Research Activity Report
Supported by "Leading Graduate Program in Primatology and Wildlife Science"
(Please be sure to submit this report after the trip that supported by PWS.)

	2015. 08. 03
Affiliation/Position	Primate Research Institute/D1
Name	Duncan Wilson

1. Country/location of visit

Kyoto University Primate Research Institute and Kagamigahara Ranch in Inuyama, Japan

2. Research project

Comparative Cognitive Science course.

3. Date (departing from/returning to Japan)

2015. 04. 01 - 2015. 07. 31 (4 months)

4. Main host researcher and affiliation

Prof. Masaki Tomonaga (Primate Research Institute)

5. Progress and results of your research/activity (You can attach extra pages if needed)

Please insert one or more pictures (to be publicly released). Below each picture, please provide a brief description.

Aim: To learn the basis of comparative cognitive science. Understand the procedures in cognitive experimentation and behavioural observation. Work with chimpanzees and horses.

Note: As I am a first year PhD/PWS student in Prof. Tomonaga's comparative cognition laboratory, daily participation in experiments was regarded as suitable practice for this course. Therefore, my report will focus on my observations working with chimpanzees and horses from April to July, 2015.

Chimpanzees: In my first few months at the Primate Research Institute, I learnt how to conduct cognitive experiments with chimpanzees. The experimental procedure is largely automated; a computer programme is used to present stimuli on a touch screen and collect raw data, and universal feeders provide the chimpanzees with food rewards for correct responses. The advantage of this automated system is that it maximizes the accuracy and reliability of the results, and minimizes experimenter bias.

The procedure involves preparing, weighing and placing food rewards (diced apples) into the universal feeders and loading up the relevant computer programmes. Next, the chimpanzees are tempted into the experimental booth from the indoor holding area using extra food or water. Once inside the booths, the chimpanzees are rewarded again and must touch a start button on the screen to begin the first trial in a session (this ensures they are ready to attend to the stimulus presentation). Current research includes: learning the basic rules of the 'Rock, Scissors, Paper' game, sequence counting, visual search with a central visual distractor, and discriminating circle size and dot density. A correct answer results in a high pitched tone and a piece of apple, which drops down a tube for the chimpanzee to eat (positive reinforcement), and an incorrect answer results in no-reward and a low pitched buzzer (negative punishment). There are usually three different experiments run during a session, which typically lasts 45-60 minutes for each chimpanzee. Often the chimpanzees are required to reach a certain level of accuracy, e.g. 80-90% correct responses before the training stage is complete, or the next stage of the task can be introduced. In order to maintain motivation during the tasks, the chimpanzees are rewarded with extra food (e.g. berries, peanuts, dried fish) during a set of trials, at the end of a set of trails, or between experiments. Once the chimpanzees have finished all the experiments, they are rewarded with extra food again and allowed to return to their indoor enclosures.

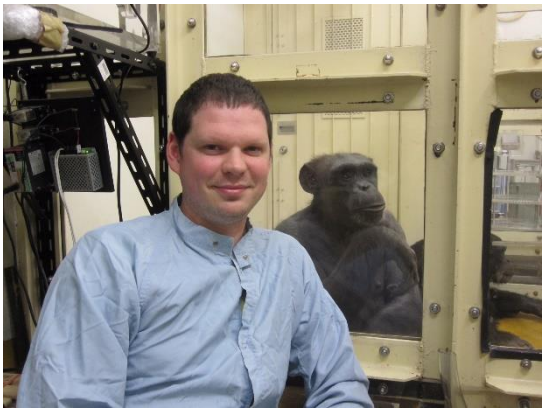
I found it very interesting to see how the individual preferences of the chimpanzees are accommodated during the experiments. For example, some chimpanzees prefer to be rewarded with raisins instead of apples, some prefer to sit on a wooden pallet, some prefer to have the door

to the experimental booth open, and some prefer to have the drainage hole in the experimental booth closed. The most challenging aspect of conducting cognitive experiments with chimpanzees is understanding how best to motivate them to take part in the experiments. Levels of motivation and participation often change between and within sessions. Sometimes they will refuse to enter the booth, sometimes they will enter the booth but refuse to engage with the computer, and sometimes they will concentrate fully on the experiments from start to finish. There are many factors which could be affecting motivation levels such as; temperature, level of hunger, the estrous cycle, personality, intrinsic interest in the task, prior social interactions with conspecifics, testing alone or with another chimpanzee, and the presence of different experimenters, etc., and so it is very challenging to isolate the precise reasons for lack of motivation/participation. The most commonly employed strategies used by the staff to increase motivation are calling the chimpanzees names, giving vocal encouragement during the task, and offering food rewards of high value, with varying degrees of success.

