The 74th Annual Meeting of the Japanese Society for Animal Psychology

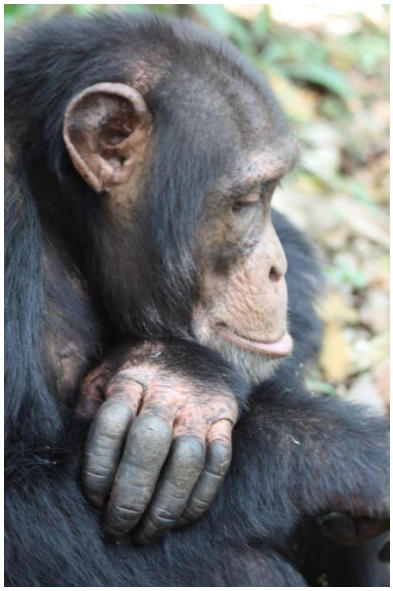
19th(Sat)- 21st(Mon), July, 2014

KYOTO UNIVERSITY KYOTO JAPAN FOUNDED 1897

日本動物心理学会

The 74th Annual Meeting of the Japanese Society for Animal Psychology

July 19th(Sat)- 21st(Mon), 2014, Inuyama



Hosted by

the Primate Research Institute, Kyoto University

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Foreword

Dear friends and colleagues,

Tetsuro Matsuzawa, Ph. D.
President of the Organizing Committee of the 74th Annual Meeting of the Japanese Society for Animal Psychology

It is my very great pleasure and honor to welcome you to the 74th annual congress of the Japanese Society for Animal Psychology. Society members can feel proud to belong to such a long-established and well-regarded organization, but one still willing to embrace change. For the very first time, all presentations at this society meeting will be given in English. This is also the first congress to be hosted by Kyoto University Primate Research Institute (KUPRI). Given the extra challenge and effort required for non-native speakers to present in English, we are delighted and encouraged to have received such a large number of high quality applicants. Over the three-day conference schedule we are proud to offer over 100 presentations (plenary, oral and poster presentations) covering a huge variety of fascinating topics.

Please allow me to take this opportunity to introduce the host institution (KUPRI) and some historical background. In terms of studying nonhuman primates, Japan holds a unique position. There are no species of monkeys or apes native to either North America or Europe or any other G8 industrialized nation. In contrast, Japan has its own species of monkey: the Japanese macaque. The discipline of Primatology in Japan grew out of curiosity for this native monkey. It was as far back as 1948 that Kyoto University scholars first went to Koshima Island to start the study of wild Japanese macaques. This exceptionally long-running field site remains active today, with, to date, records of eight generations of the Koshima Island population over a 66-year span. It was here that the first potential traditions in any nonhuman animal were noticed: sweet-potato washing and wheat placer-mining by Koshima monkeys.

This auspicious start led to a number of important developments within Japan. In 1956, the Japan Monkey Center (JMC) was built in. The journal “Primates” was founded, by the JMC, in 1957 and is now recognized as the oldest journal within the discipline of Primatology (by the SCI). Following the success of the JMC, in 1967 the Japanese government established a national center for the academic study of primates: KUPRI. Psychology was the original focus of the newly-launched center. This tradition was maintained with the creation of a new section at KUPRI in 1993: The Language and Intelligence Section (L & I). L & I Researchers study the chimpanzee mind, both in the laboratory and the wild. Please see current research activity: http://langint.pri.kyoto-u.ac.jp/ai/

The chimpanzee is an important species for a number of reasons. It is considered to be a ‘flagship’ or umbrella species. By focusing conservation efforts and public campaigns on this charismatic species, many other species sharing the same environment are likely to benefit. In addition, chimpanzees play a direct role within their ecosystem: seed dispersal. Chimpanzees eat fruit and also travel long distances, distributing the seeds widely. Chimpanzees thus help to maintain the high level of biodiversity in their tropical rainforest habitat. Chimpanzees, along with bonobos, are the closest living relative of humans. Research on chimpanzees at KUPRI has taken a leading role in recent progress in the Animal Psychology sub-discipline of Comparative Cognitive Science. We feel strongly that studying nonhuman animal minds is the key to better understanding the evolutionary origins of the human mind.

At this pioneering Congress, I encourage you to take the opportunity to get to know each other, exchange information, and collaborate in our common goal: to support a better understanding of human nature through the lens of animal minds.

Tetsuro Matsuzawa

President of the 74th annual meeting

Program Overview

	Sat. Jul 19		Sun. Jul 20		Mon. Jul 21	
	Academic Program	**Business Mtg**	**Academic Program**	**Business Mtg**	**Academic Program**	**Business Mtg**
8:45	**Registration**					
9:00	**Special Lecture** Sukumar 9:15-10:00 Main Hall		**Special Lecture** Platt & Brannon 9:00-10:00 Main Hall		**Special Lecture** Adolphs	
10:00	**Oral Session 1** 10:00-12:00 Main Hall	**Editorial Mtg** 10:00-11:00 Room D	**Oral Session 4** 10:00-12:00 Main Hall		**Special Symposium 2** 10:00-12:00 Main Hall	
11:00		**Elected Board Mtg** 11:00-12:00 Room D				
12:00		**Standing Comm** 12:00-1:00 Room D		**Awawrd Comm** 12:00-1:00 Room D		**General Assembly** 12:00-1:00 Room B
1:00	**Oral Session 2** 1:00-3:00 Main Hall		**Special Symposium** 1:00-3:00 Main Hall		**Oral Session 6** Room D	
3:00				**Old Board Mtg** 3:00-4:00 Room D		
3:30	**Oral Session 3** 3:30-5:30 Main Hall		**Oral Session 5** 3:30-5:30 Main Hall		**Public Symposium** 3:30-5:30 Main Hall	
4:00				**New Board Mtg** 4:00-5:00 Room D		
5:30	**Poster Session 1** Odd Numbers 5:30-7:00 Room B		**Poster Session 2** Even Numbers 5:30-7:00 Room B			
7:00	**Welcome Reception** 7:00-8:30 Room B		**Academic Discussion** 7:00-8:30 Room B			
8:30						

***PRI tour is scheduled from 12:00pm on 19th and 20th**

***Cloak: 9:00am-7:00pm**

***Lounge: 9:00am-6:00pm**

Venue

Inuyama International Sightseeing Center (Freude)

- **Registration** :4th floor
- **Cloak**: 3rd floor

- **Special Lecture** : Main Hall
- **Oral Presentation** :Main Hall
- **Symposium** :Main Hall
- **Poster Presentation** :Room B

- **Lounge**: 3rd floor:
- **Party/Academic Discussion** :Room B
- **General Assembly** :Room B

- **Committee Meeting** :Room C
- **Head Quarter**: 3rd floor

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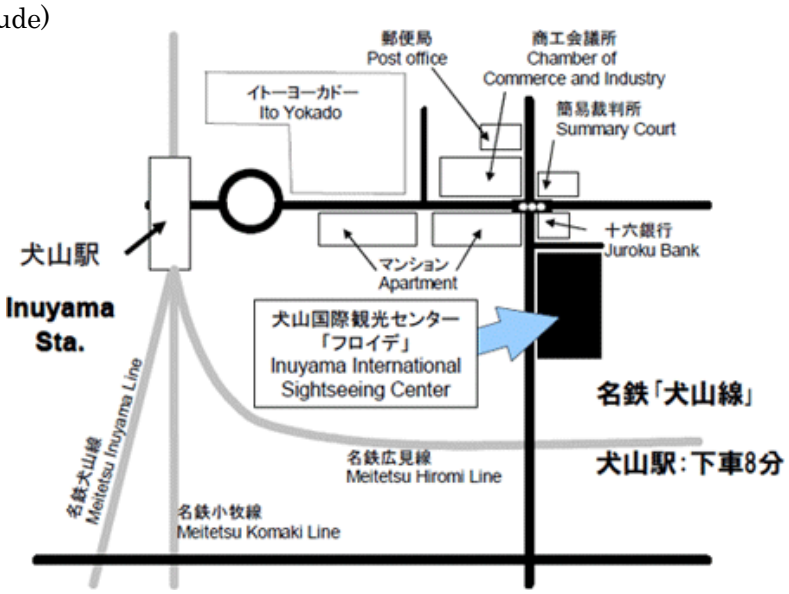
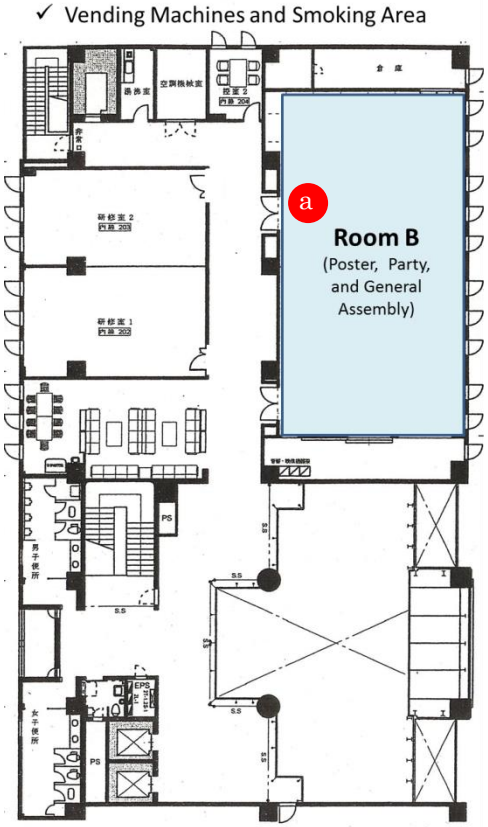


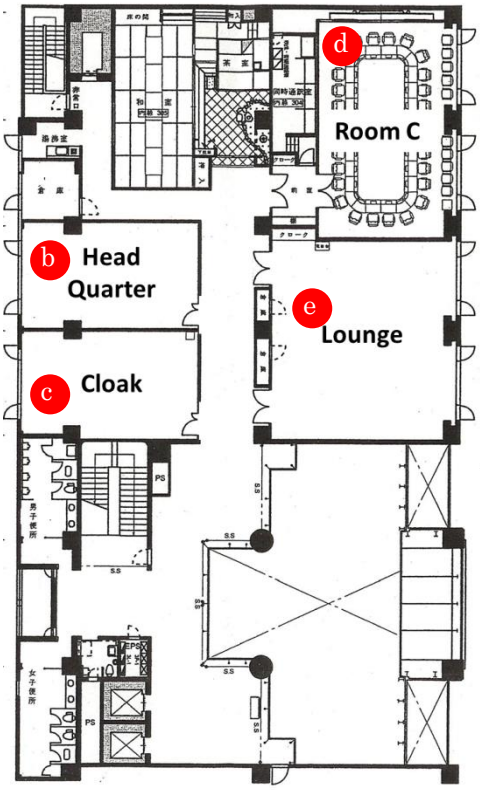
2nd Floor

- ✓ Poster Presentation
- ✓ Vending Machines and Smoking Area



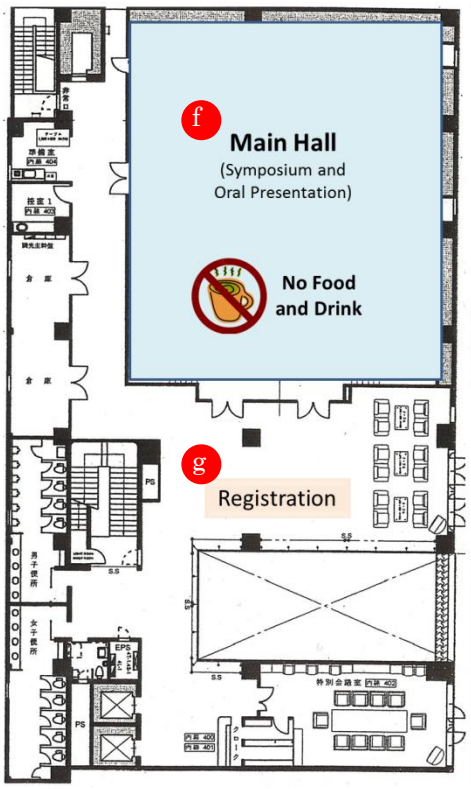
3rd Floor

- ✓ Lounge, Cloak, and Head-Quarter
- ✓ Meeting Room



4th Floor

- ✓ Registration Desk
- ✓ Main Hall (Symposium, Oral Presentation)



Guidance for Participants

Reception:

The reception desk will open from 9:00AM at the entrance hall of the 4th floor. Participants will receive a name card and its holder to wear throughout the meeting. You can ask for a receipt at the reception desk at any time during the meeting. We accept onsite registration with the following registration fee: 6,000 Yen for participants, 4,000 Yen for graduate students, and free for undergraduate student.

Welcome Reception and Academic Discussion:

Instead of having an official banquet, we will have Welcome Reception in the evening of the first day and Academic Discussion Session in the evening of the second day. These parties are complimentary and so there is no additional fees are required for the participants. Please enjoy free discussion in front of the posters.

General Assembly:

General assembly will take place at the lunch time of the third day (21st July) at Room B (2nd floor). The winner of the research award for young scientist will be announced during this assembly. Light snacks will be available at the room.

Cloak:

Cloak service is available in Cloak room (3rd floor). We can't accept valuable or fragile items. Please pick up your luggage by 7pm every day.

Lounge:

Snacks and drinks are available in the Lounge room of the third floor. Vending machine is located in the lobby on the second floor. There is a smoking area in this lobby (please refrain from smoking in the other areas). Please note that it is not allowed to eat or drink in the Main Hall.

Exhibition:

Business exhibition is open in Lounge room (3rd floor). Participant can also put some items to distribute in the designated corner in this area.

Message to other participants:

A message board will be available in Lounge room (3rd floor) for the communication among participants. Information for the Lost and Find is also available here.

Lunch:

There is a restaurant (Glanz) in the basement floor of the conference venue. We have some restaurants in the walking distance (a map of the surrounding area will be distributed in the registration desk). Considering the lunch time is only one hour in length, the participants (especially the one who is joining the PRI tour) may want to prepare the things to eat beforehand.

Internet:

Free WiFi is available in the building. However, sometimes the connection is not stable. In this case, please try it again later or consult a staff.

Others:

We recommend you to use a public transportation. The venue is five-minute walk from Inuyama Station (Meitetsu Line).

Inquiry: Please contact doshin2014@ml.pri.kyoto-u.ac.jp or headquarter room (3rd Floor)

各種役員会：すべて 3 階、円卓会議室にて開催

大会 1 日目、7/19（土）：編集委員会（10：00～11：00）、当選理事会（11：00～12：00）、
常任理事会（12：00～13：00）

大会 2 日目、7/20（日）：奨励賞委員会（12：00～13：00）、旧理事会（15：00～16：00）、
新理事会（16：00～17：00）

名誉会員・理事控室：4 階特別会議室をご利用ください。

Guidance for Oral Presentation

- All sessions will run in the Main Hall of the 4th floor.
- Each speaker has 15 minutes (including 3 minutes discussion). The time keeper will ring the bells at 10, 12 and 15 minutes.
- We have a PC (Windows 7) connected to a projector in the room. Microsoft ® PowerPoint 2013 is installed in the PC. Please bring your presentation file and any materials you refer in your slides (e.g. move clips) to the PC in the room prior to the session (more than 20 minutes before the start of the session for your presentation). Please also confirm that your presentation works fine.
- You can use your own PC if you want. However, please recognize that the time for connecting/disconnecting your PC is included in your presentation time of 15 minutes. It is strongly recommended to bring your PC prior to the session to confirm the connection with the projector to avoid any potential troubles. Please note that a Macintosh PC frequently causes problem for connection with the projector in this venue.
- If you want to distribute handouts for your presentation, please prepare the copy (around 200) on your own and give them to a staff prior to the session.
- A chair person is requested to run the session on time. If a presentation is canceled, please use the time slot for discussion on the previous talks or as a free time for rest.
- If the first author of the presentation is absent, the presentation is basically regarded as “canceled”. If one of the co-authors wants to present the work instead, you may do so under the approval of the chair of preparation committee for this meeting.
- If you have any change to the information in this program, contact us by mail or onsite.

Guidance for Poster Presentation

- Poster presentation is scheduled in the evening of the first and second day (19th and 20th July) in Room B (2nd Floor).
- The size of poster panel is 90cm in width and 180cm in height. Push pins are available at the place. You can put your poster from around 12:00pm on the first day (19th July).
- Core time for odd-number presentation is 5:30-7:00pm on the first day (19th July). Core time for even-number presentation is 5:30-7:00pm on the second day (20th July). We will have parties with light meal and drinks in the same room just after the poster sessions.
- Please remove your poster on the third day (21st July) by 10:00am. After this time, we remove all the remaining posters and discard them to prepare the room for having General Assembly at lunch time. If you want to pick up your removed poster, please consult a staff.
- Handouts or summary of the poster should be prepared by yourself.
- If the first author of the presentation is absent, the presentation is basically regarded as "canceled". If one of the co-authors wants to present the work instead, you may do so under the approval of the chair of preparation committee for this meeting.
- If you have any change to the information in this program, contact us by mail or onsite.

Abstract Submission for "The Japanese Journal of Animal Psychology (動物心理学研究)"

You are requested to submit the longer version of abstract for your presentation (up to 400 words) through the website of this meeting to be included in "The Japanese Journal of Animal Psychology (動物心理学研究)". The abstract can be submitted from 1st July (Tue) till 17:00PM on 15th July (Tue).

You need to enter the ID and password which you registered during the first submission process to access the submission page for the longer abstract. Basically, we don't accept changes to the information already registered in the first submission. Contact us for the request of any change. The printed draft can be checked onsite during the meeting.

Special Lectures

Special Lecture 1

Chair: Tetsuro Matsuzawa

Venue: 4F Main Hall (July 19th, 9:15am-10:00am)

Raman Sukumar and Karpagam Chelliah

Centre for Ecological Sciences, Indian Institute of Science

The behavioural psychology of elephants in the context of interactions with people

Summary:

The superior levels of intelligence and cognitive abilities of elephants have been recognized since ancient times but only more recently are these being investigated within a scientific framework. In Asia the elephant, both in the wild and in captivity, has had a long history of interactions with people. The behavioural response of elephants to people can be thus expected to have been shaped by not only its intrinsic levels of intelligence but also by the nature of its past interactions. In this talk I shall first give some examples of the behaviour of wild Asian elephants, as observed in the field, before going on to link such behaviour to their adaptive responses to surviving in human-dominated landscapes. Elephants exhibit a range of behaviours in the wild from "grief" following death of a calf, to "cleverness" in sneak mating strategies, "aggression" against potential predators, and "tool use" in a variety of situations. When elephants enter human settlements, home gardens and agricultural fields in reach of food, water and even locally-brewed alcohol, they put their intelligent behavioural skills to good effect to achieve their goals. They sneak in silently into settlements and fields even when they have to cross a river, show controlled aggression against people who attempt to thwart their goals, and use their tusks or branches of trees as tools to break electric fences. Male elephants employ tactics from their social relationships in the wild such as all-male coalitions to tackle hostile farmers or attachment to an older male to learn the art of crop raiding. A comprehensive understanding of elephant psychology is necessary if we are to effectively manage the negative interactions between elephants and people.

Special Lecture 2

Chair: Masaki Tomonaga

Venue: 4F Main Hall (July 20th, 9:00am-9:30am)

Michael L. Platt

Duke Institute for Brain Sciences

Neural basis of tactical deception in rhesus macaques

Summary:

Social animals face a problem. Competitors can monitor their behavior and learn to predict their actions. Theoretical models of signaling games predict that competing agents should select actions that minimize information broadcast to opponents. The degree to which animals plan to deceive others or merely adopt rule-based strategies that function deceptively remains hotly debated. Moreover, the neuronal mechanisms mediating deceptive tactics are unknown. To answer these questions, we developed a new competitive experimental paradigm designed to address the fundamental neurobiology of deceptive tactics in nonhuman primates. Here we show that pairs of rhesus macaques playing a computer soccer game develop dynamic, unpredictable, circuitous paths, which we refer to as feints. Using information theory, we show that these feints reduce the information monkeys provide to their opponent about their goal, thus serving to deceive him. Neuroimaging studies in humans have identified the dorsolateral prefrontal cortex (DLPFC) and dorsomedial prefrontal cortex (DMPFC), among other areas, as potential components of a circuit for deceptive strategies. Analysis of both eye movements and firing rates of DLPFC neurons revealed that monkeys plan feints far in advance of their execution. A subset of DLPFC neurons selectively signaled deceptive plans but not other planned visually-guided movements. Pharmacological inactivation of DLPFC, but not DMPFC, impaired execution of deceptive tactics, leading to poor performance and an increased rate of losing the game. Together, these findings indicate that DLPFC is critical for strategic deception in competitive contexts, consistent with its role in planning and decision-making. These findings also show that nonhuman primates, like humans, plan deceptive tactics in advance rather than by merely reacting online to an opponent's movements.

Special Lecture 3

Chair: Masaki Tomonaga

Venue: 4F Main Hall (July 20th, 9:30am-10:00am)

Elizabeth Brannon

Duke Institute for Brain Sciences

The neural basis of the primitive number sense in macaques

Summary:

In my talk I will first describe research that illustrates the behavioral signatures of the approximate number system (ANS) in nonhuman primates. While there are significant individual differences in the Precision of the ANS there do not appear to be species differences at least within the primate order. I will then turn to the neural basis of the ANS. Prior work suggests that neurons in the ventral intraparietal area of the well-trained rhesus monkey provide a labeled line code for numerosity. In contrast neurons in the lateral intraparietal area of the numerically naïve rhesus monkey hold a summation code for numerosity. I will describe new data from our research group that suggests that very few VIP neurons are selective to numerosity in the naïve monkey, but that numerosity can be derived from the firing of the population of non-numerically selective VIP neurons.

Special Lecture 4

Chair: Tetsuro Matsuzawa

Venue: 4F Main Hall (July 21st, 9:00am-10:00am)

Ralph Adolphs

California Institute of Technology

How can we study emotion?

Summary:

My talk will consist of two parts. First I will discuss approaches to the study of emotion in animals, and the difficulties with such approaches. This will also include a discussion of the neural basis of emotions. The second part of my talk will then focus on a case example: the emotion fear, and the brain structure of the amygdala. For this second part I will compare studies in rodents and monkeys on the amygdala's role in fear, with our own studies in humans. Overall, I will argue of the importance for neuroscience data in the study of animal psychology. Background paper: DJ Anderson & R Adolphs (2014), "A framework for studying emotions across species", Cell 157:187-200.

