Experiment that proves the positive effect of cooking on brain functions

2) Subjects: 21 males, ages 59-81 (mean 68.7 years old)

3) Location of test: Subjects' home and an Osaka Gas Cooking School

4) Period of test: March 9th – June 2nd, 2005

5) Program steps:

(1) Informed consent and pre-test (baseline): March 9th, 10th

(2) Cooking School

-Contents: Subjects learned 4 dishes from Japanese and/or Western menus in each lesson

-Testing days: 9 Thursdays, of which the following dates and times are:

14:00 – 16:00

March 17th, 24th, 31st, April 7th, 14th, 21st, May 12th, 19th, 26th

(3) Cooking was conducted at each subject's home while each subject took cooking

notes: March 17th – June 1st

(4) Post-test (follow-up): June 2nd

3. Details of the daily cooking participation program

1) Subjects were asked to attend cooking school once a week and learn daily basic cooking techniques.

2) The subjects were also asked to cook and prepare their own meals at their home at least 5 days a week and for at least 15 minutes each day. The subjects were required to fill out a homework sheet (cooking notes) about their daily cooking and shopping activities, and submit it every week at school.

3) The cooking notes were collected at the next lesson and checked. For those who experienced difficulty cooking at home, the staff talked with them each individually about how to adapt cooking habits more easily into their daily life.

4) The subjects were instructed to write down all questions or concerns that were encountered while cooking at home. Common questions among the subjects were discussed during the “dining” portion of the lessons at the school. Other questions were addressed individually. The daily cooking participation program was conducted for 3 months.

4. Results

After this program, the function of the prefrontal cortex (FAB score) was improved. So were the thinking faculty (topology score) and the total task faculty (digit-symbol score). The results prove that the daily cooking participation program improves brain functions.

5. Other conclusions

1) Purpose:

- (1) Learn basic techniques for daily cooking.
- (2) Maintain motivation to cook everyday for 3 months.

2) Points on the selection process of the food menu presented at cooking school

- (1) Present only simple dishes, which can be prepared solely with elementary cooking techniques, such as washing rice and boiling vegetables.
- (2) Consider seasonal aspects when designing the menu.
- (3) Teach cooking methods which can also be used daily at the home.
- (4) Present some short-cut techniques and simple hints for daily cooking life so that the subjects do not feel too much stress from daily cooking.
- (5) Introduce seasonal events and other festive activities into the cooking lesson so that the subjects can relax and enjoy cooking.