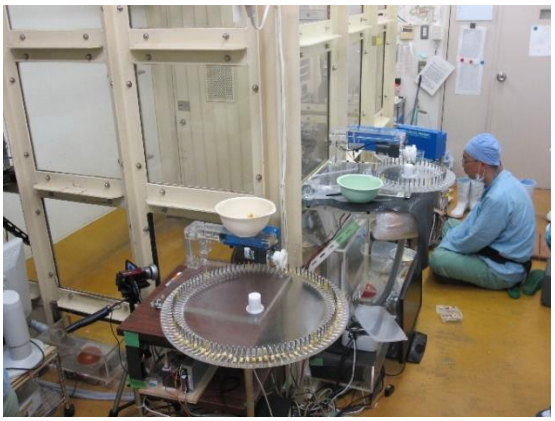
Horses: I also had the chance to visit the Kagamigahara Ranch in Inuyama to see the comparative cognitive experiments with horses and ponies. The experiments were still at an early stage of development in terms of testing cognitive abilities, but it was interesting to see how the setup with the chimpanzees (e.g. universal feeder and touch screen) have been adapted for use with equines. The equines had to use the touch screen to choose the larger of two circles in a size discrimination task. They used their noses to touch the screen, and a food reward (a piece of carrot) dropped down into a bowl positioned below the screen after a correct response. A bracket was placed across the screen to prevent the equines from licking across the surface and causing errors in response recording. Based on the preliminary results, it seems that the horses are not as good at the size discrimination task as chimpanzees. However, it may be more difficult for equines to judge size discrimination on a screen placed directly in front of them (equines have eyes on the side of their heads). Perhaps additional screens to the left and right, or a curved screen, would make the visual discrimination task results more comparable with those of chimpanzees. I look forward to seeing how the cognitive experiments with equines progress in the future.

Overall, my first few months in the comparative cognition laboratory have been both challenging and rewarding. I now feel more knowledgeable and confident about conducting cognitive experiments with chimpanzees, and look forward to starting my own experiments in the near future.

6. Others



Ai and Ayumu inside the experimental booth.



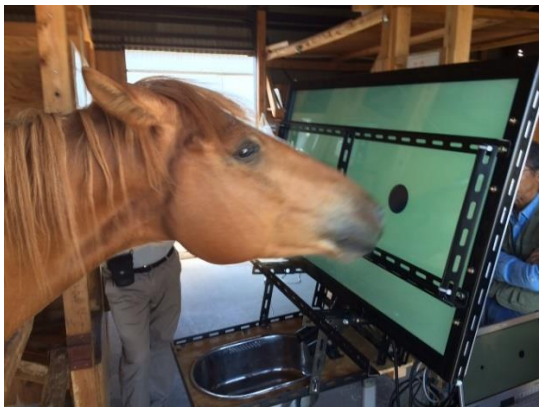
Universal feeders filled with diced apples.

Research Activity Report
Supported by "Leading Graduate Program in Primatology and Wildlife Science"
(Please be sure to submit this report after the trip that supported by PWS.)

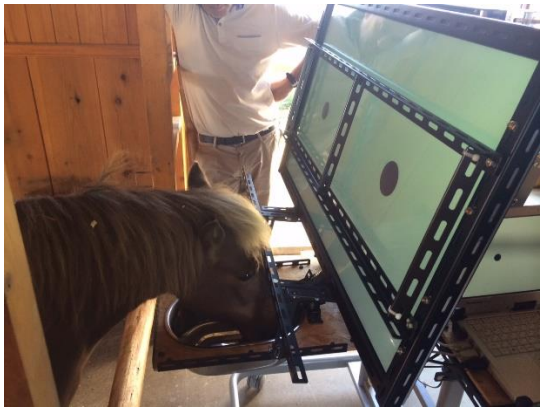
Experiment monitoring system featuring 'Rock, Scissors, Paper' game.

Cleo using a touch screen to gain food rewards (pieces of apples).

Universal feeder, computer and touch screen.



A horse using a touch screen to choose the larger of two circles in a size discrimination task.



When the largest of the two circles is correctly identified a food reward drops down into a bowl.

An outdoor training session.

Submit to：report@wildlife-science.org 2014.05.27
version