Symposiums

Special Symposium 1

July 20th, 1:00pm-3:00pm

Venue: 4F Main Hall

Higher behavioral functions in animals; their mind and evolution

Organizer: Takefumi Kikusui

Azabu University

Overview

"Empathetic systems" have a pivotal role in cooperative and synchronized behaviors as well as in our understanding of each other. They also have a psychological function in determining social orders and fairness. Recently, empathetic systems have been observed in human infants; suggesting that these systems are inherent to human nature. In addition, behaviors related to empathy have been reported in primates other than humans, and other species such as rodents. It is hypothesized that empathetic systems have an instinctive and adaptive function that promotes the fitness of each animal and group living, and that humans have acquired a unique and higher function through the evolutionary process.

The particular interest in this special symposium "Higher behavioral functions in animals; their mind and evolution" is focusing on the evolutional perspectives of prosocial behavior in animals. Not only human beings, but also monkeys, carnivores and rodents show prosocial behavior such as cooperation and helping. Identifying contextual factors that are contributing to variation in the expression of prosocial behaviour and hindering progress towards understanding phylogenetic patterns is necessary for addressing the evolutionary origins of prosocial behaviour. In addition, contextual factors, including the nature of the relationship between the potential donor and recipient, the communicative behaviour of the recipients, and features of the prosocial task including whether rewards are visible and whether the prosocial choice creates an inequity between actors, need to be considered to identify the proximate mechanisms that drive these effects. We invited three outstanding speakers, namely Drs. Ayaka Takimoto, Teresa Romeo and Peggy Mason and they will talk about their recent research on this issue and discuss the evolutional process of the prosocial behavior.

Peggy Mason

The University of Chicago

Helping another in need: Lessons from rats

Summary:

In a rodent model for empathic helping established in my laboratory, a rat learns, without external reward or training, to deliberately open a door and thereby free a trapped rat. The motivational impetus for this pro-social behavior is neither motor mastery nor the potential reward of social play. Instead, our work suggests that communication of distress from the trapped rat to the free rat is required for helping. A rat that successfully releases a trapped rat experiences ending the trapped rat's distress as internally rewarding, meaning that helping has consequences that are desirable and that the rat seeks to experience again by intentional actions. In experiments designed to explore how the social relationship between free and trapped rats influences helping, rats were tested with cagemates or strangers from familiar or unfamiliar stocks (commonly termed outbred strain). Rats consistently help strangers from familiar stocks but do not help strangers from unfamiliar stocks, demonstrating that helping requires strain familiarity but not individual familiarity. If experience is so effective in facilitating pro-sociality, is there any role for genetics or relatedness? To address this question, rats were transferred at birth to litters from a different stock. Fostered rats never saw or interacted with another rat of their own stock until testing, making their own stock unfamiliar. Remarkably, although rats helped strangers from the fostering stock that they were raised with, they did not help trapped strangers of their own stock. This experiment shows that rats are not born with the motivation to help their own kind but rather must acquire that motivation through social interactions. Flexibility in determining one's pro-social in-group would be advantageous in changing social environments.

Teresa Romero

Department of Cognitive and Behavioral Sciences,
The University of Tokyo

Mechanisms underlying cooperation in carnivores

Summary:

While the evolution of cooperative behaviors has generated an intense debate among evolutionists and animal behaviorists, the proximate mechanisms underlying cooperative relationships have received much less attention. In recent years, it has become clear that an understanding of proximate causation of cooperation is needed in order to obtain a more balanced and complete picture of the biology of the phenomenon. The proximate cause of cooperation refers to the immediate situation that triggers behavior, and the role of learning, memory, physiology, and neural processes. Since from an evolutionary point of view cooperative relationships are maintained because of the subsequent benefits they bring, there has been the tendency to erroneously assume that they are also motivated by their future benefits. This assumption would imply that animals engage in social interactions in order to gain future benefits, or that they are able to remember the services given by another individuals in order to offer a service in return at a later date. While this "rational" calculation offers a possible explanation, it is currently unclear whether or not some animal species have these cognitive capacities. Here I will argue that less-cognitively demanding mechanisms could be at the basis of the flexibility needed to form complex, enduring cooperative relationships in animals in general, and in carnivores in particular. I will present work showing that coatis (Nasua nasua) direct agonistic support preferentially to those group members that support them most, and that this pattern could be mediated by simple emotional bookkeeping. I will also give examples of unconscious mimicry in domestic dogs (Canis lupus familiaris) and wolves (Canis lupus lupus), a behavior known to facilitate affiliation and pro-social behaviors between interacting individuals. Finally, I will show that oxytocin, a hypothalamic neuropeptide that plays an important role in various reproductive effects in mammals, enhances in domestic dogs a suit of behaviors related with cooperative bond formation and maintenance. While complex cognitive mechanisms may be present in some species, these examples are in line with the idea that simpler mechanisms, based on emotions, may be at the core of the patterns of cooperation reported for humans and other animals.

Ayaka Takimoto

The University of Tokyo
Japan Society for the Promotion of Science

The psychological mechanism of prosocial behaviors in nonhuman primates with a focus on behavioral data of tufted capuchin monkeys

Summary:

We often do good to others without expecting any return when we see people in need, even if they are unrelated strangers. Such prosocial behaviors support our society. Prosocial behaviors are defined as "voluntary actions that are intended to help or benefit another individual or group of individuals" (Eisenberg & Mussen, 1989) and has been considered a hallmark of humans in the past. However, recently, accumulating experimental data in comparative cognitive science have revealed that non-human animals also show prosocial behaviors. Why have prosocial behaviors evolved? From an ultimate perspective, the reason can be explained comparatively easily. Prosocial behaviors are beneficial to the actor when the recipient is related with the actor (kin selection; Hamilton, 1964) or when the recipient behaves prosocially toward the actor in return (reciprocal altruism; Trivers, 1971). A possible proximate mechanism has also been identified (e.g., de Waal & Suchak, 2010). Although a proximate as well as ultimate mechanism has been suggested to support evolution of prosocial behaviors, the psychological mechanism of prosocial behaviors remains unclear. Here, I introduce one potent psychological mechanism, put forward by Yamamoto and Takimoto (2012), that seems to support nonhuman primates' prosocial behaviors. Prosocial behaviors must be driven by other-regarding motivations when an individual cannot predict any return benefit (e.g., de Waal, 2008). Yamamoto and Takimoto (2012) indicated that empathy, the ability to share the feelings and emotions of others, is the most plausible underlying psychological mechanism of prosocial behaviors and may also be important in promoting them. On the other hand, a sense of fairness may play a role as a stabilizer of prosocial behaviors in non-human primates. That is, prosocial behaviors can be maintained by a sense of fairness, the inhibitory system for unnecessarily excessive expression of them. Without a sense of fairness, empathic individuals might be exploited by free-riders, which might lead to the extinction of prosocial behaviors. Therefore, the interplay of empathy and a sense of fairness is considered to be important to maintaining prosocial behaviors. In this talk, first, I will introduce experimental studies on prosocial behaviors in nonhuman primates, and discuss any similarities and differences between them. Secondly, I will talk about the psychological mechanism of prosocial behaviors by mainly discussing the role of empathy and a sense of fairness in them. Thirdly, I will demonstrate, by focusing on the behavioral data from tufted capuchin monkeys, that evidence from nonhuman primates supports this psychological mechanism.

Special Symposium 2

July 21th, 10:00am-12:00pm

Venue: 4F Main Hall

The science of mental time

Organizer: Satoshi Hirata

Wildlife Research Center, Kyoto University

Overview

The aim of this symposium is to discuss the evolutionary origins of mental time. Our mental time does not always reflect physical time, which involves the passage of time along a physical axis. For example, our mental time passes quickly when we are having fun, whereas it passes slowly when we are in distress. Mental time relies on the capacity to remember the past and imagine a future, which can be referred to as mental time travel. Some researchers have argued that the capacity for mental time travel is unique to humans, and that it is not shared by nonhuman animals. About 100 years ago, Wolfgang Köhler, a pioneer researcher of the mentality of apes, concluded that "The time in which the chimpanzee lives is limited in past and future." However, innovative research on scrub-jays has suggested that these birds are capable of mental time travel into the past and future. In a food-caching experimental task, scrub-jays were successful at distinguishing the type of food they cached, its location, and the duration of time it had been cached, which can be considered evidence of their ability to form episodic-like memory. In another experiment, the scrub-jays adjusted their food-caching behavior in ways that decreased the risk of losing their caches to conspecifics, thus saving the items for future consumption. These results suggest that the capacity for mental time travel may not be completely unique to humans. More recently, various researchers have addressed this issue by conducting experimental studies with a wide range of animal taxa, including humans. In the present symposium, three speakers will introduce recent advances in the study of mental time travel in human and nonhuman animals, including topics such as episodic-like memory, prospective memory, and future planning. They will then discuss the similarities and differences in the mental time of human and nonhuman animals..

Josep Call

University of St Andrews
Max Planck Institute for Evolutionary Anthropology

On the evolution of forward and backward thinking

Summary:

Retrieving stored information either from working memory or long-term memory is an essential component of planning abilities. In fact, some authors have argued that certain types of memory like episodic memory and mental time travel have evolved not just to recall information but to assist organisms to solve current that they face or future problems that they may encounter. Although there has been some research on both memory and planning skills in the great apes, there has not been a concerted effort to investigate them together. This information is crucial to make inferences about the evolution of memory and planning systems in humans and other animals. In this talk, I will focus on object use in the great apes in problem solving situations. More specifically, I will examine various aspects of long-term memories for single events including cued recall and the importance of the various cues during encoding and recall. Additionally, I will examine planning for future goals in two contexts: exchanging tokens for food and making tools. Although the bulk of the talk will be devoted to data on great apes I will also include data on monkeys and corvids to offer a broader perspective on the evolution of these abilities.

Michael J. Beran

Georgia State University
Language Research Center

Prospective Memory in Nonhuman Primates

Summary:

Prospective memory (PM) involves remembering to perform a planned action or intention at an appropriate future time. PM is highly prevalent in daily life and can range in importance from being rather trivial (remembering to add an attachment to an email) to critical (remembering to take medication). For this reason, PM has been studied extensively in humans. However, PM has been understudied in nonhuman animals. We have designed a variety of PM tasks for use with nonhuman primates (and human children). These non-verbal tasks sometimes mimic the designs used in research with adult humans, and in other cases make use of the special capacities or training histories of our chimpanzees and monkeys. I will provide an overview of these research projects.

With chimpanzees, we assessed PM using naturalistic tasks. Chimpanzees had to remember to request a hidden food item at a later time by naming it with a lexigram symbol. In all experiments, after seeing a food being hidden, the chimpanzees had to retain this memory for 3-30 minutes while participating in a concurrent task such as foraging for preferred food items or matching lexigram tokens to photos of representative food items. The chimpanzees had to request the hidden food at specific times during these tasks, and so they had to encode when to make those requests and then remember to do so at the appropriate time. In most variations, the chimpanzees succeeded in doing this, even when the appropriate moment for implementing the PM was determined by the experimenter or was left to the chimpanzee to decide. Thus, chimpanzees appear to have the capacity for PM in tasks that are similar in basic design and complexity to those used with humans.

In another series of experiments, rhesus monkeys and capuchin monkeys were presented with a variation of the matching-to-sample task in which they had to anticipate and plan a future response before they were allowed to make it. After seeing only the sample, monkeys performed a psychomotor task in which they pursued moving stimuli around the screen. Later, they had to remember to make the matching response. Both species succeeded in this task, demonstrating that they anticipated future responses before they could be made. Thus, monkeys also appear to show some of the characteristic features of a PM system.

(Supported by National Institute of Child Health and Human Development grant HD060563 and National Science Foundation grant BCS-0924811.)

Satoshi Umeda

Keio University

Prospective memory and future-directed cognition: Role of the anterior prefrontal cortex

Summary:

In our daily lives, we make plans to do things at particular times in the future. Neuropsychological and neuroimaing studies have been focusing on memory of such plans or intentions, which is called prospective memory (PM). The broadly accepted divisions involved in PM consist of prospective memory component (PMC), the process for remembering to remember, and retrospective memory component, the process for remembering the content of intended actions. Although both components need to be appropriately processed for realizing intentions, PMC is particularly essential since it requires spontaneous memory retrieval.

In this talk, I will first present our neuropsychological and neuroimaging investigations for identifying unique characteristics of future cognition in humans. As a neuropsychological study, I will highlight the question of whether damage to part of the prefrontal cortex affects attenuated performance of PMC. Our data indicated that the following three areas are highly contributory to PMC performance: the right dorsolateral prefrontal cortex; the right ventromedial prefrontal cortex; and the left dorsomedial prefrontal cortex. These areas are all located in the anterior prefrontal cortex (BA10), which has been considered as the most critical area for prospective remembering. I will then provide our results from functional MRI study to demonstrate the effectiveness of implicit cues for making awareness of sustaining intentions in mind. The results also support the involvement of the anterior prefrontal cortex (BA10). Recent cognitive neuroscience studies have been focusing on the role of the BA10 from the perspectives of default-mode network and episodic future thinking. In the final part of my talk, I will address some questions for uncovering the function of the BA10 from integrative perspectives for understanding the unique properties of future cognition in humans.

Public Symposium

July 21th, 15:00am-17:40pm

Venue: 4F Main Hall

Frontiers in Comparative Cognitive Science
In Search of the Origins of Mind

Organizer: Tetsuro Matsuzawa & Masaki Tomonaga
Primate Research Institute, Kyoto University

Overview

As our body is the result of evolution, it is no doubt that our mind is also the result of evolution. Comparative cognitive science is aiming for exploring the evolution of mind on the basis of comparison among living animals. Although this doctrine is still young and growing up, so many exciting results have been reported in recent years. In this public symposium “Frontiers in Comparative Cognitive Science: In Search of the Origins of Mind”, we invited four international researchers who are working with a variety of animals; primates, dolphins, and birds. From their talk we can see the future of comparative cognitive science.

Robert R. Hampton

Emory University
Yerkes National Primate Center

Dynamic interactions of cognitive monitoring and cognitive control in monkeys

Summary:

A potential function of metacognitive monitoring is to provide dynamic feedback on the status of ongoing cognitive processes to optimize cognitive control of those processes. Most of the work investigating metacognition in nonhumans has focused on the monitoring side of this interaction while minimizing the role that feedback based cognitive control might have on cognition. For example, metacognitive monitoring has been inferred when monkeys exert cognitive control in minimal ways, such as by avoiding tests or seeking information when ignorant. I will describe experiments from our lab in which we have begun to test whether metacognitive monitoring and control might interact in more dynamic ways in the contexts of working memory and discrimination.

John Iversen

University of California, San Diego

Synchronization to a musical beat in non human animals

Summary:

The tendency to move in rhythmic synchrony with a musical beat is a human universal yet is not commonly observed in other species. In addition to its foundational role in music cognition, beat synchronization has been argued to play an important prosocial role in promoting interpersonal connections and possibly in diffusing group tensions. Synchronization to a beat involves multiple cognitive functions, including the ability to extract a simple periodicity from a complex musical stimulus and the ability to couple rhythmic movement to sound in a highly flexible manner. Does human ability in beat synchronization reflect a brain specialization for music cognition, for social bonding, or does it build on neural circuitry that ordinarily serves other functions? Several hypotheses have sought to explain the origins of human synchronization with music: The "vocal learning and rhythmic synchronization" hypothesis (Patel, 2006) posits that entrainment relies on the neural circuitry for complex vocal learning, which is posited to require tight coupling between auditory and motor systems. The "gradual audiomotor evolution" hypothesis (Merchant & Honing, 2014) proposes that component skills for beat synchronization are only partly shared with non-human primates. In this talk I will present experimental results bearing on this question, demonstrating rhythmic synchronization the sulphur-crested cockatoo (Cacatua galerita eleonora), which is able to synchronize with complex music across a range of tempos. Specifically, bouts of extended synchronized movement were observed, in the absence of any visual movement cues, and the rate of these movements varied with music tempo. This reveals both a perceptual ability to extract a simple periodicity from a complex musical signal, but also, crucially, the ability to couple movement timing to sound. As the sulphur-crested cockatoo is a vocal learner, this finding is consistent with he vocal learning hypothesis. We found additionally that the tendency to synchronize is greatly enhanced with human interaction, suggesting the joint importance of social factors. These results were the first indication that synchronization to a musical beat is not uniquely human and demonstrate how animal models can provide insights into the neurobiology and evolution of human music, sensorimotor integration, and social interaction.

Vincent M. Janik

School of Biology, University of St Andrews

Reference with learned signals in cetacean communication

Summary:

Reference is a key component in the evolution of complex communication systems. Studies on animals have focussed on functionally referential signals, in which a call is reliably paired with a stimulus and this correlation is used by receivers to display behaviour appropriate to the communicated context. This approach does not make any inferences about the intention of the signaller. In its simplest form, reference does not require intention and occurs through a strong genetic predisposition in which the use of existing signals is restricted to exchanging information about a specific context. A good example here is the dance language of bees used to inform hive members of lucrative food locations. Studies on nonhuman primates have provided clear evidence for referential communication taking place intentionally. While nonhuman primates cannot invent or copy novel signals, they use different pre-existing signals to communicate about different food items, predators or social classes. In humans, reference goes beyond such constraints and novel signals can be introduced and used in referential communication. However, only few animals share the ability of referential communication and vocal learning with us. These are the cetaceans (whales, dolphins and porpoises) and the psittaciformes (parrots). In our work on bottlenose dolphins, we are studying the natural communication system of these animals to investigate how they use their ability of vocal labelling with learned signals in their own communication system. Bottlenose dolphins develop individually distinctive signature whistles that broadcast an animal's identity by the unique frequency modulation pattern. We documented stages of signature whistle development for three calves showing the changes in preferred frequency modulation patterns over time. Individuals use these signals as their prime whistle emitted when in isolation but also occasionally copy signature whistles of close relatives or associates. When copying, they introduce modifications to the copied whistle, making them recognisable as copies. In isolation, these exchanges occur most often in vocal matching interactions between the signature whistle owner and the copier. However, in free swimming, wild dolphins, signature whistles of absent dolphins are heard regularly. We have shown that wild dolphins can be addressed with copies of their own whistle. We are now studying whether such copies of absent animals occur on patterns that suggest that the emitter is searching for the whistle owner, or whether they are more likely to be used to exchange information about third parties, which would be evidence for referential use of these learned signals.

Klaus Zuberbühler

University of Neuchatel

The primate roots of human language

Summary:

In 1871 Darwin famously wrote that, in his opinion, there was no fundamental difference between man and the higher mammals in their mental faculties. In the past decades this claim has driven much empirical research and, by and large, the evidence supports Darwin's hypothesis. One mental faculty, however, has been particularly difficult to study empirically, with little progress made until recently: the faculty of language. Non-human primates notoriously do not speak, and are unable to acquire speech even with substantial training efforts. Yet speech is only one manifestation of human language, a complex behaviour based on a number of fundamental processes: coding, inference, and assessments of common ground. In this talk I present our research programme on the biological origins of these processes in the different modalities of non-human primate communication and the underlying social cognition. Although primates have little control over their articulators, they are able to encode information using discrete and graded signals, sometimes composed into more complex sequences. The first line of investigation concerns the flexibility of primate signal production, both at the unit and sequence level, in the visual and vocal domain. The second line deals with the question of semantic content, that is, what types of meaning receivers can extract from signals and sequences, and how they integrate signal structure and sequential composition with pragmatic context and signaller intention. The third line of enquiry is to study the biological origins of common ground, including audience awareness and cooperative motivation during acts of communication. Primate social cognition and communication are intimately intertwined, so that the overall goal of our research programme is to empirically elucidate this crucial intersection to provide a deeper understanding of the primate origins of the human language faculty.

