

# ICRP

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# 2018

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## PROCEEDING OF 3<sup>rd</sup> INTERNATIONAL CONFERENCE ON REBUILDING PLACE (ICRP) 2018

*Towards Safe Cities & Resilient Communities*

**13 & 14 SEPTEMBER 2018**  
**IMPIANA HOTEL, IPOH, PERAK**

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# A STUDY ON THE INFLUENCE OF WORKERS ON INTELLECTUAL PRODUCTIVITY WHEN WORKING WITH CLOTHES WITH ATTACHMENT

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**Abstract** - Increasing global competition due to globalization, diversification of people's values and so forth, has further increased the need for improvement in intellectual productivity in offices. However, various factors affect the improvement of intellectual productivity. However, a method to directly measure intellectual productivity has not been established yet. Therefore, empirical studies that quantitatively capture intellectual productivity by using proxy variables of intellectual productivity have been accumulated so far. In addition, we sometimes make a special meaning to a particular thing, as we say "attaching" to things. Watanabe (2016) pointed out that "attachment" held by people on things play a role in improving psychological value such as amplifying the sense of happiness caused by ownership and realizing identity. In this study, therefore, the researcher hypothesized that intelligent productivity will improve if you do work with attached clothes. So the subject of an experiment to evaluate "work efficiency" as a subjective evaluation and "VAS evaluation of intellectual activity degree" which are a proxy variable of intellectual productivity was carried out. As a result, it cannot be said that the work efficiency is affected by wearing attached clothes, but when a group who replied that they feel attachment less than 50% of their own clothes wear attached clothes, it was found that the results improved which was established by influencing the convergent thinking work which leads one correct answer based on already existing information. In addition, it was discovered that in this group, compared with the time of wearing clothes without attachment, immediately before the work, their global vigor, global affect, happiness, and calmness is higher and immediately after the work their global affect is high and sadness is low.

**Keywords** - intellectual productivity, attachment, work efficiency, intellectual activity degree

## 1 BACKGROUND AND PURPOSE OF STARTING RESEARCH

### 1.1 Background and Problems

In recent years, improvement of intellectual productivity of each office worker in the office is demanded against the backdrop of long-term economic downturn, which is said to have been lost 20 years in our country. Various problems such as a declining birth rate and an aging population do influence the trend. At the same time the software aspects such as the organisation structure and way of working are considered important to reform the hardware aspects of the physical environment in which workers work such as office space. In recent years, the number of enterprises introducing office casual is increasing as part of the trend to allow companies to work in various ways. While the selection area of clothing worn in workers offices is expanding, 66% of companies in Tokyo have dress codes, and few companies can choose their own clothes freely.

### 1.2 Attachment of People to Things

People sometimes have positive feelings towards specific things, like expressions that "have attachment" to things. Furthermore, it has been reported that people have attachment to the area, and various researches on regional attachment are being conducted (Suzuki, Fujii 2008).

Attachment is originally an emotional connection in humans and animals in the field of psychology, mainly is caused by mutual relations between infants and mothers (Bowlby 1969).

Today it began to be developed and used in a way that is "attached" to various things. In addition, Kino, Iwashiro, Ishihara and Dekihara (2006) pointed out that a person may personify things to the owner himself or to a familiar other person. In recent years, in the field of brand marketing and consumer behavior, the concept of affection has also attracted attention as a factor for consumers' willingness to purchase. For example, as called emotional branding, a strategy has been developed that places emphasis on acquiring market share in people's emotions rather than mere market share (Yaeshi, Iwakura 2014). Watanabe (2016) also pointed out that "affection" that human beings hold against things plays a role in promoting psychological value such as amplifying the sense of happiness by ownership and realizing identity. We proposed a design strategy to embed attachment point of view in product and suggest that the strategy is effective in promoting the formation of attachment.

### **1.3 Measurement of Intellectual Productivity**

As mentioned above, it is important to measure intellectual productivity in order to improve the intellectual productivity of each office worker. The Ministry of Land, Infrastructure and Transport tried to measure intellectual productivity by dividing intellectual activities into three tiers, and discussions were held (Intellectual Productivity Research Committee Report, 2011). Therefore, various empirical studies have been accumulated using proxy variables of intellectual productivity.

