

## GENDER DIFFERENCES IN MEMORY FOR FILM OF PIGMIES' HUNTING-GATHERING ACTIVITIES AMONG JAPANESE CHILDREN AND ADULTS

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Although adaptation to hunting-gathering life is a main hypothesis for understanding of the nature of humans, studies directly examining the hypothesis have not been done. In the present study, we used the method of showing a film depicting hunting and housework by African hunter-gatherers to elementary pupils and university students to examine their memories. In pupils and students, males showed higher percentage of correct answers than females for hunting-related questions, and female showed higher percentage for housework-related questions. The results suggest a males' learning bias to hunting and support the hunting-gathering hypothesis.

**Keywords:** gender difference; hunting-gathering; learning bias

An essential hypothesis in recent studies trying to clarify the human nature from viewpoint of evolution is that the physical, physiological, mental and behavioral dispositions of humans are adaptive to *Homo sapiens'* natural environment and life style (Buss, 1995; Silverman and Eals, 1992; Tooby and DeVore, 1987). Many researchers surmise that an aspect of the life style is male-hunting and female-gathering, and respective human characteristics are adapted to it (hunting-gathering hypothesis) (Kimura, 1999, 1992; Heerwagen and Orians, 1993). They interpret as the male's adaptation to hunting and the female's to gathering and housework the sexual differences in recognition-related activities, for example, the male's superiority in geographical orientation and female's in memory of object location. The impetus for the present evaluation of the hunting-gathering hypothesis is that it is supported only by indirect evidences.

In the present study, we used the method of showing a film, which depicted hunting and housework by African hunter-gatherers, to elementary pupils and university students to examine their memories of the contents after the film showing. If a higher percentage of correct answers by males than females occurs only for questions closely related to hunting, it indicates that the males have a mechanism of recognition for paying attention selectively to hunting and/or a memorizing mechanism selectively reacting to hunting. The purpose of this paper is to report and discuss the results obtained by the above mentioned methods. Examining the learning bias related the hunter-gather activities is thought to offer more direct materials for discussion of the hypothesis.

### METHODS

#### *Preparation of film*

Documentary film which fulfils the following conditions was prepared. (1) It records hunting in grassland or forest by hunting-gathering people. (2) Not only males but also females participate in the hunting. (3) The record includes daily activities other than hunting, for example, activities for

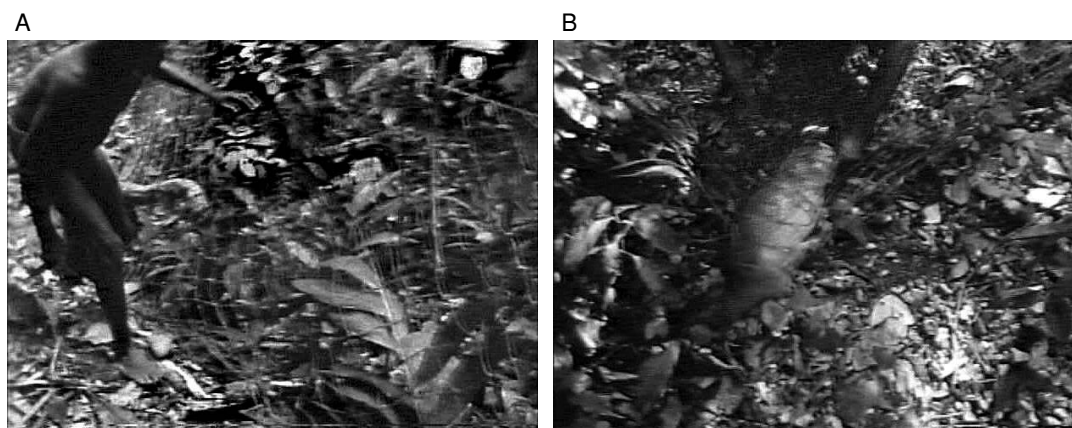


Fig. 1. Scenes in the film. A) a male is setting a net for hunting, and B) a male has captured a duiker tangled in the net.

house keeping. The content of the film was a record (13 minutes) of net hunting by Pygmies in Central Africa (No. 1148 of video library in National Museum of Ethnology, Osaka).