Oral Sessions

Oral Sessions 1

Saturday Morning: 10:00 am – 12:00 pm

Venue: 4F Main Hall

Chair: Claire Watson & Taichi Kusayama

10:00am-1-01 **Call playback artificially generates a temporary cultural style of high affiliation in monkeys**

Claire F.I. Watson [1,2], Hannah M. Buchanan-Smith, [3] Christine A. Caldwell

[1] Primate Research Institute, Kyoto University, [2] Japan Society for the Promotion of Science, [3] University of Stirling [3]

10:15am-1-02 **Do capuchin monkeys (*Cebus apella*) share their food at a cost for themselves?**

Benoit Bucher, Hika Kuroshima, Kazuo Fujita

Graduate School of letters, Department of psychology, The University of Kyoto

10:30am-1-03 **Inference about the person's "reliability" by dogs**

Akiko Takaoka, Kazuo Fujita

Graduate School of Letters, Kyoto University

10:45am-1-04 **Effects of conflicts and combatant status on post-conflict greeting call usage in Japanese macaques**

Noriko Katsu, Kazunori Yamada, Masayuki Nakamichi

Graduate School of Human Sciences, Osaka University

11:00am-1-05 **Social Attention in Great Apes: Eye Contact, Gaze Following, Predictive Look, and Their Species Differences**

Fumihiro Kano [1], Josep Call [2,3]

[1] Kumamoto Sanctuary, Kyoto University, [2] Department of Developmental and Comparative Psychology, Max-Planck Institute for Evolutionary Anthropology, [3] School of Psychology and Neuroscience, University of St Andrews

11:15am-1-06 **Approaches to the study of third-party social evaluation by nonhumans**

Jim Anderson

Department of Psychology, Kyoto University Graduate School of Letters

11:30am-1-07 **Rats learn the necessity of other individuals in a cooperative task**

Taichi Kusayama

Department of Psychology, Faculty of Liberal Arts, Teikyo University

11:45pm-1-08 **Preference for and discrimination of emotional expression in mice**

Shigeru Watanabe

Research Center for Human cognition, Keio University

Oral Sessions 2

Saturday Afternoon: 1:00 pm – 3:00 pm

Venue: 4F Main Hall

Chair: Yasuo Nagasaka & Rie Suge

1:00pm-2-01 **Influence of oxytocin receptor *OXTR* gene polymorphisms on personality traits in cats**

Minori Arahori [1], Miho Inoue-Murayama [2], Kazuo Fujita [1]

[1] Department of Psychology, Graduate School of Letters, Kyoto University, [2] Wildlife Research Center, Kyoto University

1:15pm-2-02 **Association between genetic polymorphism and tractability in Thoroughbred horses**

Yusuke Hori [1,2], Yasuo Nambo [3], Fumio Sato [4], Mutsuki Ishimaru [4], Teruaki Tozaki [5], Miho Inoue-Murayama [6], Kazuo Fujita [1]

[1] Graduate School of Letters, Kyoto University, [2] Japan Society for the Promotion of Science, [3] Department of Clinical Veterinary Science, Obihiro University of Agriculture and Veterinary Medicine, [4] Hidaka Training and Research Center, Japan Racing Association, [5] Laboratory of Racing Chemistry, [6] Wildlife Research Center, Kyoto University

1:30pm-2-03 **Post-acquisition hippocampal GluN2B-containing NMDA receptors blockade prevents "forgetting" in the Morris water maze in rats**

Keisuke Shinohara [1], Toshimichi Hata [2]

[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

1:45pm-2-04 **A negative feedback pathway which generates prediction errors in amygdala neurons and sets learning asymptotes during auditory fear conditioning in rats**

Takaaki Ozawa [1], Edgar A. Ycu [1], Touqeer Ahmed [2], Ashwani Kumar [1], Jenny Koivumaa [1], Joshua P. Johansen [1]

[1] Laboratory for Neural Circuitry of Memory, Brain Science Institute, RIKEN, [2] National University of Sciences and Technology, Atta-ur-Rahman School of Applied Biosciences

2:00pm-2-05 **Neural response during virtual language acquisition in macaques**

Yasuo Nagasaka, Misako Komatsu, Kana Takaura, Naotaka Fujii

Lab. for Adaptive Intelligence, BSI, RIKEN

2:15pm-2-06 **Effects of maternal separation in early or late postnatal days before weaning: body weights, anxiety-like behavior, depressive-like behavior, and isolation-induced ultrasonic vocalization**

Yurie Kawamura, Hiromi Wada

Division of Human Sciences, Hokkaido University, Graduate School of Letters

2:30pm-2-07 **Neurons in the lateral hypothalamic area of cynomolgus monkeys may provide precursor signals for midbrain dopaminergic neurons in reward processing**

Atsushi Noritake [1], Kae Nakamura [1,2]

[1] Department of Physiology, Kansai Medical University, [2] PRESTO

2:45pm-2-08 **Fos-like immunoreactivity in the intermediate and medical mesopallium (IMM) during sleeping after filial imprinting in the domestic chick**

Rie Suge [1], Alister Nicol [2], Brian McCabe [2]

[1] Department of Physiology, Saitama Medical University, [2] Sub-Department of Animal Behaviour, Department of Zoology, University of Cambridge

Oral Sessions 3

Saturday Evening: 3:30 pm – 5:30 pm

Venue: 4F Main Hall

Chair: Masaki Tomonaga & Ikuma Adachi

3:30pm-3-01 **Is spatial information encoded during Occasion Setting?: A new cross-species search task with landmarks**

Chad M. Ruprecht, Christian Sullivan, Josh E. Wolf, Kenneth J. Leising

Texas Christian University

3:45pm-3-02 **Do Syrian hamsters (*Mesocricetus auratus*) retrieve the incidental memory of a single past event?**

Toru Betsuyaku [1], Mana Tsuzuki [1], Sumie Iwasaki [1], Jun Okamura [2], Kazuo Fujita [1]

[1] Graduate School of Letters, Kyoto University, [2] Faculty of Letters, Kyoto University

4:00pm-3-03 **Do human children know what information they should collect for their future knowledge state?**

Sumie Iwasaki, Hika Kuroshima, Mana Tsuzuki, Minori Arahori, Kazuo Fujita

Department of Psychology, Kyoto University

4:15pm-3-04 **What-Where-Which memory in degus (*Octodon degus*)**

Mana Tsuzuki, Toru Betsuyaku, Sumie Iwasaki, Kazuo Fujita

Graduate school of letters, Kyoto University

4:30pm-3-05 **Long Numerical Sequential Learning in Chimpanzees (*Pan troglodytes*): from 1 to 19**

Akiho Muramatsu, Tetsuro Matsuzawa

Primate Research Institute, Kyoto University

4:45pm-3-06 **Visual motion modulates head-bobbing in bantams**

Yuya Hataji, Sho Otaki, Kazuo Fujita

Department of Psychology, Graduate School of Letters, Kyoto University

5:00pm-3-07 **Mental Representation of Order in Monkey**

Victoria L. Templer [1,2]

[1] Providence College, [2] Yerkes National Primate Research Center

5:15pm-3-08 **Spatial mapping of orders in chimpanzees**

Ikuma Adachi

Primate Research Institute, Kyoto University

Oral Sessions 4

Sunday Morning: 10:00 am – 12:00 pm

Venue: 4F Main Hall

Chair: Kosuke Sawa & Tomokazu Ushitani

10:00am-
4-01 **Abstract relational learning of pictorial stimuli in rats**

Makiko Kamijo, Tohru Taniuchi

Graduate School of Socio-Environmental Studies, Kanazawa University

10:15am-
4-02 **How do pigeons (*Columba livia*) perceive Delboeuf illusions made of squares?**

Ayami Hyuga, Takaaki Kaneko, Kazuo Fujita

Department of Psychology, The University of Kyoto

10:30am-
4-03 **Do cats (*Felis silvestris catus*) infer invisible objects from sounds?**

Saho Takagi [1], Hitomi Chijiiwa [2], Kazuo Fujita [1]

[1] Graduate school of letters, Kyoto University, [2] Ikedasensyu-bank

10:45am-
4-04 **The role of temporal relationship among events in causal reasoning in rats**

Kosuke Sawa, Akira Kurihara

Department of Psychology, Senshu University

11:00am-
4-05 **The Comparative Inhibitory Control Ability of Two Kinds of Colobus**

Tao Chen [1, 2], Yanjie Su [1, 2], Jie Gao [2, 3]

[1] Department of Psychology, Peking University, [2] Developmental and Comparative Psychology Laboratory, Peking University, [3] School of Life Sciences, Peking University

11:15am-
4-06 **Pigeons perceive an integrated motion pattern**

Sho Otaki, Benoit Bucher, Yuya Hataji, Kazuo Fujita

Graduate School of Letters, Kyoto University

11:30am-
4-07 **Picture discrimination by pigeons in an RSVP task (3): Responses elicited by targets**

Tomokazu Ushitani [1], Noriyuki Nakamura [2], Masako Jitsumori [1]

[1] Faculty of Letters, Chiba University, [2] Faculty of Human Sciences, Toyo Gakuen University

11:45am-
4-08 **Picture discrimination by pigeons in an RSVP task (4): The effect of blank intervals**

Masako Jitsumori [1], Noriyuki Nakamura [2]

[1] Department of Cognitive and Information Sciences, Chiba University, [2] Faculty of Human Sciences, Toyo Gakuen University

Oral Sessions 5

Sunday Evening: 3:30 pm – 5:30 pm

Venue: 4F Main Hall

Chair: Yuko Hattori & Masumi Wakita

3:30pm-5-01 **Spontaneous auditory-motor entrainment during self-paced tapping in chimpanzees and humans**

Yuko Hattori, Masaki Tomonaga, Tetsuro Matsuzawa

Primate Research Institute, Kyoto University

3:45pm-5-02 **Lack of rhythmic synchronization in a key-pecking task of Bengalese finches**

Yoshimasa Seki [1,2], Kazuo Okanoya [2]

[1] Faculty of Letters, Aichi University, [2] Graduate School of Arts and Sciences, The University of Tokyo

4:00pm-5-03 **Behavior coordination in chimpanzees (*Pan troglodytes*): Testing under a face-to-face setup**

Lira Yu, Masaki Tomonaga

Primate Research Institute, Kyoto University

4:15pm-5-04 **No gratitude, nor punishment: orangutans' insensitivity to unfairness**

Yena Kim [1], Jae Chun Choe [2,3], Jeong Rae Rho [4], Masaki Tomonaga [1]

[1] Primate Research Institute, Kyoto University, [2] Division of EcoScience, Ewha Womans University, [3] National Institute of Ecology, [4] Animal Welfare Division, Seoul Zoo

4:30pm-5-05 **Facial recognition in fish**

Masanori Kohda, Takashi Hotta, Masami Taniyama, Naoya Kosaka, Tomohiro Takeyama

Department of Biology and Geosciences, Graduate school of Science, Osaka City university

4:45pm-5-06 **Auditory sequence perception in Common marsets (*Callithrix jacchus*)**

Masumi Wakita

Department of Behavioral and Brain Sciences, Primate Research Institute, Kyoto University

5:00pm-5-07 **Monkeys use similar discriminative cues across two tests of metamemory**

Emily Kathryn Brown, Benjamin M. Basile, Victoria L. Templer, Robert R. Hampton

Yerkes National Primate Research Center, Emory University

5:15pm-5-08 **Inference in dogs of physical properties of the apparatus from socially-given clues**

Kazuo Fujita, Yuikari Nabeoka, Hika Kuroshima

Department of Psychology, Graduate School of Letters, Kyoto University

Oral Sessions 6

Monday Afternoon: 1:00 pm – 2:30 pm

Venue: 4F Main Hall

Chair: Masaki Shimada & Shinya Yamamoto

1:00pm-6-01 **The importance of social play network for the juvenile wild Japanese macaques**

Masaki Shimada

Department of Animal Sciences, Teikyo University of Science

1:15pm-6-02 **Stress reduction after giving grooming in Japanese macaques (*Macaca fuscata*)**

Masataka Ueno, Kazunori Yamada, Masayuki Nakamichi

Graduate School of Human Sciences, Osaka University

1:30pm-6-03 **Chimpanzee skillful tool-makers transport their processed tools longer**

Shinya Yamamoto

Kobe University

1:45pm-6-04 **Interaction with a small mobile robot decreases depression level of rats**

Hiroyuki Ishii [1], Hikaru Sugita [3], Katsuaki Tanaka [3], Daisuke Kuroiwa [3], Yuya Okamoto[3], Qing Shi [3], Yusuke Sugahara [5], Satoshi Okabayashi [4], Hiroshi Kimura [4], Atsuo Takanishi [2]

[1] Research Institute for Science and Engineering, Waseda University, [2] Faculty of Science and Engineering, Waseda University, [3] Graduate School of Advanced Science and Engineering, Waseda University, [4] Faculty of Letters, Arts and Sciences, Waseda University, [5] School of Science and Engineering, Kokushikan University

2:00pm-6-05 **The Famous Five: Decision-Making by Five Male Asian Elephants in a Human-Dominated Landscape of southern India**

Nishant M. Srinivasaiah

National Centre for Biological Sciences, Tata Institute of Fundamental Research

2:15pm-6-06 **Behavioral indicators of motor and sensory lateralization in studies with dogs, cats and chimpanzees. Does lateralization of various functions of the cerebral hemispheres depend on the species?**

Maciej Trojan

Department of Animal Behaviour, Faculty of Psychology, University of Warsaw

Poster Sessions

Poster Presentations

19th (Sat) (5:30pm-7:00pm) : Odd Numbers
20th (Sun)(5:30pm-7:00pm): Even Numbers

P-1 The role of serotonin neurons in escalated aggression induced by social instigation

Aki Takahashi [1], Kenji F. Tanaka [2], Akihiro Yamanaka [3], Tsuyoshi Koide [1]

[1] Mouse Genomics Resource Laboratory, National Institute of Genetics, [2] Department of Neuropsychiatry, School of Medicine, Keio University, [3] Department of Neuroscience II, Research Institute of Environmental Medicine, Nagoya University

P-2 A rubber tail task in mice: effect of spatial location of the rubber tails

Makoto Wada [1,2], Hiroki Ora [1,3], Kouji Takano [1], Kenji Kansaku [1,3]

[1] Sys Neurosci Sect, Dept Brain Rehab, Res Inst of NRCD, [2] Dev Disorders Sect, Dept Brain Rehab, Res Inst of NRCD, [3] Brain Sci Inspir Life Supp Res Cent, Univ of Electro-Communications

P-3 How Chimpanzees (*Pan troglodytes*) respond to expected values?

Yoshiki Kurosawa, Masaki Tomonaga

Primate Research Institute, Kyoto University

P-4 Characteristics of tool use by common marmosets (*Callithrix jacchus*) and variables relevant to individual differences

Yumiko Yamazaki [1,2], Chieko Echigo [3], Masakado Saiki [2], Masayuki Inada [2], Shigeru Watanabe [3], Atsushi Iriki [2]

[1] Advanced Research Centers, Keio University, [2] Laboratory for Symbolic Cognitive Development, RIKEN Brain Science Institute, [3] Department of Psychology, Faculty of Letters, Keio University

P-5 On the effects of varying body weight and kinds of grain as reinforcers in VR schedule on food intake behaviour of a pigeon (*Columba livia*)

Ken'ichi Fuji

Department of Psychology, Ritsumeikan University

P-6 Acquisition of tool-use behavior in rats

Akane Nagano [1], Kenjiro Aoyama [2]

[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

P-7 Temporal order memory in spontaneous object exploration paradigm in rats: effect of number of items

Manami Sugita, Kazuo Yamada, Yukio Ichitani

Faculty of Human Sciences, University of Tsukuba

P-8 Rats help their soaked cagemate even if they learned the help-related behavior by food reward

Nobuya Sato, Kazushi Tate, Maya Okada

Department of Psychological Sciences, Kwansei Gakuin University

P-9 Suppression of gamma frequency oscillation by a selective blocker of kainate-type glutamate receptor in CA3 region of mouse hippocampus.

Etsuko Suzuki [1,2], Haruyuki Kamiya [1]

[1] Department of Neurobiology, Graduate School of Medicine, Hokkaido University, [2]JSPS

P-10 Perseverative behavior and impaired detection in sensory information processing with the social and non-social situation of the model mice for autism

Kana Okada [1], Kota Tamada [2,3], Asami Ujita [1], Jin Nakatani [4], Toru Takumi [2,3,5], Shogo Sakata [1]

[1] Department of Behavioral Science, Graduate School of Integrated Arts & Science, Hiroshima University, [2] Graduate School of Biomedical Sciences, Hiroshima University, [3] RIKEN Brain Science Institute, [4] Biomedical MR Science Center, Shiga University of Medical Sciences, [5] JST, CREST

P-11 Post-conflict and post-allopreening interaction in large-billed crows (*Corvus macrorhynchos*)

Eri Miyazawa, Ei-ichi Izawa
Department of Psychology, Keio University

P-12 Blue Effect in Red Ruffed Lemurs (*Varecia rubra*)

Sana Inoue [1], Izumi Shindo [2]
[1] College of Bioresource Sciences, Nihon University, [2] Nogeyama zoological gardens

P-13 Mismatch negativity-like response on stream segregation in spontaneously hypertensive rat (SHR) as an animal model of ADHD.

Noriko Saka [1], Toshikazu Shinba [2], Hiroaki Kubo [3], Midori Nabeta [1], Miho Hayashi [4], Hiroshi Kimura [5], Go Mugishima [1]
[1] Fukuoka Prefectural University, [2] Shizuoka Saiseikai General Hospital, , [3] Kyushu University, [4] National Hospital Organization Kyushu Cancer Center, [5] Waseda University

P-14 A study on making 3DCG animation of medaka

Tomohiro Nakayasu, Eiji Watanabe
Laboratory of Neurophysiology, National Institute for Basic Biology

P-15 Serial learning and metacognition in a white-handed gibbon (*Hylobates lar*)

Masayuki Tanaka, Kanae Shimada, Masayuki Matsunaga
Center for Research and Education of Wildlife, Kyoto City Zoo

P-16 Time-place learning with negative reinforcement in mice

Akihiro Shimbo [1], Shigeru Watanabe [2]
[1] Graduate school of Human Relations, Keio University, [2] Research Center for Human Cognition, Keio University

P-17 Is interval timing modified by conditioned fear in rats?: An investigation using a self-start short/long discrimination task

Taisuke Kamada [1], Toshimichi Hata [2]
[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

P-18 Appetitive classical conditioning and absence of latent inhibition in Japanese fire belly newts

Tohru Taniuchi, Hiroaki Sano
School of Humanities, Kanazawa University

P-19 Cross-modal transfer of oddity discrimination learning in rats

MD. Abu Bokor Siddik, Tohru Taniuchi
Graduate School of Socio-Environmental Studies, Kanazawa University

P-20 Sense of agency in rhesus monkeys (*macaca mulatta*)

Koji Toda [1,2], Geoffrey Adams [1], Jean-Francois Gariepy [1], Michael Platt [1]
[1] Department of Neurobiology, Duke University School of Medicine, [2] Japan Society for the Promotion of Science

P-21 Kinematics of neck-reaching in large-billed crows (*Corvus macrorhynchos*): A preliminary study

Hiroshi Matsui, EI-Ichi Izawa
Department of Psychology, Keio Unversity, Tokyo

P-22 A competitive task attenuates the dysfunction of skilled movement in the animal model of Parkinson's disease

Yayoi Sekiguchi [1], Toshimichi Hata [2]
[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

P-23 Response chaining training of miniature pigs

Ryousei Ueno [1], Tohru Taniuchi [2]
[1] Farm of Ishikawa Prefectural University, [2] Graduate School of Socio-Environmental Studies, Kanazawa University

P-24 Chronic treatment of CX546, an AMPA receptor positive modulator, alleviates stress-induced enhancement of fear in rats

Masaharu Ueno [1], Kazuo Yamada [2], Yukio Ichitani [2]
[1] Graduate School of Comprehensive Human Sciences, University of Tsukuba, [2] Faculty of Human Sciences, University of Tsukuba

P-25 On the subjective equivalence between amount and delay in EL mouse as an animal model of ADHD

Hiroaki Kubo[1], Hiroshi Kimura [2], Koichi Nakano [3], Tomoyuki Nagai [3], Haruka Nomiyama [3], Natsumi Hayashi [4], Yurie Nakamoto [5], Mitsunobu Yoshii [5], Go Mugishima [3]
[1] Kyushu University Hospital, [2] Waseda University, [3] Fukuoka Prefectral University, [4] Kitakyushu City Children's Counseling & Guidance Center, [5] Tokyo Metropolitan Institute of Medical Science

P-26 Do budgerigars (*Melopsittacus undulatu*) experience amodal completion?

Sota Watanabe [1,2], Kazuo Fujita [3], Masato Ishida [1]
[1] Course for School Teachers, Osaka Kyoiku University, [2] Japan Society for the Promotion of Science, [3] Faculty of Letters, Kyoto University

P-27 Failure of backward conditioning is not attributed to a performance deficit

Atsuhito Yamagishi [1], Nobuya Sato [2]
[1] Graduate School of Humanities, Kwansei Gakuin University, [2] School of Humanities, Kwansei Gakuin University

P-28 Effect of retention interval on the acquisition of temporal order discrimination in radial maze in rats

Taichi Hatakeyama [1], Yukio Ichitani [2], Kazuo Yamada [2]
[1] University of Tsukuba Graduate School of Comprehensive Human Sciences, [2] Faculty of Human Sciences, University of Tsukuba

P-29 The development of endocrine stress response in early socialization period is associated with that in adulthood in dogs.

Miho Nagasawa [1], Yoh Shibata [2], Akiko Yonezawa [3], Tomoko Morita [3], Masanori Kanai [3], Kazutaka Mogi [2], Takefumi Kikusui [2]
[1] Department of Physiology, Jichi Medical University, [2] Department of Animal Science and Biotechnology, Azabu University, [3] Japan Guide Dog Center, Japan Guide Dog Association

P-30 Transitive responding for conspecific stimuli in rat

Motoyuki Tenma, Tohro Taniuchi
Graduate School of Socio-Environmental Studies,Kanazawa University

P-31 Were cynomolgus monkey females with more gravidas chosen by males?

Maiko Kobayashi [1,2], Takamasa Koyama [1], Yasuhiro Yasutomi [2], Tadashi Sankai [2]
[1] Japan woman's university, [2] National Institute of Biomedical Innovation

P-32 Sex differences in ultrasonic vocalizations of mice

Yutaka Hishimura
Department of Clinical Psychology, Faculty of Psychological Science, Hiroshima International University

P-33 Roles of alpha and beta estrogen receptors in regulation of emotion-related behavior by chronic treatment of estradiol in female mice

Kazuya Tomihara [1], Takuta Okawa [2]
[1] Faculty of Law, Economics, and Humanities, Kagoshima University, [2] Graduate School of Humanities and Social Sciences, Kagoshima University

P-34 Effects of adrenalectomy on estradiol-induced enhancement of emotion-related behavior in female mice

Ayumi Okawa [1], Kazuya Tomihara [2]
[1] Graduate School of Humanities and Social Sciences, Kagoshima University, [2] Faculty of Law, Economics, and Humanities, Kagoshima University

P-35 A case study of successful human intervention to maternal neglect by the common marmoset (*Callithrix jacchus*)

Akiko Nakagami [1,2], Miyuki Yasue [1,2], Keiko Nakagaki [2], Noritaka Ichinohe [2], Nobuyuki Kawai [1,2]
[1] Graduate School of Information Science, Nagoya Univ, [2] National Institute of Neuroscience, NCNP,

P-36 The role of temporal pitch patterns and vocal-tract resonances for discriminating individuals in morphed coo calls of Japanese macaques

Takafumi Furuyama [1,2], Kohta Kobayasi [3], Hiroshi Riquimaroux [1,3]
[1] Sensory and Cognitive Neural System Laboratory, Graduate School of Life and Medical Sciences, Doshisha University. [2] Research fellow of Japan society for the promotion of Science, [3] Neurosensing and Bionavigation Research Center

P-37 The early history of captive chimpanzees in Japan

Tomomi Ochiai[1], Koshiro Watanuki [1], Toshifumi Udono [2], Naruki Morimura [2], Satoshi Hirata [1], Masaki Tomonaga [1], Gen'ichi Idani [2], Tetsuro Matsuzawa [1]

[1] Primate Research Institute, Kyoto University, [2] Wildlife Research Center of Kyoto University

P-38 The activity of c-Fos and EGR-1 in the dorsal striatum increases during memorization of duration

Toshimichi Hata

Faculty of Psychology, Doshisha University

P-39 Tanganyikan cichlid, Julidochromis transcriptus, can infer their social status by using transitive inference

Takashi Hotta [1], Tomohiro Takeyama [2], Satoshi Awata [3], Masanori Kohda [1]

[1] Department of Biology and Geosciences, Osaka City University, [2] Department of Biospere-Geospere Science, Okayama University of Science , [3] Sado Marine Biological Station, Niigata University

P-40 Asymmetric generalisation of length in the rat

Yutaka Kosaki [1,2], John Pearce [2]

[1] Advanced Research Center, Keio University, [2] School of Psychology, Cardiff University

P-41 Position shift in a Japanese monkey (*Macaca fuscata*) induced by still pictures

Nobuaki Ohshiba [1], Masayuki Nakamichi [2]

[1] Department of Psychology, Faculty of Psychology and Children's Studies, Baika Women's University, [2] Department of Ethology, Graduate School of Human Sciences, Osaka University

P-42 The Effects of social contexts on Ultrasonic Vocalizations in C57BL/6J Mice

Yui Matsumoto [1,2], Kazuo Okanoya [1]

[1] Graduate School of Arts and Sciences, The University of Tokyo, [2] The Japan Society for The Promotion of Science

P-43 The effect of a 10-fold difference in reinforcer magnitude on pigeon's choice between different delays to reinforcer

Daisuke Saeki [1], Ryoichi Tamakoshi [2]

[1] Department of Psychology, Graduate School of Literature and Human Sciences, Osaka City University, [2] Department of Psychology, Faculty of Literature and Human Sciences, Osaka City University

P-44 Object sorting into a two-dimensional plane in humans and chimpanzees

Misato Hayashi [1], Hideko Takeshita [2]

[1] Primate Research Institute, Kyoto University, [2] University of Shiga Prefecture

P-45 Effects of methylphenidate administration on mismatch negativity-like response in spontaneous hypertensive rat (SHR) as an animal model of ADHD.