### **1.4 Purpose of the Study**

Therefore, the objective of this research is to examine the impact of emotional connections between people and clothes on intellectual productivity through subjective experiment. Additionally, the influence on intellectual productivity is obtained by measuring work efficiency and intellectual activity as a proxy variable of intellectual productivity.

## **2 OUTLINE OF THE EXPERIMENT**

### **2.1 Purpose and Objective of the Experiment**

We performed a subject experiment to ascertain the influence of working on clothes with attachment on intellectual productivity.

The subjects of this study were instructed to prepare clothes with attachment and clothes without attachment in advance. The subjects were 30 students (men:15, women:15) in Kyoto Institute of Technology.

### **2.2 Working Contents**

Work content is measured as work efficiency, 100 mass calculation with simulation of simple work, Sudoku (one of the pencil puzzles that puts numbers from 1 to 9 in a  $9 \times 9$  square frame separated into  $3 \times 3$  blocks), which is a simulation of convergent thinking work (deriving one correct answer based on already existing information), and an associative game which simulated the divergent thinking work (to make ideas based on information and produce free thought). In this association game, the subjects were asked to write words reminiscent of "vegetables" and "sports" as much as possible within the time limit. Furthermore, VAS subjective evaluation and questionnaire were conducted to measure intellectual activity degree. The subjects were then asked to perform 100 mass calculation, Sudoku, associative games with a time limit of 4 minutes each.

### **2.3 Method of the Experiment**

Figure 1 is the experimental procedure. For convenience, we set (a) when the subjects wear clothes with attachment, and (b) when the subjects wear clothes without attachment. In consideration of the influence of accustomed by order, an experiment was conducted by separating it into group A wearing attached clothes at first and group B opposite. Furthermore, the intellectual task that the subject wears clothes with attachment is "Intellectual Work  $\alpha$ " and the intellectual task performed by wearing clothes without attachment is "Intelligent Work  $\beta$ ". In the questionnaire, I asked

whether the subjects are interested in fashion, what kind of clothing subjects are attached in their own clothes and what percentage of their own clothes they have attachment.

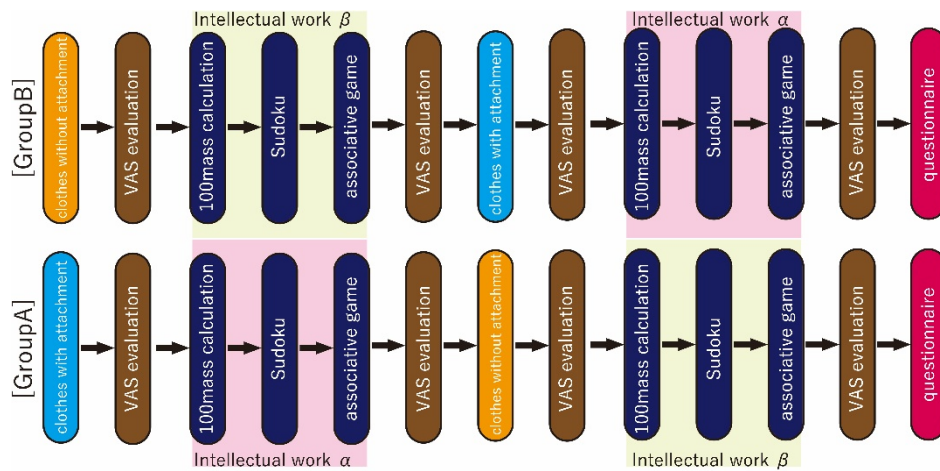


Figure 1 Experimental Procedure

### 3 RESULTS AND CONSIDERATION OF THE EXPERIMENT

#### 3.1 Measurement result of working efficiency

##### 3.1.1 Comparison by number of correct answers

The number of correct answers of subjects in each task in (a) when the subjects wear clothes with attachment and (b) when the subjects wear a clothes without attachment was shown in Figure 2 below.