#### *For the elementary school pupils*

The film was shown to pupils 8 to 12 years old (281 males and 231 females) of three elementary schools (Yayoi, Haida, and Ichinomiya elementary schools of Tsuyama City, Japan). The film was shown in their classrooms before the start of formal lessons. Before the start of film, the pupils were not given any direction except, “Go back to your seat. I will show you some film”, from their homeroom teachers. The teachers did not say anything during the film showing.

The outline of the film was as follows: [Fourteen persons (6 males and 8 females) walk hanging loads on their foreheads toward a new base camp], [They make a base camp with tree branches, then make string of bark and build a fire with stones], [They move to a hunting place and, there, pray for the success of hunting around a fire to paint charcoal on their faces], and then [Hunting starts].

The content of hunting was as follows: [Males open and set the net of about 1.3 m wide and about 70 cm long in form of “U” on the ground (Figure 1A). Females drive animals into the “U” enclose of net from entrance of “U” net. Males catch animals which rushed in and became tangled in the net or animals which were chased and climbed a tree (Figure 1B). By this hunting, they captured a duiker (small deer) in the net and a pangolin on a tree.]

The pictures of film were supplemented by narration of Japanese. After the film ended, the teachers distributed the question papers to the pupils and said, “Please answer the questions on the paper. This is not an examination”. Pupils could take time for answer as they like. Answers required more than a few minutes, but less than tens of minutes.

The questions were the following: (1) How did they carry their load? (2) How did they make the string in the base camp? (3) How did they build a fire in the base camp? (4) What was the difference in clothing between males and females? (5) What did they do when praying for the success of hunting? (6) Which is correct explanation of how to hunt? (7) What animal was caught in the net by hunting? (8) How did they catch a pangolin which was chased and climbed a tree?

Four or five answers (one of them is correct) were prepared for each question, and pupils could chose one of them according to their memories. The answers for choice in the question (1) were, for example, as follows: 1) hanging it on the neck, 2) placing it on the head, 3) hanging it on the shoulder, 4) holding it by the arm, or 5) hanging it on the forehead (the number 5 is correct.)

### For university students

The basic procedure was same as the case of elementary school pupils. The film was shown to 18 to 27 years old students (193 males and 109 females) of Tottori University of Environmental Studies in Tottori City, Japan. At the beginning of the lecture, the film was started with no explanation. Students were not given any instructions during the film showing.

## RESULTS

### The elementary school pupils

Figure 2 summarizes the result. Male pupils showed significantly higher percentage of correct answers in (3) (how to build a fire) ( $p < 0.05$ ,  $\chi^2$  test), (6) (how to hunt) ( $p < 0.01$ ), (7) (the animal caught by net hunting) ( $p < 0.01$ ), and (8) (how to catch a pangolin) ( $p < 0.05$ ) than female pupils. On the other hand, female pupils did so in (2) (how to make string) ( $p < 0.01$ ) than male pupils.