Go Mugishima [1], Hiroaki Kubo [2], Noriko Saka [1], Midori Nabeta [1], Miho Hayashi [3], Hiroshi Kimura [4], Toshikazu Sinba [5]

[1] Fukuoka Prefectural University, [2] Kyushu University, [3] National Hospital Organization Kyushu Cancer Center, [4] Waseda University, [5] Shizuoka Saiseikai General Hospital

P-46 Single dorsal raphe neurons encode appetitive and aversive stimuli in cynomolgus monkeys

Kazuko Hayashi [1], Kazuko Nakao [2], Kae Nakamura [1,2]

[1] Department of Physiology, Kansai Medical University, [2] Precursory Research for Embryonic Science and Technology, Japan Science and Technology Agency

P-47 Automatic classification of rat ultrasonic vocalizations suggests the existence of distinct vocalization patterns

Shoko Yuki [1,2], Ryosuke O.Tachibana [1,3], Kazuo Okanoya [1,2]

[1] Graduate School of Arts and Sciences, The University of Tokyo, [2] JST, ERATO, Okanoya Emotional Information Project, [3] JSPS Research Fellow

P-48 Do chimpanzees see a face on Mars? Pareidolia in chimpanzees

Masaki Tomonaga [1], Fumito Kawakami [1,2]

[1] Primate Research Institute, Kyoto University, [2] Japan Society for the Promotion of Science

P-49 A primate model of ASD: Prenatal exposure to valproic acid (VPA) in common marmosets (*Callithrix jacchus*)

Miyuki Yasue [1,2], Akiko Nakagami [1,2], Noritaka Ichinohe [2], Nobuyuki Kawai [1,2]

[1] Graduate School of Information Science, Nagoya University, [2] Research National Institute of Neuroscience, National Center of Neurology and Psychiatry

P-50 Remote memory deficit in three strains of mutant mice with immature dentate gyrus phenotype

Hirotaka Shoji [1,2], Tsuyoshi Takagi [3,4], Shunsuke Ishii [4], Isabella Graef [5], Gerald Crabtree [5], Paul Frankland [6,7], Tsuyoshi Miyakawa [1,2,8]

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P-51 Autoshaping of a lever-press response in spontaneously hypertensive rats (SHR) as a function of distance between lever and food cup position

Toshihiko Sato

Graduate School of Health and Environmental Sciences, Tohoku Bunka Gakuen University

P-52 Neuronal characteristics of mice exposed to nicotine during adolescence

Toshiko Suenaga [1], Yoko Ogawa [2], Hongrui Meng [2], Daiichiro Nakahara [2]

[1] Department of Psychology, Tokyo University of Social Welfare, [2] Department of Integrated Human Sciences, Hamamatsu University of School of Medicine

P-53 Social lives of captive chimpanzees in PRI and Noichi Zoological Park

Fumito Kawakami [1,2], Masaki Tomonaga [1], Nobuhiro Yamada [3]

[1] Primate Research Institute, Kyoto University, [2] Japan Society for the Promotion of Science, [3] Noichi Zoological Park of Kochi Prefecture

P-54 Repeated mild oxidative stress favors habits over goal-directed actions in instrumental learning: effects of 2-cyclohexene-1-one on behaviors associated with the dopaminergic system in rats

Yoshio Iguchi, Ziqiao Lin, Hiromi Nishikawa, Sakurako Kosugi, Yoshio Minabe, Shigenobu Toda

Department of Psychiatry & Neurobiology, Kanazawa University School of Medicine

P-55 On the development of delayed matching and nonmatching to position performance in mice

Kazuhiro Goto

Department of Human Psychology, Sagami Women's University

P-56 Effects of chronic forced-swim stress on behavioral properties in rats with neonatal repeated MK-801 treatment

Kouichi Kawabe

Graduate School of Literature and Human Sciences, Osaka City University

P-57 The inhibition effect of introducing pipes on the stressful and aggressive behaviors of pared Syrian hamsters

Hiroshi Yamada

Rakuno Gakuen University

P-58 Rehabilitation for an adult male chimpanzee with a disability using computer-controlled cognitive tasks

Yoko Sakuraba [1,2], Masaki Tomonaga [1], Misato Hayashi [1]

[1] Primate Research Institute, Kyoto University, [2] Japan Society for the Promotion of Science

P-59 Assessing the effects of relocation on long-term stress level in captive chimpanzees using hair cortisol as a measure

Yumi Yamanashi [1,2], Migaku Teramoto [1], Naruki Morimura [1], Satoshi Hirata [1], Misato Hayashi [3], Juri Suzuki [3], Miho Murayama [1], Gen'ichi Idani [1]

[1] Wildlife Research Center, Kyoto University, [2] Japan Society for Promotion of Science, [3] Primate Research Institute, Kyoto University

P-60 Cooperative problem solving in Mongolian gerbils

Kentaro Nagasaka, Seira Arizumi, Keita Ishii, Rina Kinouchi, Anna Sasaki, Manato Suzuki, Yuki Miyamura, Taichi Kusayama

Department of Psychology, Faculty of Liberal Arts, Teikyo University

P-61 Presence of contagious yawning in sheep

Yuka Otaki [1], Satomi Ishii [1], Kohei Sato [1], Mona Uchida [2], Atusi Yamazaki [1], Tomohiro Yonezawa [1]

[1] School of Veterinary Medicine, Kitasato University, [2] Graduate School of Agricultural and Life Science, The University of Tokyo

P-62 Preliminary report on the behavior of wild orangutans (*Pongo abelli*) in Danum Valley, Borneo, Malyasia

Yuri Kawaguchi [1], Masaki Tomonaga [2]

[1] Faculty of Letters, Kyoto University, [2] Primate Research Institute, Kyoto University

P-63 Receptor-specific roles of dopamine in male rat sexual behavior

Shota Iwaki, Miki Matsumaru, Ririko Osawa, Natsuki Sato, Yasuhiko Kondo

Department of Animal Sciences, Teikyo University of Science

P-64 Examination of the property of cognitive map in rats using shortcut task in lattice maze

Tomohiro Hayashi, Nobuya Sato

Kwansei Gakuin University

P-65 The Personality of François' Langur (Trachypithecus francoisi): The First Glance

Jie Gao [1,2], Tao Chen [2,3], Yanjie Su [2,3]

[1] School of Life Sciences, Peking University, [2] Developmental and Comparative Psychology Laboratory, Peking University, [3] Department of Psychology, Peking University

Summaries
Oral & Poster Presentations

Oral Session 1

Saturday Morning: 10:00 am – 12:00 pm

Venue: 4F Main Hall

Chair: Claire Watson & Taichi Kusayama

10:00am-1-01 **Call playback artificially generates a temporary cultural style of high affiliation in monkeys**

Claire F. I. Watson [1,2], Hannah M. Buchanan-Smith, [3] Christine A. Caldwell

[1] Primate Research Institute, Kyoto University, [2] Japan Society for the Promotion of Science, [3] University of Stirling

Cultural variation can be conceptualised in two main ways: as culture-specific qualitative differences in behavioural form, and also as quantitative variation in performance of constellations of universal behaviours (cultural style). Despite observation of both types in wild non-human primates, diffusion of qualitative culture has been scrutinised extensively experimentally whilst within-species transmission of cultural style has remained entirely unexplored. Here we investigated whether a cultural style of high affiliation could be artificially generated in a nonhuman primate (*Callithrix jacchus*), by daily playback of conspecific affiliative calls simulating nearby amicable individuals. We found that vocalisation playback influenced monkeys to spend more time in affiliative behaviours outwith playback hours, relative to silent playback. This change did not persist into the final phase of observation after all playbacks were complete. Findings are consistent with a temporary shift in cultural style effected through vocalisation playback, supporting existence of this conception of culture in wild primates.

10:15am-1-02 **Do capuchin monkeys (*Cebus apella*) share their food at a cost for themselves?**

Benoit Bucher, Hika Kuroshima, Kazuo Fujita

Graduate School of letters, Department of psychology, The University of Kyoto

The study conducted by Hare et al. (2010), “Bonobos (Pan Paniscus) voluntarily share their own food with others”, suggests that human altruistic food-sharing may be shared among apes and may have evolved much longer ago than previously considered. In this study, we tested 12 pairs of tufted capuchin monkeys (Cebus apella) placed in two adjacent compartments separated by a swinging door locked by a rod. We observed whether the monkeys in possession of food would allow their partner to enter their compartment by unlocking the door. Results showed that the monkeys clearly preferred to monopolize the food for themselves, though they in a few cases unlocked the door after eating preferred food. This suggests that this species, which has been shown to be sensitive to the others’ welfare, would not actively share food at a cost of their own. Possible evolutionary development of this prosocial tendency will be discussed.

10:30am-1-03 **Inference about the person's "reliability" by dogs**

Akiko Takaoka, Kazuo Fujita

Graduate School of Letters, Kyoto University

We investigated whether dogs evaluate "reliability" of the experimenter by observing her behaviors and extend the knowledge to gauge her trustworthiness in the future. In the observation phases, the subjects of the high reliability group observed the experimenter opening the baited container, which met their expectation, whereas animals of the low reliability group observed her opening the empty container, which did not meet their expectation. Then the dogs of both groups were baited by their owner. In the test phases that followed, many dogs in the high reliability group visited the container the experimenter pointed, but fewer dogs in low reliability group did. The only difference between the two groups was whether the experimenter did what the dogs expected or not. This suggests that dogs make inferences about the "reliability" of the experimenter and generalized it to a subsequent situation to change their behavior flexibly.

10:45am-1-04 **Effects of conflicts and combatant status on post-conflict greeting call usage in Japanese macaques**

Noriko Katsu, Kazunori Yamada, Masayuki Nakamichi

Graduate School of Human Sciences, Osaka University

We investigated flexibility in greeting call usage of Japanese macaques in post-conflict (PC) contexts, where anxiety levels and the risk of aggression of combatants increase. Greeting calls are soft vocalizations that are considered a signal of benign intent. It is predicted that greeting calls function to smoothly initiate affiliative interactions in PC contexts. We conducted focal observations on aggressors and victims in PC and matched-control (MC) context. We found that affiliative interactions were more likely to be accompanied by greeting calls in PCs than MCs. Combatants were more likely to receive affiliative interactions with greeting calls from bystanders when they were the aggressor of the conflict, maternally unrelated to the bystanders, and when the conflicts included intense attacks. These findings indicate that the usage of greeting calls is adjusted by the temporal states of receivers.

11:00am-1-05 **Social Attention in Great Apes: Eye Contact, Gaze Following, Predictive Look, and Their Species Differences**

Fumihiro Kano [1], Josep Call [2,3]

[1] Kumamoto Sanctuary, Kyoto University, [2] Department of Developmental and Comparative Psychology, Max-Planck Institute for Evolutionary Anthropology, [3] School of Psychology and Neuroscience, University of St Andrews

Using eye-tracking, we found that great apes are more similar to humans in the structure of social attention than previously thought. Nevertheless, there are substantial species differences among great apes and humans even in their simple visual preference. Study 1 examined the predictive look of bonobos, chimpanzees, and orangutans when they viewed a human agent or a mechanical claw reaching to the objects. Great apes predicted the goal of a human hand but not a claw. Study 2 examined the gaze following of great apes and human infants when they viewed the conspecific and other species models. Although all species followed the conspecific gaze, chimpanzees and human infants, unlike bonobos or orangutans, did not follow the other species' gaze. Study 3 examined the eye contact of bonobos, chimpanzees, and human adults when they viewed conspecific faces. Bonobos, similar to human adults, viewed the eyes more often than chimpanzees.

11:15am-1-06 **Approaches to the study of third-party social evaluation by nonhumans**

Jim Anderson

Department of Psychology, Kyoto University Graduate School of Letters

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Young human infants socially evaluate agents' interactions with third parties, with evaluation detectable in terms of differential looking at, and willingness to engage with those agents. Comparative psychologists have studied whether social evaluations also occur in other species, with the aim of elucidating possible evolutionary origins and correlates of this central aspect of human social cognition. Despite evidence that nonhuman animals gain foraging-, mating- and competition-related information through "eavesdropping," there is little consensus concerning evaluation of social traits such as cooperativeness or fairness. Three experiments were conducted to investigate capuchin monkeys' (Sapajus apella) social evaluations of humans engaged in third-party interactions. In the first study, capuchins observed one human actor trying to open a small transparent container to get an object inside. Failing to open it, the actor then requested assistance from another actor sitting alongside. In one condition the second actor helped by co-manipulating the container, and in another condition she refused to help. After every demonstration each actor offered a piece of food to the monkey. In alternation, experimental sessions consisted of only "helper" or "non-helper" trials, with the two actors' roles also alternating across sessions. The results showed that capuchins accepted food equally from the helpful actor and the actor who originally tried to open the container, but they expressed a bias against the actor who consistently refused to help. Further experiments ruled out alternative explanations, and we concluded that the capuchins negatively evaluated consistently unhelpful human actors. Our second study asked whether monkeys were sensitive to violations in exchanges of objects by third parties. Monkeys saw two human actors either exchange the same number of non-food items with

each other, or exchange asymmetrically, i.e., one actor failed to fully reciprocate. Again, the monkeys negatively evaluated actors who failed to return at least the same number of objects that he received from a donor. This negative bias did not emerge, however, when failure to fully reciprocate was because one of the actors started out with fewer potentially exchangeable items. The third study again used the object exchange method, but this time one individual was consistently generous, i.e., giving away more objects than received. Monkeys preferentially accepted food from the generous individual, even though the third-party exchanges never involved food. The existence of these third-party social evaluations, which we believe to be based on emotional book-keeping, is currently being assessed in other New World monkeys.

11:30am-1-07 **Rats learn the necessity of other individuals in a cooperative task**

Taichi Kusayama

Department of Psychology, Faculty of Liberal Arts, Teikyo University

In a cooperative problem task, behavioral coordination is necessary to cooperate with each other. Sprague-Dawley rats were tested with the most commonly used cooperative task, appropriate to test the behavioral coordination. They were housed in pairs("cagemates"). In this task, they learn to coordinate with a partner in a task requiring two individuals to simultaneously pull two ends of the same string to obtain a reward. They did not only act together, they could wait the pulling response for up to 5 seconds if the arrival of a partner was delayed. In the situation that a partner was trapped inside the restrainer which the key hung over, they could rescue a partner and pull the string together. Although they did not choose the cagemate in the condition that they could recruit the best collaborator in all trials, these results have been interpreted as demonstrating an understanding of cooperation in rodents.

11:45pm-1-08 **Preference for and discrimination of emotional expression in mice**

Shigeru Watanabe

Research Center for Human cognition, Keio University

Animals have to discriminate emotional expression of others to maintain social relation and others' emotion had positive/ negative value. Here I examined selective preference between rat's normal facial expression and facial expression with pain in mice. Subjects were placed in a chamber with three compartments in which two side compartments had ipad for display of stimuli. Most of the subjects prefer photos of the normal face to the face with pain. Then, I trained mice to discriminate the facial expression using an operant chamber with a touch screen. They could discriminate the normal face and face with pain but required rather long training and did not demonstrate a clear generalization to novel face. These results suggest visual preference and discrimination of emotional expression in mice.

Oral Sessions 2

Saturday Afternoon: 1:00 pm – 3:00 pm

Venue: 4F Main Hall

Chair: Yasuo Nagasaka & Rie Suge

1:00pm-2-01

Influence of oxytocin receptor *OXTR* gene polymorphisms on personality traits in cats

Minori Arahori [1], Miho Inoue-Murayama [2], Kazuo Fujita [1]

[1] Department of Psychology, Graduate School of Letters, Kyoto University, [2] Wildlife Research Center, Kyoto University

Genetic polymorphisms have been indicated to play an important role in personality and behavior (Savitz et al., 2004). In this study, we examined whether polymorphisms in oxytocin receptor (*OXTR*) gene of domestic cats (*Felis catus*) influence their personality. We collected samples from cats in Japan, and analyzed the sequence of the *OXTR exon1* region. We also collected questionnaires about each cat personality from cat owners. The DNA analysis revealed 2 SNPs (single nucleotide polymorphisms, T474C and G738A). The Factor Analysis detected 3 factors, named "curiosity", "aggressiveness" and "moderateness". In results, *A* carriers in G738A were more aggressive than cats homozygous for the *G* allele. There was marginal significance between age and "curiosity", and sex and "moderateness". These results partly support that polymorphisms in cats also affect their personality, but it's still difficult to say that *OXTR* in cats is related to social behavior. Further work involving behavioral tests is needed.

1:15pm-2-02

Association between genetic polymorphism and tractability in Thoroughbred horses

Yusuke Hori [1,2], Yasuo Nambo [3], Fumio Sato [4], Mutsuki Ishimaru [4], Teruaki Tozaki [5], Miho Inoue-Murayama [6], Kazuo Fujita [1]

[1] Graduate School of Letters, Kyoto University, [2] Japan Society for the Promotion of Science,
[3] Department of Clinical Veterinary Science, Obihiro University of Agriculture and Veterinary Medicine,
[4] Hidaka Training and Research Center, Japan Racing Association, [5] Laboratory of Racing Chemistry,
[6] Wildlife Research Center, Kyoto University

Recent studies suggest that polymorphisms in genes related to neurotransmitter/hormone affect the individual variability in behavioral traits in many animal species. In this study, we tested association between genetic polymorphisms and tractability in Thoroughbred racing horses. Caretakers evaluated 121 horses' tractability during stabling, handling, and training for two years (2011 and 2012). We conducted a principal component analysis for the behavioral evaluation data and extracted four components. The association between these components and the genotypes of three candidate genes (*DRD4*, *OXTR*, and *AR*) was analyzed. We found a statistically significant effect of DRD4 on one principal component, which reflected the difficulties in familiarization with riding. However, the trend was opposite between years. There may be interaction between the genotype and other environmental factors. Analyzing the data from other years is needed to conclude whether *DRD4* genotype affects individual differences in tractability.

1:30pm-
2-03

Post-acquisition hippocampal GluN2B-containing NMDA receptors blockade prevents "forgetting" in the Morris water maze in rats

Keisuke Shinohara [1], Toshimichi Hata [2]

[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

Many studies have reported that pharmacological blockade of *N*-methyl-D-aspartate type glutamate receptors (NMDARs) impairs the acquisition of spatial reference memory. In contrast, we demonstrated that post-acquisition administration of an NMDAR antagonist, D-AP5, prolongs spatial reference memory retention (Shinohara & Hata, 2014). Here, we investigated the role of GluN2B-containing NMDARs in the retention of spatial reference memory. Rats were trained for three consecutive days (4 trials/day) and performed the acquisition probe test on the 4th day. Starting one day after this session, Ro 25-6981 (5.0 mM) was chronically infused into the dorsal hippocampus bilaterally for 6 days. In the subsequent retention probe test without the effect of the drug, we found that rats infused with Ro 25-6981 showed high performance, similar to that in the acquisition probe test, whereas controls did not. This result suggests that hippocampal GluN2B-containing NMDARs blockade suppresses "forgetting" of acquired spatial reference memory.

1:45pm-
2-04

A negative feedback pathway which generates prediction errors in amygdala neurons and sets learning asymptotes during auditory fear conditioning in rats

Takaaki Ozawa [1], Edgar A. Ycu [1], Touqeer Ahmed [2], Ashwani Kumar [1], Jenny Koivumaa [1], Joshua P. Johansen [1]

[1] Laboratory for Neural Circuitry of Memory, Brain Science Institute, RIKEN, [2] National University of Sciences and Technology, Atta-ur-Rahman School of Applied Biosciences

During auditory fear conditioning, learning reaches a steady state (termed the learning asymptote) beyond which further training is ineffective at producing learning. We previously found that a learning dependent reduction in response to the predicted-shock (termed prediction error coding) in lateral nucleus of amygdala (LA) neurons functions to set the learning asymptote. Prediction error coding also occurs in the periaqueductal gray (PAG) which relays shock signals from periphery to LA. PAG receives inhibitory input from central nucleus of amygdala (CeA) which is activated by tones after fear learning. Here, we hypothesized that a CeA-PAG pathway provides a negative feedback on PAG to produce prediction error coding in LA thereby setting learning asymptotes. Supporting this hypothesis, we found that: (1) optogenetic inhibition of CeA-PAG afferents disinhibited predicted shock-evoked responses in LA (i.e. reengaged prediction error coding). (2) This manipulation at learning asymptote also increased learning levels through the activation of LA.

2:00pm-
2-05

Neural response during virtual language acquisition in macaques

Yasuo Nagasaka, Misako Komatsu, Kana Takaura, Naotaka Fujii

Lab. for Adaptive Intelligence, BSI, RIKEN

Humans readily learn statistically defined patterns in auditory sequence, such as word segmentation in speech. Several human studies demonstrated that the ERP component was reflected tone-word segmentation and process of statistical learning. However, little is known about the function in non-human animals. Here we examined probabilistic sounds segregation in macaques. We recorded electrocorticography (ECoG) signal from three monkeys while each monkey was exposed to continuous, nonlinguistic auditory sequences, which was organized by four “tritone” words without inter-tone-interval. In preliminary results, the significant changes of ECoG signals corresponding to transitional probabilities between tones were found in premotor cortex and superior temporal gyrus. Furthermore, those changes were observed only for several minutes after the first half of the sequence. The present results suggested that macaques also might have the ability to segregate and unitize elements of sound sequence by statistical learning.