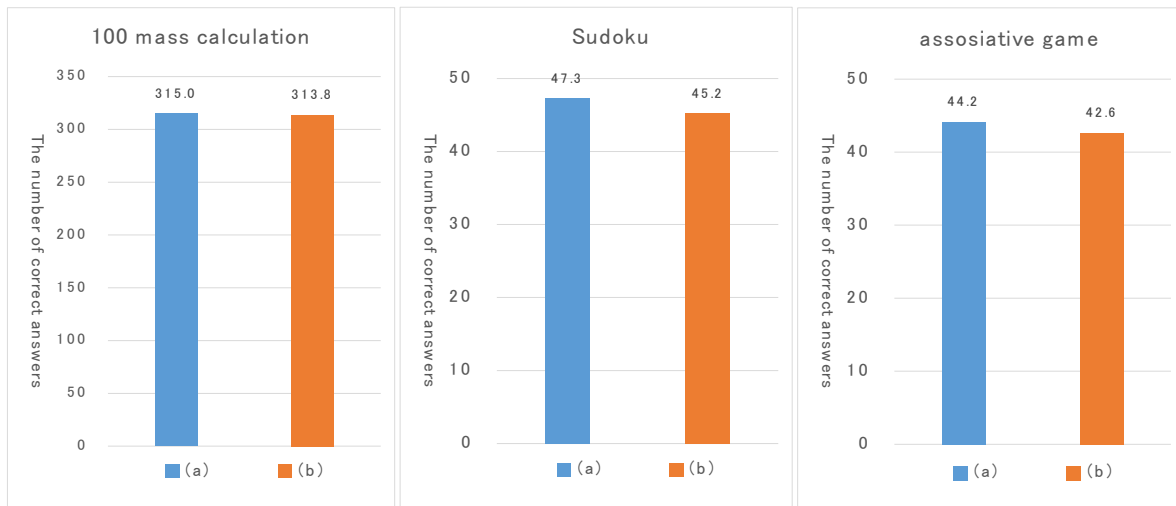


Figure 2 The average point of the number of correct answers of subjects in each task

In all the items, it was found that the number of correct answers when wearing clothes with attachment was higher than the number of correct answers when wearing clothes without attachment. Subsequently, we also made comparisons taking personal capacity differences into account. Looking at the growth rate of (a) to (b), assuming that the number of correct answers when wearing clothes without attachment is 100%, 17 out of 30 people in 100 mass calculation, 19 people in 30 in Sudoku, 19 out of 30 in associative game exceeded 100%.

### 3.1.2 Consideration of influence by order

In order to consider the influence of accustomed by order, regardless of the type of clothes subjects are wearing, the ratio of the results of the second work to the results of the first work of 30 subjects was examined. As a result, I found out that 20 out of 30 people in the item of 100 mass calculation, 24 people out of 30 in the item of Sudoku, and 21 out of 30 in the item of associative game improves records in the second work than in the first work.

### 3.2 Considering the significant difference

In order to examine whether the work efficiency is affected by the difference of clothes worn by subjects, the significant difference was examined. As a result, the significant difference of 100 mass calculation, Sudoku, associative game was  $p=0.611(>0.05)$ ,  $p=0.402(>0.05)$ ,  $p=0.343(>0.05)$  respectively.

Secondly, the significant difference of the influence of accustomed by order was examined. Regardless of the clothes worn by the subjects, the significant difference between the number of correct answers in the first task of 100 mass calculations, Sudoku and associative games and the number of correct answers in the second task were examined. As a result, the significant difference of 100 mass calculation, Sudoku, associative game was  $p=0.001(<0.05)$ ,  $p=0.002(<0.05)$ ,  $p=0.021(<0.05)$  respectively. In all work, the average score of the work of the second work is higher than the first work of 100 mass calculation, Sudoku, associative game. It turned out that it influenced the work efficiency by the order. From these results, it was found that the results of 100 mass calculations, Sudoku and associative games are not affected by the differences in the clothes worn by the subjects, but the influence of habituation by order.

### 3.3 Analysis by attribute difference

From the questionnaire taken at the end of the experiment, the subjects were categorized into various attributes and the work efficiency was analyzed. Among them, in a group that replied that the proportion of the number of clothes that have attachment in the owned clothes is 50% or more, (a) when the subjects wear clothes with attachment compared to (b) when the subjects wear clothes without attachment, the average point was found to be low. The average number of correct answers of subjects in each task in a group that replied that the proportion of the number of clothes that have attachment in the owned clothes is 50% or more is as shown in Figure 3.