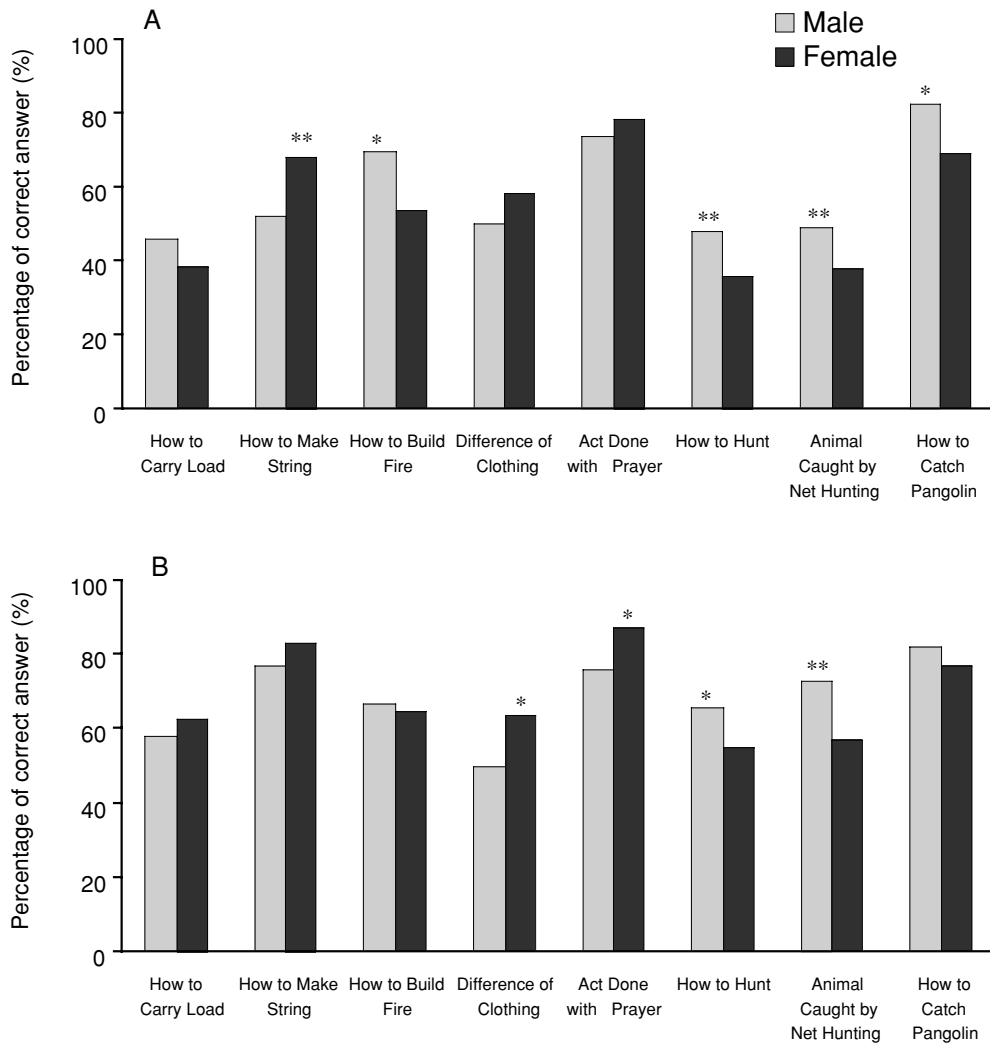


Fig. 2. Percentages of correct answers to eight questions about the content of the film by males and females.

A: elementary school pupils, B: university students. \*:  $p < 0.05$ , \*\*:  $p < 0.01$  ( $\chi^2$  test)

### *University students*

In almost all questions, the percentage of the correct answer was higher than cases in the pupils. Male students showed significantly higher percentage of correct answers in (6) (how to hunt) ( $p < 0.05$ ) and (7) (the animal caught by net hunting). On the other hand, female students did so in (4) (difference of clothing between males and females) ( $p < 0.05$ ) and (5) (what males and females did when praying) ( $p < 0.05$ ).

Except a question (1), the sex of higher percentage of correct answer was the same as in the elementary school pupils, although the differences between the percentages were not statistically significant in many cases. That is, in both of pupils and students, the percentage was higher in males in “how to build fire”, “how to hunt”, “animals caught by net hunting”, and “how to catch pangolin”. The percentage was higher in females in “how to make string of plant”, “difference of male’s and female’s clothing”, and “act done with prayer”.

## DISCUSSION

The tendency of higher percentage of the correct answer by the students than pupils is supposed to be caused by more amount of knowledge of students, which helps to detect the correct answers.

Among the questions, “how to hunt”, “animals caught by net hunting”, and “how to catch pangolin” are thought to be directly related to the animal hunting, and “how to make string of plant” and “difference of male’s and female’s clothing” are thought to be closely related to plant gathering and housework. The facts that male pupils and students showed higher percentage of correct answers than female ones in the former questions (statistically significant in five of six cases) and that female pupils and students did so in the latter questions (statistically significant in two of four cases) suggest the following possibility: Male pupils and students have a mechanism of recognition for paying attention selectively to hunting and/or a memorizing mechanism selectively reacting to hunting; on the other hand female ones do so to plant gathering and housework.

The reason for better memorization of hunting-related contents by the male pupils and students is thought to be neither of the following: (i) because hunting in the film was performed by the same sexed individuals as them, that is, males, nor (ii) because the male pupils had experienced the similar hunting acts in their actual lives to those in the film. In the film, both males and females participated in the hunting. And, in the present Japan, young males can hardly ever have experience of hunting mammals, nor systematic hunting of any animals. In the same way, better memorization of plant gathering and housework-related contents by the female pupils is not thought caused by “the same sex image”.

The present results obtained by a “spontaneous memory method” suggest existence of innate learning bias for the hunting by males and for the plant gathering and housework by females, and support the hypothesis of humans’ psychological adaptation to the hunting-gathering life.

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