2:15pm-2-06 **Effects of maternal separation in early or late postnatal days before weaning: body weights, anxiety-like behavior, depressive-like behavior, and isolation-induced ultrasonic vocalization**

Yurie Kawamura, Hiromi Wada

Division of Human Sciences, Hokkaido University, Graduate School of Letters

Early life stress, like childhood neglect, has potential to induce psychological disorders. Previous studies have shown that early life stress affects the behavior in adult rats. Maternal separation (MS) has been used as an animal model of neglect. We compared the effects of early MS (EMS; postnatal day 5-10) and later MS (LMS; days 15-20) with those of no MS (NMS) on body weight, anxiety, depression-like behavior, and ultrasonic vocalizations (USV) using infant rats. After weaning, the EMS group gained less body weight and exhibited more anxiety-like behavior in the elevated plus maze and hole-board tests compared with both LMS and NMS. The duration of USV decreased only in the EMS, however there was no significant effect on depression-like behavior during the forced swim test. These results indicate that the EMS has potential to induce psycho-physiological problems including less body weight gain and anxiety-like behavior after weaning.

2:30pm-2-07 **Neurons in the lateral hypothalamic area of cynomolgus monkeys may provide precursor signals for midbrain dopaminergic neurons in reward processing**

Atsushi Noritake [1], Kae Nakamura [1,2]

[1] Department of Physiology, Kansai Medical University, [2] PRESTO

In the uncertain world, trial-and-error learning is critical for survival. Midbrain dopamine (DA) neurons encode signals essential for this process including the reward prediction error (RPE), the discrepancy between the actual and predicted rewards. However, the sources of these signals remain unknown. The lateral hypothalamic area (LHA) has strong reciprocal connections with midbrain DA neurons, suggesting its participation in reward processing observed in the DA neurons. We recorded single-unit activity in the LHA in two cynomolgus monkeys conditioned with a Pavlovian procedure where rewards (USs) were associated with different visual stimuli (CSs) with different probability (P=0, 0.5, or 1). To measure the RPE signals, unpredictable rewards were also delivered in the conditioning. We found that many LHA neurons showed modulation in responses to CSs, USs, and delay depending on reward probability, predictability, and uncertainty, respectively. The results suggest that LHA neurons may convey precursor signals of DA neurons.

2:45pm-2-08 **Fos-like immunoreactivity in the intermediate and medical mesopallium (IMM) during sleeping after filial imprinting in the domestic chick**

Rie Suge [1], Alister Nicol [2], Brian McCabe [2]

[1] Department of Physiology, Saitama Medical University, [2] Sub-Department of Animal Behaviour, Department of Zoology, University of Cambridge

Undisturbed sleep is important for memory consolidation in imprinting in the domestic chick. In the intermediate and medical mesopallium (IMM), critical forebrain region for visual imprinting, imprinting leads to an increase in the proportion of neurons that are selectively responsive to a visual imprinting stimulus. This increase is dependent on undisturbed sleep 5 - 12 h after the first exposure to the stimulus. We have examined whether sleep during this period is associated with a change in neuronal activity in the IMM, using Fos immunoreactivity as a marker.Dark-reared chicks were trained in individual running wheels by exposure to a red box for 2h. Chicks were assigned to Rest group (immobilized wheel) or Disturbed group (randomly rotated wheel to prevent continuous sleep) and killed 9 or 11 h after the start of training. In the IMM, there were more Fos-positive cells in the Rest group than in the Disturbed group.

Oral Sessions 3

Saturday Evening: 3:30 pm – 5:30 pm

Venue: 4F Main Hall

Chair: Ikuma Adachi & Masaki Tomonaga

3:30pm-3-01 **Is spatial information encoded during Occasion Setting?: A new cross-species search task with landmarks**

Chad M. Ruprecht, Christian Sullivan, Josh E. Wolf, Kenneth J. Leising

Texas Christian University

We can imagine the time of day (12pm vs. 5pm) setting the occasion for where we will ride the next train to. Recent studies on occasion setting have found that the effectiveness of an occasion setter (X) in facilitating responding to a landmark (A, e.g., a train stop) is determined by the landmark's past training as an ambiguous cue (e.g., Ruprecht, Quintana, Wolf, & Leising, in press). We wondered if pigeons and undergraduates could learn that a colored background, alone, could set the occasion for *where* a reinforcer was located in relation to the landmark (e.g., ←XA; YA →). Across three experiments, using a pigeon peck-screen, human touch-screen, and human 3-D task, we found that landmarks already participating in occasion setting elicited the highest magnitude and accuracy of responses when paired together with different occasion setters at test.

3:45pm-3-02 **Do Syrian hamsters (*Mesocricetus auratus*) retrieve the incidental memory of a single past event?**

Toru Betsuyaku [1], Mana Tsuzuki [1], Sumie Iwasaki [1], Jun Okamura [2], Kazuo Fujita [1]

[1] Graduate School of Letters, Kyoto University, [2] Faculty of Letters, Kyoto University

We asked whether Syrian hamsters (*Mesocricetus auratus*) would retrieve memory for a single previous exploration of food, as one aspect of episodic-like memory. We used a four-armed radial maze with a feeder at the end of each arm. Two of the 4 feeders were baited, but one was uncollectable because of a false bottom. Subjects visited all feeders once and were allowed to eat only from the baited-collectable feeder (exposure). After 5 minutes, they re-explored the apparatus with the remaining food removed (test). The use of an incidentally formed memory would be demonstrated if hamsters showed a preference for the baited-uncollectable feeder; however, they first revisited the two previously baited feeders comparably. Thus, no recollection of an incidental memory was demonstrated, though subjects more frequently revisited baited than empty feeders, suggesting one-trial spatial learning. Some procedural modifications, such as using exogenous interference instead of a false bottom, may be required.

4:00pm-3-03 **Do human children know what information they should collect for their future knowledge state?**

Sumie Iwasaki, Hika Kuroshima, Mana Tsuzuki, Minori Arahori, Kazuo Fujita

Department of Psychology, Kyoto University

Our previous results suggest that five-year-olds may seek information more often before solving difficult tasks than easy tasks. Here we asked whether they recognize what information they would need for their future knowledge state. Children were requested to find stickers in two rooms; an experimenter hid a sticker under one of five opaque cups in one room, whereas another did it in transparent ones in the other room. While experimenters were hiding stickers, children could watch one of the rooms via a monitor. In the first two trials, they watched the two rooms non-differentially. In later trials, they learned to watch the opaque-cup room in order to collect the two stickers. These results suggest that five-year-olds may initially have difficulty in recognizing what information they need for their future knowledge state.

4:15pm-
3-04

What-Where-Which memory in degus (*Octodon degus*)

Mana Tsuzuki, Toru Betsuyaku, Sumie Iwasaki, Kazuo Fujita

Graduate school of letters, Kyoto University

Recent evidence suggests that several nonhuman animals exhibit various aspects of episodic memory, historically described as unique to humans. It has two features: integration of what-where-when information and incidental encoding. Eacott et al. (2005) proposed "which (contextual cues)" as an alternative idea of "when." We adapted their procedure to degus (*Octodon degus*), a social rodent, to test whether they remember what happened, where and in which context it happened in the situation of object exploration. We used two E-shaped mazes with a smooth floor or that covered with wire mesh. In each context, we placed objects in different positions. Results suggested that degus preferentially visited the arm containing novel objects even in the absence of visual contact with them. This data, therefore, indicates that degus have an ability to integrate what-where-which information of past events, i.e., a type of episodic-like memory.

4:30pm-
3-05

Long Numerical Sequential Learning in Chimpanzees (*Pan troglodytes*): from 1 to 19

Akiho Muramatsu, Tetsuro Matsuzawa

Primate Research Institute, Kyoto University

How chimpanzees learn the long numerical sequence including the carry of digits? To clarify one numerical concept in chimpanzees, we focused on the ordinal number and the positional notation. We tried to teach our chimpanzees the sequence of Arabic numerals from 1 to 19. After the training, six chimpanzees participated in the test under 24 conditions. As a result, their accuracy was dropped in the trial including the stimuli from the latter part of the sequence (over 10), the carry of digits, the sequence from 1 to 19, and the non-adjacent sequence. And their latency became longer when the trial includes the stimuli over 10. Our results suggest that chimpanzees can learn the long numerical sequence. They have, however, some difficulties especially in the carry of digits. These difficulties might be related to the distance among stimuli, the complexity of Arabic numerals as a figure, and their impulsivity.

4:45pm-
3-06

Visual motion modulates head-bobbing in bantams

Yuya Hataji, Sho Otaki, Kazuo Fujita

Department of Psychology, Graduate School of Letters, Kyoto University

Several bird species move their heads back and forth during walking. This head-bobbing is one of the most striking features of avian locomotion. Previous studies showed the head is locked in space during backward movements, and consequently suggested that head-bobbing stabilizes images on the retina. No previous study, however, directly examined the effect of visual motion stimuli on the head-bobbing. In the present study, we examined the effect of backward motion stimuli presented bilaterally on head-bobbing of bantams (Gallus gallus domesticus) walking on a treadmill. Although heads remained stationary with static stimuli, they moved rapidly back and forth with motion stimuli. These results indicate that head-bobbing is modulated by visual motion stimuli. Furthermore, we examined the effect of velocity, temporal frequency, and spatial frequency of the motion stimuli on head-bobbing.

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5:00pm-
3-07

Mental Representation of Order in Monkey

Victoria L. Templer [1,2]

[1] Providence College, [2] Yerkes National Primate Research Center

There are a variety ways humans and other animals order stimuli. Fixed orders are remembered when actions are taken in routinized sequence, such as in executing a favorite cooking recipe, and when paired associations are used to construct and a hierarchy (e.g. Amy is taller than Dan, and Dan is taller than Sally, so by Transitive Inference, Amy must be taller than Sally). The way we encode such structured and stable sequences is likely similar in many ways, but also critically different, from how we encode and explicitly remember unique sequences of events. For example, you may remember the order of activities you took on a day of your vacation: you first went snorkeling, then went sailing, and finally ate lunch. The temporal order in which unique events occurred, such as those that comprise such an episodic memory, are also based on a mnemonic representation of ordered stimuli. Cognitive tests suitable for nonverbal species have been developed that model these types of memory for order. Common properties of mental representations across serial order and temporal order tasks are explored and illuminate critical differences and similarities between ordinal memory tasks. Progress in understanding the types of memory systems monkeys possess will be enhanced by improved characterizations of the specific features of the cognitive representations underlying memory for ordered stimuli.

5:15pm-
3-08

Spatial mapping of orders in chimpanzees

Ikuma Adachi

Primate Research Institute, Kyoto University

There has been a growing number of reports on space-based representation of numbers and serial order in humans. Here, to explore evolutionary origins of such representations, I examined whether chimpanzees map an acquired sequence onto space. The subjects had been trained to perform a number sequence task in which they touched a sequence of “small” to “large” Arabic numerals presented in random locations. This task was presented in sessions that also included test trials consisting of two numerals (1 and 9) horizontally arranged. On half of the trials 1 was located to the left of 9, whereas on the other half 1 was to the right to 9. Their performance was influenced by the spatial arrangement of the stimuli; specifically, they responded quicker when 1 was on the left to 9 compared to the other way around. This result suggests that chimpanzees, like humans, spontaneously map a sequence onto space.

Oral Sessions 4

Sunday Morning: 10:00 am – 12:00 pm

Venue: 4F Main Hall

Chair: Kosuke Sawa & Tomokazu Ushitani

10:00am-
4-01

Abstract relational learning of pictorial stimuli in rats

Makiko Kamijo, Tohru Taniuchi

Graduate School of Socio-Environmental Studies, Kanazawa University

Four Long-Evans rats were trained to discriminate same/different relationships between two pictorial stimuli in a conditional place discrimination task. Same-sets consisted of two identical pictorial stimuli (AA, BB, and so on), while different-sets consisted of two different stimuli (AB, BA, so on). A rectangular discrimination box was divided into two compartments by a central partition with a guillotine door. LCD displays were attached on both sides of the box and presented identical stimulus sets. Rats could explore both sides of the compartments freely for 60 s. Rats were reinforced if they stayed in the correct side at the end of the 60 s trial. Correct sides were determined by which of the same/different stimulus set was presented on the trial. Rats could acquire this kind of relational discrimination task reliably. We will report the result of the training and the transfer test with novel stimuli.

10:15am-
4-02

How do pigeons (*Columba livia*) perceive Delboeuf illusions made of squares?

Ayami Hyuga, Takaaki Kaneko, Kazuo Fujita

Department of Psychology, The University of Kyoto

The Delboeuf illusion, or a concentric-circles illusion, is an optical illusion of size perception. Typically, two separate circles of identical size are placed, each surrounded by another concentric circle of different sizes. Humans overestimate the one with a smaller annulus, whereas they underestimate the one with a larger annulus. Nakamura et al. (2012) found that pigeons see circles with a larger annulus as bigger; that is, illusion in the opposite direction. We tested pigeons on a slightly different procedure using squares instead of circles. We confirmed that the birds perceived the same reversed illusion: an overestimation of the target squares surrounded by large squares. In addition, we found that pigeons underestimated the squares with small squares surrounding them. This is the third reversed illusion discovered in this species. Whether this is limited to pigeons or applicable to more avian species remains to be answered.

10:30am-
4-03

Do cats (*Felis silvestris catus*) infer invisible objects from sounds?

Saho Takagi [1], Hitomi Chijiiwa [2], Kazuo Fujita [1]

[1] Graduate school of letters, Kyoto University, [2] Ikedasensyu-bank

Inferential ability has been studied in various animal species, but few studies used cats. We investigated whether cats could infer an invisible object in an opaque container by making use of the association between movement of the container(an opaque box) and corresponding sounds. Either the owner or Experimenter 2 lightly constrained a cat on the floor, and Experimenter 1 shook the box for 15-s. Following this, the cat was released to move freely for 15-s. There were 3 conditions: the object condition, the white noise condition, and the empty condition. All subjects participated in all 3 conditions. We expected that, if cats infer the existence of invisible objects from the correlation between shaking movement and contingent sounds, they would be more interested in the container and would look at the event longer in the object condition than in other conditions. The final results will be presented at the conference.

10:45am-4-04 **The role of temporal relationship among events in causal reasoning in rats**

Kosuke Sawa, Akira Kurihara

Department of Psychology, Senshu University

A temporal relationship between events is important for a causal cognition, because the cause occurs before the effect. The main aim of this study is to investigate the role of temporal information in inference based on causal Bayes net. In Group Successive rats received training trials whereby Event 1 was followed by Events 2 and 3. Those in Group Simultaneous received simultaneous presentation of Events 1 and 2, and 1 and 3. In testing, subjects were allowed to press the lever, produced the occurrence of Event 2. Prediction for Event 3 (sucrose) was assessed by measuring nose-poke responses during Event 2. Rats in Group Successive showed a lower response rate than did those in Group Simultaneous. These results imply rats have the ability to use elemental temporal information, even after building the temporal map, which is critical to Bayesian causal inference.

11:00am-4-05 **The Comparative Inhibitory Control Ability of Two Kinds of Colobus**

Tao Chen [1, 2], Yanjie Su [1, 2], Jie Gao [2, 3]

[1] Department of Psychology, Peking University, [2] Developmental and Comparative Psychology Laboratory, Peking University, [3] School of Life Sciences, Peking University

A temporal relationship between events is important for a causal cognition, because the cause occurs before the effect. The main aim of this study is to investigate the role of temporal information in inference based on causal Bayes net. In Group Successive rats received training trials whereby Event 1 was followed by Events 2 and 3. Those in Group Simultaneous received simultaneous presentation of Events 1 and 2, and 1 and 3. In testing, subjects were allowed to press the lever, produced the occurrence of Event 2. Prediction for Event 3 (sucrose) was assessed by measuring nose-poke responses during Event 2. Rats in Group Successive showed a lower response rate than did those in Group Simultaneous. These results imply rats have the ability to use elemental temporal information, even after building the temporal map, which is critical to Bayesian causal inference.

11:15am-4-06 **Pigeons perceive an integrated motion pattern**

Sho Otaki, Benoit Bucher, Yuya Hataji, Kazuo Fujita

Graduate School of Letters, Kyoto University

Humans integrate local visual information into a global percept. When two gratings which drift in different directions (component motion) were superimposed, human observers perceive a motion in a direction that is between the component motions (plaid motion). The observers can hardly segregate the component motion from the plaid motion. We examined whether pigeons perceive the plaid motion like as humans. Three pigeons were trained to report the direction of a drifting grating. The pigeons reported the direction of the plaid motion when two component motions were superimposed. While the effect of spatial frequency difference between the two component motions on performance of the pigeons was similar to humans, the effect of contrast difference was dissimilar. The pigeons were more sensitive to the contrast difference than humans. These results indicate that pigeons integrate component motions into global plaid motion like as humans, but a mechanism is different between the two species.

11:30am-4-07 **Picture discrimination by pigeons in an RSVP task (3): Responses elicited by targets**

Tomokazu Ushitani [1], Noriyuki Nakamura [2], Masako Jitsumori [1]

[1] Faculty of Letters, Chiba University, [2] Faculty of Human Sciences, Toyo Gakuen University

We previously reported that five pigeons learned to discriminate between target images of birds in a rapid serial visual presentation (RSVP) task. On each trial, pecking at the starting stimulus produced a rapid stream in which images of one target and one distractor bird appeared serially, and the pigeons were then required to choose a comparison stimulus depending on the target. We found that the pigeons spontaneously responded to the items in the streams, even though no responses were required. In the current report, we analyzed the responses to the targets and found that the pigeons responded to the targets significantly more frequently than to the distractors. This suggested that pigeons' identification of the targets induced them to elicit the unrequired responses to the targets. Nevertheless, the elicited responses did not contribute to increasing correct choices, compared to the performance on trials in which no responses occurred to the targets.

11:45am-4-08 **Picture discrimination by pigeons in an RSVP task (4): The effect of blank intervals**

Masako Jitsumori [1], Noriyuki Nakamura [2]

[1] Department of Cognitive and Information Sciences, Chiba University, [2] Faculty of Human Sciences, Toyo Gakuen University

Pigeons were tested on RSVP trials and Target-Only trials occurring equally often per session. Each RSVP trial consisted of successively presented three items (one target and two distractors), with the target appeared in serial position 1, 2, or 3 (T-D-D, D-T-D, D-D-T). Each distractor was replaced by a blank interval on the corresponding Target-Only trials (T-B-B, B-T-B, B-B-T). The presentation time per item was gradually decreased from 233 to 17 ms. When it was 133 ms or longer, the recency effect occurred on both RSVP and Target-Only trials. The blanks had virtually no effect in improving performance, suggesting that all items in an RSVP stream are visually processed independently to one another. When the items were presented quite rapidly (≦83 ms/item), the recency effect disappeared and the blanks improved the performance. The pigeons continued to perform significantly above chance with the presentation time of 17 ms on Target-Only trials.

Oral Sessions 5

Sunday Evening: 3:30 pm – 5:30 pm

Venue: 4F Main Hall

Chair: Yuko Hattori & Masumi Wakita

3:30pm-5-01 **Spontaneous auditory-motor entrainment during self-paced tapping in chimpanzees and humans**

Yuko Hattori, Masaki Tomonaga, Tetsuro Matsuzawa

Primate Research Institute, Kyoto University

This study provides evidence that chimpanzees and humans show similar rhythmic entrainment spontaneously when they heard simple auditory rhythm as distractor stimuli. While self-paced tapping two keys alternately, we played auditory sound as distractor stimuli. When the tempo of the stimulus was close to their preferred tapping tempo, weak entrainment appeared both in chimpanzees and humans. The result suggests that strong connection between auditory and motor-related areas in the brain is already deeply rooted in the common ancestor of chimpanzees and humans six million years ago.It is unclear whether chimpanzees are capable of intentionally synchronizing their tapping to auditory rhythm as in previous human tapping studies. The absence of report on flexible behavioral synchrony in the field may suggest that behavioral synchrony might have advanced particulary during human evolution.

3:45pm-5-02 **Lack of rhythmic synchronization in a key-pecking task of Bengalese finches**

Yoshimasa Seki [1,2], Kazuo Okanoya [2]

[1] Faculty of Letters, Aichi University, [2] Graduate School of Arts and Sciences, The University of Tokyo

Bengalese finches were engaged for a key-pecking task to examine “Vocal learning and rhythmic synchronization hypothesis”. Birds were trained to peck a key during a transient period (300ms) indicated by an audio-visual cue (light emission from the key and 3kHz pure tone). The cue was presented rhythmically and repeatedly. The birds were required to follow the stimuli and peck the key without error until a food reward was provided. The number of required key-peck was gradually raised up to 5 times. Although the birds were tested with various tempi (600-1500ms), we did not find evidence showing the key-peck timings were synchronized to the rhythm or the birds anticipated the stimulus timing. The result differed from a report acquired in a previous study of Budgerigars. This finding may suggest that rhythmic synchronization requires some properties that are shared in both parrots and humans in addition to the ability of vocal learning.

4:00pm-5-03 **Behavior coordination in chimpanzees (*Pan troglodytes*): Testing under a face-to-face setup**

Lira Yu, Masaki Tomonaga

Primate Research Institute, Kyoto University

We humans often coordinate our behavior with others. Behavior coordination, including matching a type of behavior or a timing of the movement, has been known to occur inevitably when we perceive other’s action. Moreover, this behavior coordination has been known to have positive social function in humans. The present experiment introduced a comparative approach to investigate whether behavior coordination occurs in other highly social animal species. Chimpanzees, who are phylogenetically closest living relatives to humans and living in a complex social group, were focused. During the experiment, a pair of chimpanzees faced each other and produced rhythmic finger-tapping movements with their own preferred tempo. We confirmed that chimpanzees’ own tapping speeds were significantly interfered by their partner chimpanzees. Furthermore, preliminary results on asynchrony indicate that chimpanzees frequently matched their timing of the movements with their partner. The current findings were comparable to the previous experiment conducted in side-by-side setup.