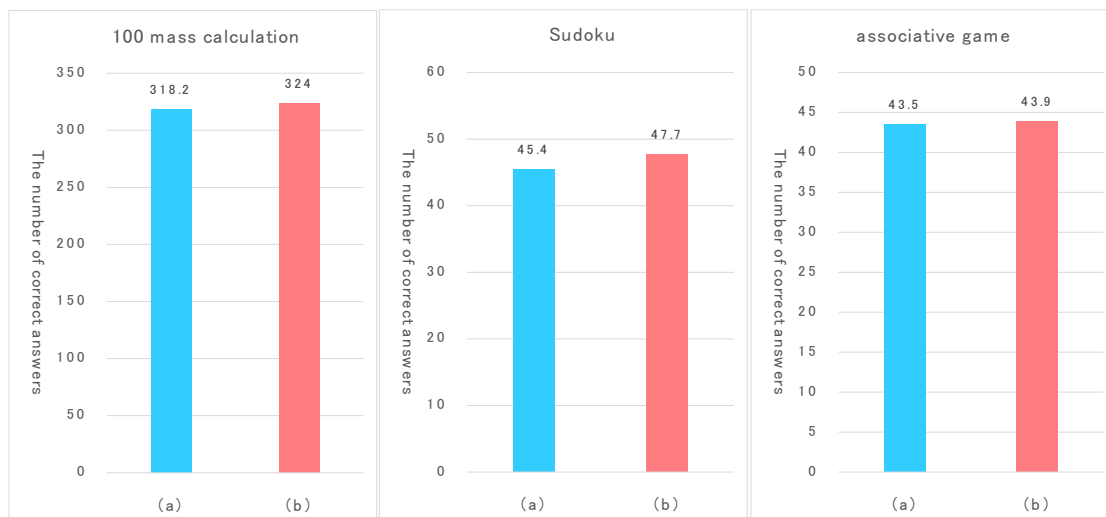


Figure 3 The average of the number of correct answers of subjects in each task in a group that replied that the proportion of the number of clothes that have attachment in the owned clothes is 50% or more

To the contrary, in a group that replied that the proportion of the number of clothes that have attachment in owned clothes is 50% or less, (a) when the subjects wear a clothes with attachment compared to (b) when the subjects wear a clothes without attachment, the average point was found to be higher. The average of the number of correct answers of subjects in each task in a group that replied that the proportion of the number of clothes that have attachment in owned clothes is 50% or less is as shown in Figure 4.

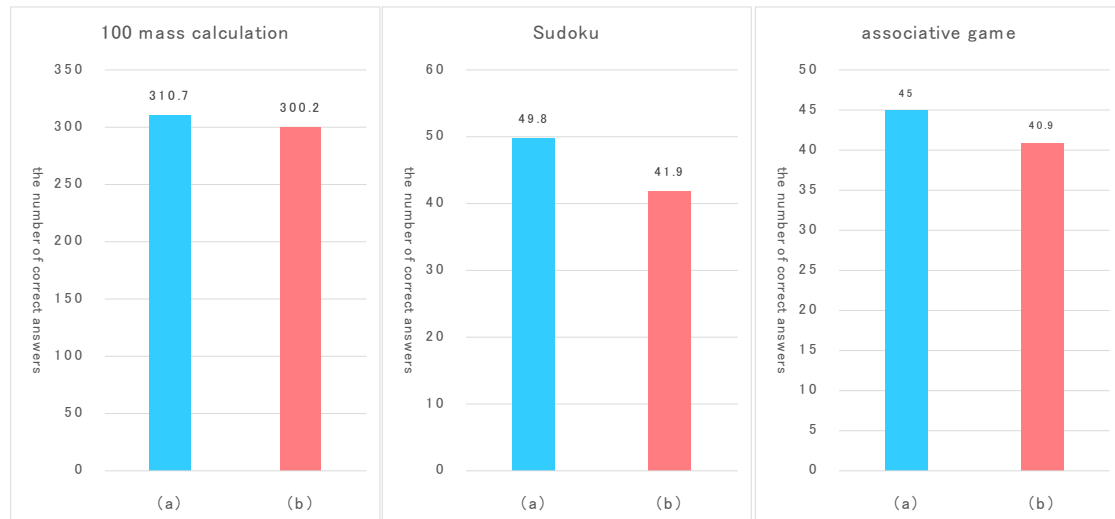


Figure 4 The average of the number of correct answers of subjects in each task in a group that replied that the proportion of the number of clothes that have attachment in owned clothes is 50% or less

Therefore, the significant difference between the correct answer numbers of (a) when the subjects wear clothes with attachment and (b) when the subjects wear a clothes without attachment of the group who replied that the proportion of the number of clothes that have attachment in the owned clothes is 50% or less. As a result, the significant difference of 100 mass calculation, Sudoku, associative game was  $p=0.280(>0.05)$ ,  $p=0.01(<0.05)$ ,  $p=0.086(>0.05)$  respectively. That is in Sudoku's correct answer number, there was a significant difference between (a) when the subjects wear clothes with attachment and (b) when the subjects wear clothes without attachment. Regarding Sudoku, it can be seen that the work efficiency is affected by the difference in the clothes worn by the subjects.