4:15pm-5-04 **No gratitude, nor punishment: orangutans' insensitivity to unfairness**

Yena Kim [1], Jae Chun Choe [2,3], Jeong Rae Rho [4], Masaki Tomonaga [1]

[1] Primate Research Institute, Kyoto University, [2] Division of EcoScience, Ewha Womans University, [3] National Institute of Ecology, [4] Animal Welfare Division, Seoul Zoo

One critical point for understanding the evolution of reciprocity is a psychological mechanism to detect a free-rider. Among them, sensitivity to unfairness has been widely tested in group living primates. Experimental studies of chimpanzee and capuchin sensitivity to unfairness show that they display aversive reactions when the partner has a better reward than themselves. Even though there have been few studies testing orangutan sensitivity to unfairness outcomes, no study has yet tested orangutan sensitivity to partner's unfair intentions. We tested two captive orangutans with human participants who were randomly assigned either to be prosocial or selfish, using a previously used choice paradigm apparatus. Our results showed that neither prosocial choices nor selfish choices by human partners affected the prosocial choices orangutans made afterwards. These findings suggest that species' sociality plays a more critical role than the current social environment in embedded psychological mechanisms, which is important for regulating reciprocity.

4:30pm-5-05 **Facial recognition in fish**

Masanori Kohda, Takashi Hotta, Masami Taniyama, Naoya Kosaka, Tomohiro Takeyama

Department of Biology and Geosciences, Graduate school of Science, Osaka City university

Recently it has been reported that social fish often recognize group members individually optically, but precise cues for recognition are rarely identified. We show for the first time the visual cue for individual recognition in fish, that being based on facial colour patterning, independent of other physical traits. By combining manipulated digital presentations with the dear enemy behavioural paradigm, we assessed the signal for individual recognition in the model species for cooperative breeding cichlid, Neolamprologus pulcher. Four types of digital fish-models were presented: (1) known neighbour, (2) neighbour face on stranger's body, (3) stranger and (4) stranger face on neighbour's body. Fish responds toward models 1 & 2 similarly (watching models less frequently but near models) and differently from behaviour towards models 3 & 4. Our results indicate that they distinguish the models only by facial coloration, and their individual recognition will be comparable to face-based recognition of primates.

4:45pm-5-06 **Auditory sequence perception in Common marsets (*Callithrix jacchus*)**

Masumi Wakita

Department of Behavioral and Brain Sciences, Primate Research Institute, Kyoto University

The phonological sequencing is essential to recognize words from continuous speech. To investigate auditory sequence perception ability in nonhuman primates, I trained two common marmosets to discriminate ABAB and AABB patterns using absolute and relative discrimination procedures. The stimuli were sequences of pure tones A (0.5 kHz, 50ms) and B (2 kHz, 200ms). During the absolute discrimination training, either one of two stimuli was presented in a trial. The monkeys were required to identify the positive stimulus without any references. During the relative discrimination training, monkeys had to detect stimulus change from one sequence to the other, which occurred only in the positive trials. Consequently, the marmosets achieved relative discrimination but failed in absolute discrimination. These findings imply that the marmoset's auditory processing ability is sufficient for the online processing depending on working memory but is insufficient to build a representation of an auditory sequence in long-term memory.

5:00pm-5-07 **Monkeys use similar discriminative cues across two tests of metamemory**

Emily Kathryn Brown, Benjamin M. Basile, Victoria L. Templer, Robert R. Hampton

Yerkes National Primate Research Center, Emory University

Metamemory is the ability to monitor and adaptively control memory. Here, we directly compare performance of rhesus monkeys (Macaca mulatta) on two metamemory paradigms: decline-test and information-seeking. We tested the assumption that these two metamemory tests assess the same underlying cognitive capacity. Monkeys performed a four-choice match-to-sample memory task. In Experiment 1, monkeys could decline memory tests on some trials to receive a small, guaranteed reward. Monkeys were significantly more accurate on tests they chose to take than on those they were forced to take, suggesting that they monitored memory to selectively avoid tests when memory was poor. In Experiment 2, monkeys could choose to repeat the sample on some trials. Monkeys were significantly more accurate on tests for which they chose not to repeat the sample than on tests they were forced to take without the option to repeat the sample. This result suggests that they monitored memory to select the repeat-the-sample response when memory was poor. We made the metacognitive response available at different points during trials in both Experiments 1 and 2, to assess which cues control metacognitive judgments. The opportunity to decline tests or repeat the sample was presented prospectively, before test stimuli appeared, or concurrently with test stimuli. In prospective choices, monkeys must base metamemory judgments solely on the current contents of memory, whereas in concurrent choices, the test stimuli provide additional cues that reflect the difficulty of the memory test. In both metamemory paradigms, monkeys showed a greater benefit of metacognitive responding on concurrent than on prospective tests, suggesting that monkeys monitored both their internal memory states and the immediate familiarity elicited by test items. Similar patterns of metamemory performance across the paradigms used in Experiments 1 and 2 strengthen the hypothesis that similar cognitive monitoring processes are active across the two paradigms, and that metamemory results from the monitoring of multiple cues.

5:15pm-5-08 **Inference in dogs of physical properties of the apparatus from socially-given clues**

Kazuo Fujita, Yukari Nabeoka, Hika Kuroshima

Department of Psychology, Graduate School of Letters, Kyoto University

Dogs are sensitive to social clues from humans. We asked whether dogs could infer physical properties of objects in question by observing consequences of human actions toward them. In Experiment 1, dogs chose between two identical doors, both of which led to food when opened, after witnessing a human actor opening each door quite easily (light door) or with much effort (heavy door). The dogs' choice was random. In Experiment 2, new dogs chose between two baited transparent containers with a lid, after witnessing the actor touching the lid either safely (safe container) or painfully (dangerous container). The dogs' choice was again random. In Experiment 3, we gave new dogs experience of opening both doors used in Experiment 1 for themselves before showing the actions. Now the dogs tended to choose the light door. The results suggest that experience with the objects in question may enhance dogs' inference.

Oral Sessions 6

Monday Afternoon: 1:00 pm – 2:30 pm

Venue: 4F Main Hall

Chair: Masaki Shimada & Shinya Yamamoto

1:00pm-
6-01

The importance of social play network for the juvenile wild Japanese macaques

Masaki Shimada

Department of Animal Sciences, Teikyo University of Science

In this study, regarding the cohesion of juvenile animals as a ‘social network’, the relationships between play network and proximity/kinship network were evaluated using the techniques of social network analysis to discuss the possible benefits of social play for juveniles. Field research was carried out on the habituated wild troop of Japanese macaques (*Macaca fuscata*) in Kinkazan Island, Miyagi prefecture. The play interactions and play partners of the focal animals, and the individuals close to less than 3 m of the focal were recorded.Both play network and kinship network were correlated positively with proximity network. The eigenvector centrality in play network and the frequency of social play of each individual were positively correlated. Juvenile macaques were taken into not only kinship, but also play network, of which structure was similar to that of proximity network. Play network may enable juvenile macaques to develop their affiliative relationships other than play.

1:15pm-
6-02

Stress reduction after giving grooming in Japanese macaques (*Macaca fuscata*)

Masataka Ueno, Kazunori Yamada, Masayuki Nakamichi

Graduate School of Human Sciences, Osaka University

Our study examined the effects of giving grooming on stress reduction in free-range female Japanese macaques (*Macaca fuscata*) at Katsuyama by measuring rates of self-scratching as an index of stress. We evaluated affiliative relationships which were defined by the standard proximity rates. We found that females’ self-scratching rates were lower after grooming affiliated partners than during matched control periods at the same time on the different day as post-grooming periods, but not after grooming unaffiliated partners. This was still true after excluding the data in which groomer and groomee were in proximity after the grooming interaction. Additionally, multivariate analysis showed that affiliative relationships were related to the differences in the rates of self-scratching between post-grooming and matched control periods, but kinships and rank distances were not related to them. In conclusion, individuals’ stress levels decreased after providing grooming to affiliated partners.

1:30pm-
6-03

Chimpanzee skillful tool-makers transport their processed tools longer

Shinya Yamamoto

Kobe University

Tool transportation was detected in fossil records of ancient humans. This behavioral property is considered to help humans make sophisticated tools, innovate technology, and therefore survive and succeed evolutionarily and culturally. However, the evolutional origin of this is still equivocal, especially from the cognitive viewpoints. Here I tested 34 captive chimpanzees in Kumamoto Sanctuary of Kyoto University, and found two types of tools for drinking juice in experimental setups: brush-type and stick-type. A brush-type tool was intentionally made by chewing, and could catch more juice than the other. The primary finding was that chimpanzees who made the brush-type tools used and transported their processed tools longer than stick-type tool-users. This study suggests that chimpanzees recognize the energetic cost in making tools and/or the tool efficiency. The individual difference in tool-making and tool-transportation might be the basis of the existence of specialists in technology, division of labor, and economic cooperation.

1:45pm-6-04 **Interaction with a small mobile robot decreases depression level of rats**

Hiroyuki Ishii [1], Hikaru Sugita [3], Katsuaki Tanaka [3], Daisuke Kuroiwa [3], Yuya Okamoto[3], Qing Shi [3], Yusuke Sugahara [5], Satoshi Okabayashi [4], Hiroshi Kimura [4], Atsuo Takanishi [2]

[1] Research Institute for Science and Engineering, Waseda University, [2] Faculty of Science and Engineering, Waseda University, [3] Graduate School of Advanced Science and Engineering, Waseda University, [4] Faculty of Letters, Arts and Sciences, Waseda University, [5] School of Science and Engineering, Kokushikan University

Interactions with other conspecifics or playing tools provide positive effects on behavior of laboratory animals. We propose a novel methodology to study how interaction affects behavior of rats, using a small mobile robot. A robot with two active wheels was developed for this aim. Its dimensions and locomotion performance are same as mature rats. We conducted an experiment to investigate how interactions with the robot affected depression and anxiety of rats. The robot was programmed to behave to play with a rat by following it. After interactions, behavior tests consisting of forced swimming test and elevated plus-maze test were performed. In forced swimming test, immobility time of the rat which had experienced interactions with the robot was higher than that of the rat which had not experienced it. A significant difference was confirmed between them. Therefore, we consider that interaction with the robot decreases depression level of rats.

2:00pm-6-05 **The Famous Five: Decision-Making by Five Male Asian Elephants in a Human-Dominated Landscape of southern India**

Nishant M. Srinivasaiah

National Centre for Biological Sciences, Tata Institute of Fundamental Research

Decision-making by Asian elephant appears to be determined at two levels, that of the population and, more importantly, the individual. Models based on decision-making by individual elephants have the potential to predict conflict in fragmented landscapes that, in turn, could aid in mitigating Human Elephant Conflict. Thus, we must try and understand individuals, in addition to populations, in our efforts to manage and conserve this threatened species, particularly in human-dominated landscapes. In my talk I would like to showcase the life and times of five individual male elephants, Ranga and four of his associates, in the human-dominated landscape of Bannerghatta, Eastern Ghats, India. The behavioral decisions these elephants make, as reflected in their residence time and group dynamics in response to resource availability and human activity in their habitat is presented using recursive partitioning classification trees based on behavioral observations. At a general population level, the behavioral decisions appeared to be guided by the age and group-type of the male elephants. At the individual level, the observed variation could be explained only by the idiosyncratic behaviors of individuals and that of their associating conspecific individuals.

2:15pm-6-06 **Behavioral indicators of motor and sensory lateralization in studies with dogs, cats and chimpanzees. Does lateralization of various functions of the cerebral hemispheres depend on the species?**

Maciej Trojan

Department of Animal Behaviour, Faculty of Psychology, University of Warsaw

Originally lateralization of the cerebral hemispheres was considered as a phenomenon which differentiates a man from other species. Nowadays we know that it is not a feature unique to the human brain, furthermore in some species it is far more developed than in a man. This concerns, for example, migratory birds that are sleeping during flights, orientation in space, the response to the threat, etc. Lateralization refers to the motor reactions and the senses collecting information from the environment. We can talk about it on the level of specific individuals but also as a feature typical of the species. Differences in motor lateralization depend on the individual characteristics, but also complexity of the task. Motor lateralization rate can be an indicator of learning effectiveness, for example of dogs trained to work with a human. In the case of sensory lateralization, stimulus type may be crucial for the activation of receptors transmiting impulses more to the left or right hemisphere. The key in this case may be, both the type and complexity of the stimulus and its importance to the receiver. In our research we focused on the problem of complexity of the task or stimulus. We wanted possibly the widest comparison of these processes in different species.

Poster Presentations

Saturday (5:30pm-7:00pm): Odd Numbers
Sunday(5:30pm-7:00pm): Even Numbers

P-1 The role of serotonin neurons in escalated aggression induced by social instigation

Aki Takahashi [1], Kenji F. Tanaka [2], Akihiro Yamanaka [3], Tsuyoshi Koide [1]
[1] Mouse Genomics Resource Laboratory, National Institute of Genetics, [2] Department of Neuropsychiatry, School of Medicine, Keio University, [3] Department of Neuroscience II, Research Institute of Environmental Medicine, Nagoya University

Social instigation is known to increase aggressive arousal in many animal species. In this procedure, resident male is exposed to a potential rival male which is in the protected cage, and thus resident can see, smell, and hear the existence of the rival but cannot physically attack it. After 10 min of social instigation, we confirmed that resident male mice showed clear increase of aggressive behavior at the following aggressive encounter. By using in vivo microdialysis, we showed that this social instigation procedure caused an increase of serotonin (5-HT) releases in the dorsal raphe nucleus (DRN). This indicates that the social provocation induces an excitement of DRN 5-HT neurons, and this enhancement of 5-HT release may be the cause of escalated aggression of male mice. To examine this possibility, we are currently examining the role of the DRN 5-HT neuron activity during the social instigation by using optogenetic technique.

P-2 A rubber tail task in mice: effect of spatial location of the rubber tails

Makoto Wada [1,2], Hiroki Ora [1,3], Kouji Takano [1], Kenji Kansaku [1,3]
[1] Sys Neurosci Sect, Dept Brain Rehab, Res Inst of NRCD, [2] Dev Disorders Sect, Dept Brain Rehab, Res Inst of NRCD, [3] Brain Sci Inspir Life Supp Res Cent, Univ of Electro-Communications

Feeling ownership of our limbs represents a fundamental aspect of self-consciousness, and in some circumstances, the feeling is extended out of our own body, as in the rubber hand illusion (RHI). We have developed a rubber tail task in mice, aiming to evaluate their body ownership, and reported a RHI-like phenomenon (Wada et al., 2014). In this study, we prepared 2 rubber tails, and placed them in right and left sides. We synchronously stroked one of the rubber tail and the real tail. In condition 1, the rubber tail that was not stroked was grasped; and in condition 2, the stroked rubber tail was grasped. The responses of the mice were evaluated. The response rates in condition 1 were significantly smaller than the response rates in condition 2 ($p < 0.001$, $n=5$). The result suggests that the RTI-like phenomenon relates to spatial attention, as suggested by RHI in humans.

P-3 How Chimpanzees (*Pan troglodytes*) respond to expected values?

Yoshiki Kurosawa, Masaki Tomonaga
Primate Research Institute, Kyoto University

Prospect theory describes human behaviors deviating from expected utility theory, whereas in traditional economics, rationality is investigated on the basis of expected utility theory. To study evolutionary origin of such anomalies, we investigated chimpanzees' attitudes toward expected values. We presented chimpanzees options producing different amounts of small pieces of apples with various probabilities, and examined which one they preferred to. In the first experiment, chimpanzees were given two options: option A, 2 apples with 50% probability; option B, 1 apple with 100% probability, and they preferred to the option B. In the second experiment, two options given to chimpanzees were: option C, 2 apples with 100% probability; option D, 1 apple with 100% probability, and they did not show any systematic preferences. These results indicate that chimpanzees do not have a simple preference based on expected values and they are more strongly affected by probabilities than by quantities of rewards.

P-4 Characteristics of tool use by common marmosets (*Callithrix jacchus*) and variables relevant to individual differences

Yumiko Yamazaki [1,2], Chieko Echigo [3], Masakado Saiki [2], Masayuki Inada [2], Shigeru Watanabe [3], Atsushi Iriki [2]

[1] Advanced Research Centers, Keio University, [2] Laboratory for Symbolic Cognitive Development, RIKEN Brain Science Institute, [3] Department of Psychology, Faculty of Letters, Keio University

Through a systematic step-by-step training protocol, we have shown that captive common marmosets could stably acquire tool use behavior (raking), though there is no report of tool use in wild (Yamazaki et al. 2009). We analyzed the several behavioral characteristics of their performance, including number of trials required, velocity of the tool tip, and hand use. In addition, individual profiles, such as age, nursing condition, and body size, were analyzed to see whether these variables had any influence on their acquisition of the behavior. We found that velocity of tool tip decreased as the training proceeded, which was common in all subjects. Preferential hand for grasping tool varied in individual subjects, and there was no trend for left or right dominance of hand use, suggesting that hands for tool use were mostly determined by spatial relationships between the tool shaft and the food item to be retrieved.

P-5 On the effects of varying body weight and kinds of grain as reinforcers in VR schedule on food intake behaviour of a pigeon (*Columba livia*)

Ken'ichi Fuji

Department of Psychology, Ritsumeikan University

One pigeon (PH006) was used to investigate the effects of varying body weight and kinds of grain in VR173 schedule on food consumption.Five kinds of grain, i.e. soybean, safflower, corn, sorghum and mixed feed, were used as reinforcers. Four conditions of body weight were used: 94%, 87%, 80% and 100% ad-lib body weight (Fuji, 2013).From 80% to 94% ad-lib body weight, the pigeon decreased the rate of intake energy (kcal) per session per body weight (g) in all grain.However, the ratios of decline of each grain were almost same (soybean 0.001 kcal/g/Δ%, safflower 0.001 kcal/g/Δ%, corn 0.001 kcal/g/Δ%, sorghum 0.001 kcal/g/Δ%, and mixed feed 0.0006 kcal/g/Δ%).From 80% to 94% ad-lib body weight, the rates of number of responses per intake energy (kcal) were not affected by body weight (mixed feed 170-160 resp/kcal, sorghum 230-240 resp/kcal).

P-6 Acquisition of tool-use behavior in rats

Akane Nagano [1], Kenjiro Aoyama [2]

[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

Tool-use behavior has been observed in non-human animal species in the wild and in experimental settings. In the present study, we showed that rats can be trained to use the tools to obtain the food in an experimental setting. Long-Evans rats were trained to use the rake-shaped tool to retrieve a food beyond the rats' reach. In the first phase, the reward was placed between the tool and the rat so that rats can retrieve the reward simply by pulling straight the tool. In the next phase, the reward was placed at the side of the tool so that the rat had to move the tool laterally before pulling it.All rats could use the tool to obtain the reward in both phases. The rats could move the tool according to the position of the reward. The results indicate that rats can use tools by training in an experimental setting.

P-7 Temporal order memory in spontaneous object exploration paradigm in rats: effect of number of items

Manami Sugita, Kazuo Yamada, Yukio Ichitani

Faculty of Human Sciences, University of Tsukuba

Temporal order memory in rats was analyzed by use of spontaneous object exploration. The task consisted of two or three sample trials and one test trial (5 min, respectively). In each sample trial, two identical objects were placed in an open field and the rat explored them. Different objects were used for each sample trial. The interval between sample trials was 11 min in two sample-trial condition, and 3 min in three sample-trial condition. After the delay of 3 min, the test trial started. One object from the first and one object from the last sample trials were presented. In both two and three sample-trial conditions, rats explored the object which they encountered in the earlier sample trial longer. These results suggest that rats could discriminate the order of objects in this paradigm regardless of the number of items.

P-8 Rats help their soaked cagemate even if they learned the help-related behavior by food reward

Nobuya Sato, Kazushi Tate, Maya Okada
Department of Psychological Sciences, Kwansei Gakuin University

To examine the relative value of helping distressed conspecific in rats, we tested choice behavior of the rats between helping action and food reward. The rats were trained to open a circle shaped door to help their cagemate from a soaking situation or to obtain food reward. After the training, the rats were tested on which of two doors they chose. One of the doors opened into the cagemate's room, and the other opened into the food room. In most of the test trials, the rats trained by helping cagemate firstly opened the door to their cagemate. The rats trained by food reward also opened the door to their cagemate first in a half of the test trials. These results suggest that for rats, the value of helping behavior is relatively high.

P-9 Suppression of gamma frequency oscillation by a selective blocker of kainate-type glutamate receptor in CA3 region of mouse hippocampus.

Etsuko Suzuki [1,2], Haruyuki Kamiya [1]
[1] Department of Neurobiology, Graduate School of Medicine, Hokkaido University, [2]JSPS

Gamma frequency oscillation (GFO: 20-80 Hz) is a robust synchronous activity of neurons. GFO in the hippocampus are thought to be important for memory encoding and retrieval. *In vitro* experiments, GFO is induced by application of low concentration of kainic acid (KA), an agonist of kainate-type glutamate receptors (KARs). However, it is still unclear about a role of KARs in the generation of GFO. In this study, we examined a role of KARs on GFO using ACET, a selective blocker of KARs. Acute hippocampal slices were obtained from C57BL/6J mice. Local field potentials were recorded from the pyramidal cell layer of the CA3 region. Application of low concentration of KA induced robust oscillation at a frequency range of GFO. This KA-induced GFO is almost suppressed by co-application of ACET. These results suggest that the activation of KARs is required for the generation of network activity during GFO.

P-10 Perseverative behavior and impaired detection in sensory information processing with the social and non-social situation of the model mice for autism

Kana Okada [1], Kota Tamada [2,3], Asami Ujita [1], Jin Nakatani [4], Toru Takumi [2,3,5], Shogo Sakata [1]
[1] Department of Behavioral Science, Graduate School of Integrated Arts & Science, Hiroshima University, [2] Graduate School of Biomedical Sciences, Hiroshima University, [3] RIKEN Brain Science Institute, [4] Biomedical MR Science Center, Shiga University of Medical Sciences, [5] JST, CREST

The duplication of chromosome 15q11-13 is considered as the most frequent cytogenetic abnormality in ASDs, and this genetic change has been modeled in mice as the paternally duplicated mice (*patDp/+*). *patDp/+* mice display the major behaviors seen in ASD, while the underlying mechanisms of their behavioral abnormalities are remaining unknown. This study addressed the neural and cognitive mechanisms that cause autistic-like behaviors in *patDp/+* mice. The results indicated that *patDp/+* mice showed perseverative behavior and aberrance in detection of novelty or deviance with social and non-social situation. During the deviance detection, *patDp/+* mice showed the abnormalities in evoked local field potential, suggesting the deficit of attentional auditory processing in the cortex. A recovery effect of a cholinergic drug was found only in deficit of novelty detection with objects and stimulus-mice. Degenerated sensory processing of *patDp/+* mice might lead the behavioral inflexibility and provide the underpinnings to various symptoms in ASD

P-11 Post-conflict and post-allopreening interaction in large-billed crows (*Corvus macrorhynchos*)

Eri Miyazawa, Ei-ichi Izawa
Department of Psychology, Keio University

Post-conflict (PC) interactions as a social solution to reduce the cost associated with conflicts have been reported in various gregarious animals. Post-conflict (PC) redirected aggression and bystander-initiated post-conflict affiliation are suggested to function for the original victim and the bystander to reduce the likelihood to receive the future aggression, respectively. These PC interactions have been examined primarily in primates but recently reported in corvid birds. In this study, we investigated whether these PC interactions occurred in two captive flocks of large-billed crows. Time course of post-conflict interactions involving victims and bystanders were analyzed by considering allopreening as affliative behavior. We did not yet find either evidence of redirected aggression or bystander-initiated affiliation at the 'subadult' stages. We will further perform the similar analysis at the adult stage of the same flocks and compare the results with considering the different social structures between the stages.

P-12 Blue Effect in Red Ruffed Lemurs (*Varecia rubra*)

Sana Inoue [1], Izumi Shindo [2]
[1] College of Bioresource Sciences, Nihon University, [2] Nogeyama zoological gardens

We found red ruffed lemurs may have an aversion to the color blue in solid colored squares still not in photographs of flowers in previous research. To explore the effect, we introduced two types of trials using different types of stimuli, photographs of flowers cutting out from background and colored alphabet letters on a black background, to two subjects housed at Nogeyama zoological gardens. Subjects showed avoidance-like behavior with the blue flower while the effect didn't appear in photographs of flowers with background in previous research. Meanwhile, their performance on trials with colored alphabet suggested that this was not merely a general aversion to the color blue compared with solid colored squares. These findings suggest that red ruffed lemurs may have an aversion to the color blue as we found in previous research, but this aversion may reduce with other cues presented together.

P-13 Mismatch negativity-like response on stream segregation in spontaneously hypertensive rat (SHR) as an animal model of ADHD.

Noriko Saka [1], Toshikazu Shinba [2], Hiroaki Kubo [3], Midori Nabeta [1], Miho Hayashi [4], Hiroshi Kimura [5], Go Mugishima [1]
[1] Fukuoka Prefectural University, [2] Shizuoka Saiseikai General Hospital, [3] Kyushu University, [4] National Hospital Organization Kyushu Cancer Center, [5] Waseda University

Attention-deficit hyperactivity disorder (ADHD) is defined by the core symptoms of hyperactivity, impulsivity, and inattention. Spontaneously hypertensive rat (SHR) shows also hyperactive tendency, so it has been widely investigated as an animal model of ADHD. Mismatch negativity (MMN) which reflects preattentive process is elicited in a passive oddball paradigm by the tone changes on a train of sounds even if on a stream of segregating pereception in human (Sussman et al., 1998). Some studies reported the differences of amplitude or latency of MMN between the children with ADHD and controls. In this study, we investigated whether MMN-like response was shown or not in the condition of auditory stream segregation in SHR. As a result, it was suggested that there may be the unstability of auditory stream segregating perception, reflecting the dysfunction of preattentive processing in SHR.

P-14 A study on making 3DCG animation of medaka

Tomohiro Nakayasu, Eiji Watanabe
Laboratory of Neurophysiology, National Institute for Basic Biology

Investigations of the aggregations of fishes, or shoals, have employed several experimental techniques, including live stimuli, mirror, computer still images and videotaped images. Although each technique has its own advantages, researchers have difficulty in finely controlling and manipulating a variety of features (morphological and behavioral) of complex stimulus. However, computer animations allow us to manipulate systematically both morphological and motion cues. Therefore, we constructed 3DCG animations of medaka on the basis of the tracking coordinate data of real medaka. These animations enable us to depict medaka faithfully and undertake a more detailed analysis of properties of visual stimuli which are critical in the induction of shoaling behavior.

P-15 Serial learning and metacognition in a white-handed gibbon (*Hylobates lar*)

Masayuki Tanaka, Kanae Shimada, Masayuki Matsunaga
Center for Research and Education of Wildlife, Kyoto City Zoo

A cognitive task has been conducted in an adult male white-handed gibbon in Kyoto City Zoo. The subject was 25 years old at the beginning of the task. The task was a serial learning with Arabic numerals. When the subject touched all numerals in ascending order, the subject was given a piece of apple. Touching an "incorrect" numeral was followed by blackout screen. Another schedule ran parallel with the task. Whenever the subject uttered repeatedly, he was given a piece of apple. The experiment was conducted from March to September. In the experiment, five kinds of sequence (i.e., 1-5, 1-6, 1-7, 1-8, and 1-9) were randomly intermixed. The subject uttered and got a reward significantly more often after "incorrect" feedback than correct, and that he also uttered significantly more often during the 1-9 trials than the other. The results suggest that the subject might "escape" the difficult trial for him.

P-16 Time-place learning with negative reinforcement in mice

Akihiro Shimbo [1], Shigeru Watanabe [2]
[1] Graduate school of Human Relations, Keio University, [2] Research Center for Human Cognition, Keio University

An ability that animal can associate time of day with place where an event happened is called time-place learning. The task for the time-place learning with positive reinforcement usually requires long training. I aimed at making a new task for fast time-place learning with negative reinforcement, electric shock. An experimental chamber consisted of two different compartments and animals have to learn relationship between time of day and a compartment where electric shocks are given. I trained mice (C57BL/6J) two trials per day (at 11 a.m. and 5 p.m.) in 8 days. The test trial are also performed two times in a day, and I measured staying time for each compartment in 5 min. The mice stayed longer in one compartment at the time when electric shocks were given the other compartment.

P-17 Is interval timing modified by conditioned fear in rats?: An investigation using a self-start short/long discrimination task

Taisuke Kamada [1], Toshimichi Hata [2]
[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

We investigated the impact of conditioned fear on interval timing in rats. Trials started with the presentation of one of two levers (lever S). After the rat pressed the lever, it was retracted and a to-be-timed tone (its duration was 2-s or 8-s) was presented. Following tone presentation, both levers were presented simultaneously and rats had to choose correctly between them: the response to lever S was reinforced following a 2-s tone, whereas the other lever was reinforced following an 8-s tone. Following sufficient trainings, rats always initially stayed in front of lever S, and after a period of time ("switch latency"), they shifted toward the other lever during the 8-s tone. When the to-be-timed tone was paired with an electrical foot-shock, both switch latency and its SD increased, suggesting that the duration of the fear-inducing stimulus was underestimated and temporal sensitivity was impaired.

P-18 Appetitive classical conditioning and absence of latent inhibition in Japanese fire belly newts

Tohru Taniuchi, Hiroaki Sano
School of Humanities, Kanazawa University

The present study examined classical conditioning in Japanese fire belly newts. Newts were housed individually in an alley-like cage which had a middle dark place and bright areas in both ends. An object stimulus was presented as CS for five min. in one end and then a food US was presented in the opposite end. One trial was given per day. Reliable sign tracking response to CS was developed compared to a control condition in which CS was unpaired with US. This result provides first evidence of appetitive classical conditioning in amphibians. In a next experiment, the effect of CS pre-exposure was examined. CS was presented 10 times per day without US for seven days prior to conditioning. Retardation of conditioning by CS pre-exposure (latent inhibition) was not observed compared to a control condition with no CS pre-exposure.

P-19 Cross-modal transfer of oddity discrimination learning in rats

MD. Abu Bokor Siddik, Tohru Taniuchi
Graduate School of Socio-Environmental Studies, Kanazawa University

The present study examined acquisition and transfer of oddity discrimination learning in rats. Four rats were trained with oddity discrimination tasks in which rats were required to discriminate an odd stimulus from three identical stimuli (e.g., AAAB). Two rats learned concurrent training of 30 tasks made from six different objects (A, B, C, D, E, and F) and showed reliable transfer to novel stimuli (GGGH or HHHG). We also examined a cross-modal transfer of the object discrimination to an odor discrimination for a rat. Identical objects (erasers) with two different odors (odors 1 and 2) were presented on test trials (1112 or 2221). The rat showed reliable performance on the test trials. A similar result was replicated for additional test sets consisting of odors 3 and 4 (3334 or 4443). These findings of cross-modal transfer of oddity discrimination strongly suggest abstract relational learning in rats.

P-20 Sense of agency in rhesus monkeys (*Macaca mulatta*)

Koji Toda [1,2], Geoffrey Adams [1], Jean-Francois Gariepy [1], Michael Platt [1]
[1] Department of Neurobiology, Duke University School of Medicine, [2] Japan Society for the Promotion of Science

We asked whether rhesus monkeys (M*acaca mulatta*) show evidence of self-agency in a two-stage joystick-movement task. Each trial consisted of a manipulation stage and a subsequent choice stage. In the manipulation stage, two dots and a target were presented on the display. Movement of one dot was correlated with the monkey's manipulation of a joystick (avatar), while the movement of the other dot replayed the manipulation from the previous trial. Monkeys were required to move the avatar to the target. In the subsequent choice stage, monkeys were required to choose the avatar they operated in the manipulation stage by moving a dot to one of two targets. Two monkeys learned to detect and choose the avatar. The results suggest monkeys have a sense of agency, thus permitting direct investigation of the neural basis of self-agency.

P-21 Kinematics of neck-reaching in large-billed crows (*Corvus macrorhynchos*): A preliminary study

Hiroshi Matsui, EI-Ichi Izawa
Department of Psychology, Keio Unversity, Tokyo

Reaching is one of the basic components of motor skills and is known, in primate, as arm movement under the control of online-monitoring within stable vision. This vision-guided arm-reaching is enabled by anatomical separation of head and arm, while avian neck-reaching inevitably produces unstable vision due to anatomical unseparation of eyes and bill both on the head. However, it remains unknown about sensory-motor mechanisms of avian neck-reaching. Crows are one of the ideal subjects to investigate such mechanisms because they show dexterous skills like tool use. To verify visuo-motor mechanisms, kinematic analysis was performed on neck-reaching of large-billed crows (*Corvus macrorhynchos*) to a piece of cheese at various distances. We found that the increase of movement time dependently on distance but the decrease of velocity as approaching to the target independently of distance. Moreover, convergent eye-movement during approaching was found. These suggest vision could modulate velocity irrespective of reaching distance.

P-22 A competitive task attenuates the dysfunction of skilled movement in the animal model of Parkinson's disease

Yayoi Sekiguchi [1], Toshimichi Hata [2]
[1] Graduate School of Psychology, Doshisha University, [2] Faculty of Psychology, Doshisha University

We examined the effect of performing a competitive task on motor function in a 6-hydroxydopamine (6-OHDA)-injected rat model of Parkinson's disease (PD). In the competitive task, the PD model rats faced another well-trained healthy rat across a transparent wall and competed for a food with the rat in "first-come, first-served"basis. We tested their motor functions in two tasks, a skilled reaching and a skilled walking test, which required the motor movements similar or dissimilar to those of the competitive task, respectively. PD and control rats with the competitive task maintained their scores of skilled reaching test, whereas rats without the task showed moderate score declines. The competitive task, however, did not rescue the scores of skilled walking test, which involved movements dissimilar to those utilized for the competitive task. These results suggest that a competitive task might be suitable for rehabilitation for PD patients'movement function.

P-23 Response chaining training of miniature pigs

Ryousei Ueno [1], Tohru Taniuchi [2]
[1] Farm of Ishikawa Prefectural University, [2] Graduate School of Socio-Environmental Studies, Kanazawa University

We examined whether miniature pigs could learn a complex response chain consisting of three response units with a view to developing it to a self-start discrimination task. The first unit was a response to an object on the far side of an experimental cage and it was reinforced by a conditional reinforcer (bell sound). The second unit was a moving response to a place in front of a response panel at the opposite side of the cage and it was reinforced by a conditional reinforcer (house light). The third unit was a discriminative response to the left or right sides of the response panel and it was reinforced by a food reward. Two pigs were trained to complete these response units by a backward chaining method. The pigs accomplished the chaining task with forty days. It took 24 minutes on average to complete forty trials in the last training session.

P-24 Chronic treatment of CX546, an AMPA receptor positive modulator, alleviates stress-induced enhancement of fear in rats

Masaharu Ueno [1], Kazuo Yamada [2], Yukio Ichitani [2]
[1] Graduate School of Comprehensive Human Sciences, University of Tsukuba, [2] Faculty of Human Sciences, University of Tsukuba

Exposure to stressful events affects subsequent sensitivity to fear. We investigated whether the chronic administration of (2,3-Dihydro-1,4-benzodioxin-6-yl)-1-piperidinylmethanone (CX546), an AMPA receptor positive modulator, attenuated the sensitization of fear induced by traumatic stress. Wistar-Imamichi male rats were subjected to a multiple stress (MS) session, which consisted of 4 foot shocks (1 mA, 1 s) and forced swimming for 20 min, followed by exposure to situational reminder 7 days after the MS. CX546 (0.1 mg/kg, i.p.) was administered once a day for 10 days after the MS. The open field test and the contextual fear conditioning were performed 11-13 days and 17 days after the MS, respectively. Rats exposed to the MS exhibited a higher level of emotional responses in the open field test, but not in the fear conditioning. Chronic CX546 treatment alleviated the MS-induced enhancement of emotional responses. These results suggest AMPA receptor modulation is involved in recovering from stress.

P-25 On the subjective equivalence between amount and delay in EL mouse as an animal model of ADHD

Hiroaki Kubo [1], Hiroshi Kimura [2], Koichi Nakano [3], Tomoyuki Nagai [3], Haruka Nomiyama [3], Natsumi Hayashi [4], Yurie Nakamoto [5], Mitsunobu Yoshii [5], Go Mugishima [3]
[1] Kyushu University Hospital, [2] Waseda University, [3] Fukuoka Prefectral University, [4] Kitakyushu City Children's Counseling & Guidance Center, [5] Tokyo Metropolitan Institute of Medical Science

ADHD is a developmental disorder whose characteristic symptoms are inattention, hyperactivity, and impulsivity. Under delay discounting situations, it is called “impulsive” when preferring sooner-smaller reward to later-larger reward. This task is regarded as an index of impulsivity. In the series of our studies on validity of EL mouse as an animal model of ADHD, it is suggested that it shows impulsivity under delay discounting situations. In this present delay discounting study, DDY mice (control) and EL mice were exposed to some combinations of amount and delay. The purpose of this study was to investigate the point where amount and delay were psychologically equivalent. This result may help us to examine the behavior of animal model of ADHD more precisely and we might be able to find the key of treatment and education of ADHD.

P-26 Do budgerigars (*Melopsittacus undulatu*) experience amodal completion?

Sota Watanabe [1,2], Kazuo Fujita [3], Masato Ishida [1]
[1] Course for School Teachers, Osaka Kyoiku University, [2] Japan Society for the Promotion of Science, [3] Faculty of Letters, Kyoto University

In recent studies, researchers have examined whether nonhuman animals experience amodal completion. Here, we asked whether budgerigars experience amodal completion in the same experimental situation as was used for pigeons, humans (Fujita and Ushitani, 2005) and bantams (Nakamura, Watanabe, Betsuyaku, Fujita, 2010). We first trained two female budgerigars to choose and peck to a chipped lozenge from four red lozenges. Next, we superimposed a white small square around each red squares. In the probe test trials, the square was at the punched side of the target lozenge and there was little or no gap between each lozenge and square. The results suggest that, in contrast to the previous studies, our subjects did not generalize the training task to the test stimuli. Further experiments replacing stimulus form or variation will be needed to address that issue.

P-27 Failure of backward conditioning is not attributed to a performance deficit

Atsuhito Yamagishi [1], Nobuya Sato [2]
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It has been thought that backward conditioning hardly produces conditioned responses. However, Barnet, Cole, and Miller (1997) reported backward conditioning produced an association between a conditioned stimulus and an unconditioned stimulus which reinforces a secondary stimulus. The results suggested that the failure of backward conditioning as known was to be interpreted as a performance deficit. In this study, we attempted to replicate their experiments. Rats were trained to make licking responses, and were presented to click-shock pairings during first-order conditioning. Subsequently, they were presented to tone-click pairings during second-order conditioning. The rats were divided into forward, backward, and unpaired conditioning groups in the first-order conditioning phase. As the result, conditioned suppression of licking responses was observed in the forward, but not in the backward and unpaired groups. These results suggest the failure of backward conditioning is not attributed to a performance deficit.

P-28 Effect of retention interval on the acquisition of temporal order discrimination in radial maze in rats

Taichi Hatakeyama [1], Yukio Ichitani [2], Kazuo Yamada [2]
[1] University of Tsukuba Graduate School of Comprehensive Human Sciences, [2] Faculty of Human Sciences, University of Tsukuba

To investigate how long rats can retain memory of temporal order of their experience, temporal order discrimination using a radial maze in rats was analyzed. The task consisted of a study phase in which five arms were presented sequentially (1 min between choices) and, after different retention intervals (1－60 min), a test phase in which the first and last of these were simultaneously presented and the rat had to choose the arm presented earlier. Most of rats could acquire the task with 1 min, but not with 10 and 60 min, retention interval. However, when they were trained gradually with longer intervals, some rats could correctly discriminate the two arms even after longer interval of more than 2 min. Results suggest rats can retain temporal order memory for 1 min, and even longer than 2 min depending on the training procedures.

P-29 The development of endocrine stress response in early socialization period is associated with that in adulthood in dogs.

Miho Nagasawa [1], Yoh Shibata [2], Akiko Yonezawa [3], Tomoko Morita [3], Masanori Kanai [3], Kazutaka Mogi [2], Takefumi Kikusui [2]
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Endocrine stress response has been shown to be inhibited in a specific period of the early life of mammals; so called the stress-hyporesponsive period (SHRP). The SHRP has a significant influence on the appropriate development of infants' behavior and endocrine function. In this study, the presence of SHRP in dogs was assessed by measuring the changes in urinary cortisol levels during 5-min separation test in their early socialization period. An increase in cortisol after separation was found after 5 week-old, suggesting that the SHRP persists until 4 week-old in dogs. These puppies were under 1-year follow-up study and we found that the puppies whose SHRP continued until 5 week-old showed the rapid recovery of stress response under the novel environment in their adulthood. These suggest that the endocrine development changes at approximately 5 week-old in dogs and this developmental changes influence post growth adaptableness to stress experiences.

P-30 Transitive responding for conspecific stimuli in rat

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Transitive responding has been demonstrated in various species using visual or olfactory stimuli. By contrast, some of the studies with birds or fish have demonstrated transitive responding for conspecific stimuli. We examined whether rats could acquire premise discrimination tasks for transitive inference in which conspecifics were used as discriminative stimuli. A rectangular discrimination box was divided into two compartments by a central partition with a guillotine door. One of two stimulus rats was placed in either compartment. A subject rat could explore both compartments freely for 60 s and was reinforced if it had stayed in the side with a positive conspecific at the end of the trial. Rats could acquire the premise discrimination tasks consisting of five conspecifics (A+B-, B+C-, C+D-, and D+E-). We will report results of B+D+ transitive test.

P-31 Were cynomolgus monkey females with more gravidas chosen by males?

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In a breeding and rearing colony of cynomolgus monkeys (*Macaca fascicularis*) at Tsukuba Primate Research Center, we designed one male stays every other day alternately with each of two females. 8 sets of the female pair (8 multiparous, 8 nulliparous were various combinatorial sets) were examined in respect of vagina smear to investigate whether copulation was successful or not by confirmation of sperm on the next day after being housed with a male. In addition, we observed behaviors in some female pairs. Six out of eight multiparous were confirmed copulation by sperm, but none of eight nulliparous females have never showed evidence to mate with a male. In consideration of a result of behavior the male preferred the female with more past gravidas in order to achieve copulation to become pregnant in near future. Male may win reproductive success by his choosing and mating with a female.

P-32 Sex differences in ultrasonic vocalizations of mice

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Only few studies have reported sex differences in ultrasonic vocalizations of mice. We investigated the relationships between ultrasonic vocalizations in ICR mice (nine male-male pairs and seven female-female pairs) and their behaviors using the resident-intruder test paradigms for 8-min period. The behaviors of residents were classified into seven types, and the syllables of vocalizations in residents or intruders were classified into twelve. The overall ultrasonic vocalization rate in females was over ten times as much as that in males. The percentage of the types of syllables depended on the types of resident's behavior and sex. We assume that the "up" type of syllables are used by females for contact signals, because the percentage of "up" was high in all the non-aggressive situations.

P-33 Roles of alpha and beta estrogen receptors in regulation of emotion-related behavior by chronic treatment of estradiol in female mice

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Many findings suggest estrogens have effects on emotion-related behavior from facilitating to suppressing it. Having demonstrated chronic treatment of estradiol benzoate (EB) at higher doses was especially facilitative for the emotion-related behavior in female mice (Hatachi & Tomihara, 2011), in the present study, we investigated the roles of 2 types of estrogen receptor (ER), ERα and ERβ, on the facilitative effects of EB by using selective agonists of these subtypes. The continuous treatments of the selective agonist of ERα, propylpyrazole triol, over 2 weeks increased anxiety- and fear-related behavior of ovariectomized female mice in elevated zero-maze and fear conditioning tests, comparable with higher dose EB. In contrast, the treatments of the ERβ agonist, diarylpropionitrile, merely suppressed the emotion-related behavior. These results suggested that the enhancement effects of chronic EB on emotion-related behavior were mediated by ERα, but not ERβ.

P-34 Effects of adrenalectomy on estradiol-induced enhancement of emotion-related behavior in female mice

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Recently we demonstrated that chronic treatment of estradiol benzoate (EB) at higher doses increased the emotional behavior in female mice (Hatachi & Tomihara, 2011). Chronic EB treatment also increased the corticosterone level (Weiser & Handa, 2009), and the stimulation of glucocorticoid receptor caused higher anxiety-like behavior (Weiser et al., 2010). Therefore, we investigated the effects of adrenalectomy on the anxiety- and fear-related behavior of ovariectomized female mice which subcutaneously implanted a Silastic capsule containing either vehicle or varied doses (0.5μg or 50μg/0.1 ml) of EB. Two weeks after the operation, elevated plus-maze, open field, light-dark transition, and fear conditioning tests were conducted. The day after the last behavioral test, blood from the subjects was collected to assay for corticosterone concentration. The results suggested that hypothalamic-pituitary-adrenal axis was involved in the estrogenic regulation of the emotion-related behavior.