An investigation on whether there was an influence of accustomed by order in the number of correct answers of Sudoku of the group was examined. The findings showed that the proportion of clothes that have attachment in the owned clothes is 50% or less. Comparing the average points of the first correct answer number and the average points of the second correct answer number in this group, it was found that the average points of the second correct answer number is higher. But regardless of Group A and Group B, when considering the significant difference between the first and second correct answers, the result was  $p = 0.237(>0.05)$ , and no significant difference was found. In the group that replied that the proportion of clothes that have attachment in the owned clothes is 50% or less, it was not influenced by the order, and it was found that the difference in the clothes worn by the subjects do influence the performance of Sudoku.

### 3.4 Evaluation of intellectual activity degree

Measurement of intellectual activity degree was measured by adopting alert, sleepiness, effort (loss of motivation), weariness, happiness, sad, calmness, and tension called basic VAS. When using the eight items, obtain global vigor and global affect could be obtained. Measurement of the intellectual activity degree was carried out four times in total, which are the first intellectual work, after the first intellectual work, before the second intellectual work, and after the second intellectual work.

First, by looking at the measurement result of the intellectual activity degree of the subject as a whole, just before intellectual work, global vigor and happiness were higher and effort (loss of motivation) was lower when wearing clothes with attachment than when wearing clothes without attachment. Just after intellectual work, it was shown that global affect and happiness were higher and sadness was lower when wearing clothes with attachment than when wearing clothes without attachment.

Next, when the intellectual activity of the group of that replied that the proportion of clothes that have attachment in owned clothes is 50% or less was measured, just before intellectual work, it showed that global vigor, global affect, happiness and calmness were higher when wearing clothes with attachment than when wearing clothes without attachment. Also, just after intellectual work, it was shown that global effects were higher and sadness was lower when wearing clothes with attachment than when wearing clothes without attachment.

### 3.5 Correlation analysis of work efficiency and intellectual activity

Here, in the group that replied that the proportion of clothes that have attachment in the owned clothes is 50% or less, the intellectual activity degree just before doing intellectual work is higher than when the subjects wear clothes without attachment by wearing clothes with attachment, and that the results of Sudoku afterwards improved, the researcher examined whether there is a correlation between the items. Therefore, an analysis was done whether there is a correlation between Sudoku improvement using the test of no correlation and the increase of these intellectual activities. The results are shown in Tables 1 and 2.

Table 1 Correlation coefficient between intelligence activity and Sudoku

	global Vigor	global affect	happiness	calmness
Sudoku	-0.356	0.335	0.377	-0.189

Table 2 Significance probability of intellectual activity and Sudoku

	global Vigor	global affect	happiness	calmness
Sudoku	0.233	0.263	0.204	-0.536

As can be seen from the table above, in the group that stated the proportion of clothes that have attachment is 50% or less, the findings show that the intellectual activity degree before work is higher when wearing clothes with attachment than when wearing clothes without attachment, and the results of Sudoku later improved. This suggested that there was no correlation between them.

## 4 CONCLUSIONS

In this research, we aimed to clarify the influence of working with clothes that have attachment on intellectual productivity from the viewpoint of work efficiency and intellectual activity degree. As a result, the respondents reported that the proportion of clothes that have attachment in the owned clothes is 50% or less, wearing with attachment influenced convergent thinking work which leads one correct answer based on already existing information, and the result has improved. Additionally, in the group, it was shown that global vigor, global affect, happiness and calmness were higher when they are wearing clothes with attachment than when wearing clothes without attachment. Besides, after intellectual work, it shows that global effects were higher and sadness was lower when wearing clothes with attachment than when wearing clothes without attachment. However, there was no correlation between the changed intellectual activity degree and the increase in the results of convergent thinking work.



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