P-35 A case study of successful human intervention to maternal neglect by the common marmoset (*Callithrix jacchus*)

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Common marmosets deliver a few offspring at one birth. Healthy infants climb and cling the trunk of their mother just after the birth. In return, the mother takes care of them in collaboration with their father, while the father can not provide breast-feeding. Here we report one abandon case of infant-care among 19 deliveries by the marmoset. The mother was the first delivery and the father had an experience of co-breading. The mother did not take of her infants for 6 hours after the delivery, then we (human care-takers) put the infants on the mother's breast so that natural sucking begun. We carried out lactational assistances three times. Then the mother started appropriate infant-care. The mother that had been reluctant to be held by the infants increased frequency of carrying infants abruptly. In addition, the mother decreased the frequency of self-scratching when the infants were clinging on the mother's back.

P-36 The role of temporal pitch patterns and vocal-tract resonances for discriminating individuals in morphed coo calls of Japanese macaques

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Monkeys could discriminate individuals only by listening to the vocalizations, but it has been still discussed how the fundamental frequencies (F0) and vocal-tract characteristics (VT) can contribute to discriminating individuals. The purpose of this study was to investigate the acoustical properties for discriminating individuals in Japanese macaques. Two animals were trained with standard Go/NoGo operant conditionings to discriminate coo calls of Monkey A (cooA) and Monkey B (cooB). Test stimuli were synthesized by combining F0 and VT from each individual (F0cooA-VTcooB was synthesized from F0 of cooA and VT of cooB, while F0cooB-VTcooA was created from F0 of cooB with VT of cooA). As results, monkeys responded F0cooA-VTcooB similar to the response for cooB, while animals responded to F0cooB-VTcooA like the response to cooA. Data suggested that VT was important for discriminating individuals who made coo calls in Japanese macaques.

P-37 The early history of captive chimpanzees in Japan

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The Great Ape Information Network（GAIN）aims to create a database of high quality and transparency on great apes in Japan. As of May 1st, 2014, 323 chimpanzees of 51 facilities are living in Japan, all of which are registered in the studbook by Japanese Association of Zoos and Aquariums (JAZA). In addition to these, the GAIN database has a record of unregistered individuals. The first record of a living chimpanzee in Japan is an individual brought by an Italian circus in 1921. In 1926, two chimpanzees were brought by a foreign visitor arrived Yokohama port. One of the two was a male infant later called Taro, the first record of a zoo exhibition in Osaka 1927. About 30 chimpanzees may have entered to Japan from abroad before World War II.

P-38 The activity of c-Fos and EGR-1 in the dorsal striatum increases during memorization of duration

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We investigated the number of c-Fos- or EGR-1-immunoreactive (IR) cells in the dorsal striatum during memorization of duration in rats. In the original learning, a response to the lever S was reinforced after a 2-s (short) but not 8-s (long) to-be-timed tone, whereas that to the lever L was reinforced after an 8-s but not 2-s tone. Following sufficient trainings, the duration of the tones were changed to 4-s (short) and 16-s (long) in one (Exp) group but not in the other (Cont) group (a "time-shift session"). Ninety-minutes after finishing the time-shift session, animals were sacrificed and the brain tissues were immunohistochemically stained with a c-Fos or EGR-1 antibody. In the Exp group, the number of c-Fos- or EGR-1-IR cells in the dorsal striatum were higher than the Cont group, suggesting that the dorsal striatum involves in the memorization of duration.

P-39 Tanganyikan cichlid, Julidochromis transcriptus, can infer their social status by using transitive inference

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Transitive inference (TI) occurs when information about known relationship is used to construct novel associations, for example, if A＞B and B＞C then A＞C. TI about dominance relationship has been documented in some vertebrates. However, these experimental designs applied the same order, i.e. at first C was defeated by B (B＞C), then C observed that A defeated B (A＞B). Some claims that since C was defeated at first, C watched with interest. So, in this study, we demonstrate the ability of TI by changing order. We use cooperative cichlid, *Julidochromis transcriptus*, from Lake Tanganyika which has the ability of TI. The results show fish can infer their social status when it get information A＞B and B＞C. We suggest that the high social fish eavesdrop contest around their territory.

P-40 Asymmetric generalisation of length in the rat

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A common assumption in various theories of learning is that acquisition of a discrimination between two stimuli is not affected by which of them signals a reinforcer. Kosaki, Jones, & Pearce (2013), however, previously reported an asymmetry in the acquisition of spatial length discrimination between long (L) and short (S) stimuli, with L+S- being acquired consistently more readily than S+L-. Here we investigated a potential mechanism by training two groups of rats with only single type of stimulus, either S (for group S) or L (for group L). When animals were subsequently presented with a choice of S and L, for the first time, group S showed a preference for L whereas group L did not show a corresponding preference for S. The results demonstrate asymmetric generalisation to longer and shorter stimuli, and further imply that similar mechanisms may underlie asymmetry in the acquisition of discriminations between stimuli along magnitude dimensions.

P-41 Position shift in a Japanese monkey (*Macaca fuscata*) induced by still pictures

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We reported the previous year that a Japanese monkey perceives a frame with leftward- or rightward-moving vertical stripes leftward- or rightward-shifted, respectively. This phenomenon is referred to as “motion-induced position shift,” and is an example of motion illusion as there is a gap between the frame’s physical position and the one perceived by the subject. We are now investigating whether or not this position shift will occur when a still photograph implying motion (e.g. walking woman, running race car, arrow mark) is presented instead of moving stripes. In training trials, a motion-implying static image is displayed on the left or right end of the CRT with touch screen, and the subject is required to report its location (left / right) by touching either left or right button. In test trials (probes), the picture is located midway. The experiments are currently being conducted, and the results will be reported.

P-42 The Effects of social contexts on Ultrasonic Vocalizations in C57BL/6J Mice

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Many strains of mice emit ultrasonic vocalizations (USVs). The USVs include various syllables which are units of vocalized sound. Previous studies reported that mice changed vocalization rates among syllable types according to their environment and development conditions. We therefore hypothesized that mice can modulate USVs depending on social contexts because mice produce a long series of various syllables particularly in communications. To examine this hypothesis, we recorded mice USVs in three conditions; same- and inter-sex communications. We found that male showed longer duration and lower peak frequency of syllables when male mice encountered female than when male encountered same-sex individuals. Consistent with these results, the male mice produced syllables with longer duration and lower frequency during mounting behavior than during other behaviors. These results indicated that the syllable patterns of mice USVs were changed depending on context-specific behavior, suggesting that USVs can play a context-specific role in each social context.

P-43 The effect of a 10-fold difference in reinforcer magnitude on pigeon's choice between different delays to reinforcer

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Studies of choice behavior in nonhuman animals have reported that the reinforcer magnitude has little effects on sensitivity to delay. A possible reason for the results is the reinforcer magnitude has been manipulated in a relatively small range. The present study examined the effect of a 10-fold difference in reinforcer magnitude on pigeons' choices between different delays to reinforcer with a concurrent-chains schedule. A single VI 15 s schedule was arranged for the initial link, and two FI schedules were arranged for the terminal links differing in the FI values (2 s vs. 2 s to 16 s). Reinforcer magnitude was manipulated between two conditions of 1 pellet vs. 1 pellet and 10 pellets vs. 10 pellets. As a result, the effect of the reinforcer magnitude on the sensitivity to delay estimated by fitting a generalized matching law to the choice data was not consistent between subjects.

P-44 Object sorting into a two-dimensional plane in humans and chimpanzees

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An object-sorting task was conducted in a face-to-face situation involving human children (2-5 years of age) and juvenile/adolescent chimpanzees as a comparative measure of cognitive development. Subjects were requested to place nine blocks of different categories (distinguished by three colors and three shapes) into three-by-three cells of a box. Humans above two years succeeded in making a one-to-one correspondence by placing a block in each cell while the end-state pattern remained random. Human children gradually increased their rate of categorical sorting; this tendency peaked at four years of age. Then, humans shifted to make completely even configuration. Chimpanzees showed complete or partial categorical sorting in 24%-43% of the precued trials. While older children and chimpanzees used both color and shape cues for categorical sorting, younger humans preferred to use shape cues. The results illuminated fundamental similarities between humans and chimpanzees in the basic level of categorical sorting.

P-45 Effects of methylphenidate administration on mismatch negativity-like response in spontaneous hypertensive rat (SHR) as an animal model of ADHD.

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Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder associated with alterations in the prefrontal cortex via dopaminergic and noradrenergic neurotransmission. Spontaneously hypertensive rat (SHR) shows also hyperactive tendency, so it has been widely investigated as an animal model of ADHD. Mismatch negativity (MMN) which reflects preattentive process is elicited in a passive oddball paradigm by the tone changes on a train of sounds in human and animals. Relatively low doses of methylphenidate sedate the symptoms including hyperactivity, impulsivity, and inattention in juveniles and adolescents with ADHD. In our previous report, methylphenidate had a possibility to improve the dysfunction of MMN-like response in SHR. This report aims to confirm that doses of methylphenidate effect on MMN-like response reflected of preattentive processes in SHR and WKY rat (control). As the results, 5 mg/kg or 10 mg/kg of methylphenidate elicited MMN-like response in SHR, but deprived this response in WKY on cortex.

P-46 Single dorsal raphe neurons encode appetitive and aversive stimuli in cynomolgus monkeys

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The serotonergic system is involved in value coding, emotional processing and affective disorders; however, its exact nature remains unclear. To investigate how neurons in the dorsal raphe nucleus (DRN), the major source of serotonin, encode appetitive and aversive stimuli, we recorded single-unit activity while cynomolgus monkeys (*Macaca fascicularis*) were conditioned in a Pavlovian procedure. The task consisted of appetitive and aversive blocks in which an unconditioned stimulus (reward or airpuff) was delivered probabilistically. We found that DRN neurons encoded different value signals with distinct time scales. First, they showed significant modulation in tonic activity depending on the block. Second, they also responded phasically to conditioned and unconditioned stimuli in both blocks. Some of these phasic responses represented an error between the obtained and expected values, so-called “prediction error” signal. The results suggest that the DRN plays an important role in processing convergent value information associated with appetitive and aversive stimuli.

P-47 Automatic classification of rat ultrasonic vocalizations suggests the existence of distinct vocalization patterns.

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Ultrasonic vocalizations around 50 kHz (USVs) of rats are recently suggested to contain ecological signals reflecting their emotional states. However, USV types had been classified manually in previous studies by visual inspection of spectrograms with different classification schemata, and this fact leads to difficulty in comparing findings from these studies. Here we proposed an automatic clustering method for the rat USVs with acoustic similarity indices. At first, we applied the preprocessing on several acoustical features which related with amplitude and frequency modulations of recorded USV dataset, and calculated a similarity matrix of them. Then, we conducted a hierarchical clustering by Ward method. The number of cluster was determined as the most consistent value among three indices that suggested best cluster number. As a result, six clusters were successfully derived by the proposed method, suggesting distinct patterns in rat vocalizations. (Supported by MEXT Grant #23118003 “Adolescent Brain”)

P-48 Do chimpanzees see a face on Mars? Pareidolia in chimpanzees.

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We perceive some forms of objects as “faces”. This is known to “pareidolia”. When the objects share the similar features to the faces (i.e., inverted triangular configuration), we readily perceive them as face. Pareidolia is one of good indicatives of specificity of face perception. We tested how chimpanzees perceive face-like objects using visual search tasks. The target was a face-like object or a picture of fruit. Pictures were presented with upright and inverted orientations, and with horizontally shifted arrangements. Both chimpanzees and humans showed significant decrement of performance when the pictures of face-like objects were horizontally shifted, which caused impairment of configural processing of faces. However this manipulation did not affect the performances when the target was the picture of fruit. These results suggest that chimpanzees perceived face-like objects as faces, and share the same mechanism for processing of faces with humans.

P-49 A primate model of ASD: Prenatal exposure to valproic acid (VPA) in common marmosets (*Callithrix jacchus*)

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The present study is one of our on-going projects to establish a primate model for autism spectrum disorder (ASD). Common marmosets were exposed to valproic acid (VPA) during gestation period. We assessed social interaction of the model primates in a common behavioral test with mouse models, a three-chambered approach task. Results show that the VPA marmoset infant spent more time in a side chamber with the unfamiliar marmoset over the other side with an empty cup, as the age-matched control primates did. We also scored the time looking at an unfamiliar marmoset. Although the VPA marmoset preferred to stay in a side chamber with an unfamiliar animal, however, less attended to the conspecific. These behaviors seem to be parallel to those of autistic people. These results suggest that the VPA marmoset shows social interaction deficit in the early developmental period.

P-50 Remote memory deficit in three strains of mutant mice with immature dentate gyrus phenotype

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The hippocampal dentate gyrus (DG) is considered to play a crucial role in memory processes. We have found that several strains of mutant mice exhibit similar behavioral abnormalities related to psychiatric disorders and the adult mutants have 'immature dentate gyrus (iDG)' phenotype, in which almost all the neurons in the DG stay at a pseudo-immature state. A recent study reported that manipulations for increasing new immature neurons in the DG induce remote memory deficit (Akers et al., Science, 2014). However, it remains unknown whether the mutant mice with immature dentate gyrus phenotype show remote memory impairment. In this study, we found that the mutants exhibited normal recent memory but impaired remote memory in the Barnes maze test. These results suggest that immature state of the DG neurons is associated with deficits in remote memory in mice.

P-51 Autoshaping of a lever-press response in spontaneously hypertensive rats (SHR) as a function of distance between lever and food cup position

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A previous study reported that SHR rats could not acquire lever pressing as an operant response in four 50-trial autoshaping sessions in an operant chamber with a retractable lever located on the opposite wall from the food cup; although, four Wistar-Kyoto strain (WKY) rats did acquire this response in the same conditions. It was speculated that the distance from the goal to the signal matters. In the present study, after food cup training was complete, rats performed an autoshaping training session in which a retractable lever and food cup were located on the same wall of an operant chamber with a short distance between the two. This session was repeated four times. The results show that both strains of rats rapidly acquired the lever-press response in the first session; all of the four SHR rats showed an increase in the frequency of lever press similar to that of WKY rats.

P-52 Neuronal characteristics of mice exposed to nicotine during adolescence

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Developing brain has vulnerability to addictive drugs such as nicotine. There is a growing body of evidence that the adolescent brain is highly susceptible to nicotine compared with adult brain. Our previous study revealed a disrupted acquisition of the spatial reversal learning, and a diminished attentional performance in mice treated with nicotine during adolescent. Adult nicotine exposure did not affect these behavioral measures. Here, we examined the brain morphological characteristics of adult mice exposed to nicotine during adolescence or adulthood. Mice were decapitated and their brains were treated by a modified Golgi-Cox impregnation. Stained neurons the medial prefrontal cortex, and the hippocampus were sampled, and reconstructed using Neurolucida (MicroBrightField Japan, Inc.). Adolescent nicotine treatment induced permanent morphological changes in the medial prefrontal cortex and the hippocampus of adult mice. In the adult group, no significant difference were found between nicotine treated and control mice.

P-53 Social lives of captive chimpanzees in PRI and Noichi Zoological Park

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Observations were conducted to understand how chimpanzees socially behave in their everyday lives. Facial expressions, vocalizations, grooming, and other social behaviors were coded and compared in between two different observational fields, Primate Research Institute, Kyoto University (PRI) and Noichi Zoological Park. There were 13 individuals (three adolescents) in outdoor enclosure in PRI and nine individuals (juvenile twins) in Noichi. As the results, more play situations and smiles were observed in Noichi, but more pant hoots and grooming were seen in PRI. This may reflect the social function of the existence of juvenile individuals and constitution of group members. Play and hedonic expressions would increase in the groups which include juveniles. Conflicting situations would increase in the groups which include adolescents and affiliative behaviors would be more important.

P-54 Repeated mild oxidative stress favors habits over goal-directed actions in instrumental learning: effects of 2-cyclohexene-1-one on behaviors associated with the dopaminergic system in rats

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Dysregulation of decision-making are frequently observed in various psychiatric disorders, to which prolonged or intensive stress may attribute. Although most of physical/chemical/psychological stressors are thought to induce oxidative stress at least to some extent, it was difficult to address the genuine effect of oxidative stress on decision-making either in humans or animals. As a solution to the concern, we employed 2-cyclohexene-1-one (CHX), an agent to deplete glutathione which is the most abundant antioxidant in the brain, and examined the effects of systemic CHX pretreatment 1hr before each training session of an appetitive instrumental leverpress in rats. The CHX-treated rats were found to be prone to perform the leverpress more habitually than their control animals. They also exhibited an attenuation in habituation to an exposed context, reduced behavioral reactivity to acute cocaine administration, and less immobility in forced swimming test, which implicates involvement of dopaminergic system.

P-55 On the development of delayed matching and nonmatching to position performance in mice

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Despite its use to assess working memory in rodents, behavioral measures of delayed matching-to-position (DMTP) and delayed nonmatching-to-position (DNMTP) tasks are not free from position bias. The present study was designed to examine the dynamics of position biases from initial training of DMTP and DNMTP until obtaining asymptotic steady state. We used the data set from my previous study (Goto et al., 2010, Behavioural Processes) for a DMTP task and collected additional data for a DNMTP task in male C57BL/6 mice. In both tasks, mice were exposed to the task with no delay interval for 30 sessions, and with variable delays for further 30 sessions. Analyses of errors and the bias-free index of discriminability may help us understand what extent the response bias should be taken into consideration in these two tasks.

P-56 Effects of chronic forced-swim stress on behavioral properties in rats with neonatal repeated MK-801 treatment

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The two-hit hypothesis is known as a hypothesis of onset mechanism of schizophrenia. It assumes that the onset of schizophrenia is originally attributed to vulnerability of a brain which stems from genetic or early developmental factors, and that exposure to the later acquired factors such as stress triggers the onset. The present study examined whether rats with neonatal repeated treatment of an NMDA antagonist (MK-801), one of the animal models for schizophrenia, have stress-vulnerability. Rats with repeated neonatal MK-801 treatment were subjected to 20-day (5 days/week x 4 weeks) forced-swim stress in adulthood. After that, behavioral tests (prepulse inhibition, spontaneous alternation, open-field, and forced-swim tests) were carried out. The results do not show that these animals have stress-vulnerability.

P-57 The inhibition effect of introducing pipes on the stressful and aggressive behaviors of pared Syrian hamsters

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Single or pairs of Syrian hamsters experienced 20 minutes' experimental session in a box that could be separated to two compartment by clear wall. The first experimental stage features single hamster with pipes and a separation wall, in the second, that is two hamsters with pipes and the wall, in the third two with the wall but no pipes, in the fourth two with pipes but no wall, and the last two with double-length pipes but no wall. Ten sessions for each stage make a total of 50 sessions. The two-hamsters with wall situation would be stressful for the observed less feeding and drinking. The removal of the wall increased freezing and decreased digging and standing . The effect of pipes needs consideration for observed decreased digging and standing but increased freezing. Paring of males caused more freezing and biting.

P-58 Rehabilitation for an adult male chimpanzee with a disability using computer-controlled cognitive tasks

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Rehabilitation of companion animals with disabilities caused by disease or injury can lead to improvements in functional ability. Wild animals in captivity can also become disabled, yet there exist few reports and little systematic data on rehabilitation and impact on welfare. An adult male chimpanzee Reo, living in Primate Research Institute, Kyoto University, developed acute tetraparesis in 2006. Thanks to careful husbandry he has improved function gradually, however his locomotion remain impaired. He is motivated to perform computer-controlled cognitive tasks for food rewards. Therefore, we placed the touch-screen monitor 2m from the reward-dispenser to encourage his locomoter activity. After participating in this novel rehabilitation program, we found improvement of his locomotor skills. Moreover, Reo performed this program regularly for more than three years, suggesting that rehabilitation using cognitive tasks helped to maintain his perseverance. However, his motivation is unstable; thus, we need to search for the next step of rehabilitation.

P-59 Assessing the effects of relocation on long-term stress level in captive chimpanzees using hair cortisol as a measure

Yumi Yamanashi [1,2], Migaku Teramoto [1], Naruki Morimura [1], Satoshi Hirata [1], Misato Hayashi [3], Juri Suzuki [3], Miho Murayama [1], Gen'ichi Idani [1]
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Measuring long-term stress is important from the view of captive management and animal welfare. In a previous study, we developed an assay for quantifying hair cortisol (HC) level of captive chimpanzees as a measure of long-term stress. The present study measured HC level among captive chimpanzees in Kumamoto Sanctuary and checked the effects of relocation. Hair was cut with scissors from arm of 8 chimpanzees several times before and after the relocation. Additionally, we collected hair from 6 chimpanzees several times after relocation. HC measurement was stable as small variances were observed in the hair samples collected from arm of the same subject on the same day (14%). HC level of individuals moved from different social group and received high level of aggression tended to show large fluctuation. These results suggest that social factors might be related to long-term stress and HC might be useful tool to investigate such effects.

P-60 Cooperative problem solving in Mongolian gerbils

Kentaro Nagasaka, Seira Arizumi, Keita Ishii, Rina Kinouchi, Anna Sasaki, Manato Suzuki, Yuki Miyamura, Taichi Kusayama
Department of Psychology, Faculty of Liberal Arts, Teikyo University

In a cooperative problem task, behavioral coordination is necessary to cooperate with each other. We tested Mongolian gerbils (*Meriones unguiculatus*) with the most commonly used cooperative task, appropriate to test the behavioral coordination. In this task, animals learn to coordinate with a partner in a task requiring two individuals to simultaneously pull two ends of the same string to obtain a reward. They did not only act together, they could wait the pulling response for up to 20 seconds if the arrival of a partner was delayed. In the situation that a partner was trapped inside the restrainer which the key hung over, they could rescue a partner and pull the string together. These results have been interpreted as demonstrating an understanding of cooperation.

P-61 Presence of contagious yawning in sheep

Yuka Otaki [1], Satomi Ishii [1], Kohei Sato [1], Mona Uchida [2], Atusi Yamazaki [1], Tomohiro Yonezawa [1]
[1] School of Veterinary Medicine, Kitasato University, [2] Graduate School of Agricultural and Life Science, The University of Tokyo

Contagious yawning, one of cognitive forms of empathy, is reported in human, primate and dogs. Since empathy appears to emerge developmentally and phylogenetically, there are few reports to investigate empathy in rudimentary animals. In this study, we hypothesized that sheep also have contagious yawning along with other behaviors. Adult castrated Corriedale sheep were adjacently restrained with or without a wooden board between them and their behaviors were video-recorded for 8 hours. Unshielded subjects yawned within 5 min after the other did with a probability of over 25%. On the other hand, the probability on the shielded pairs was 5%. Moreover, the synchronicities of other behaviors, ruminating, standing and lying down, were higher in unshielded pairs compared to shielded ones. These data suggest that domestic animals also have social facilitation and/or emotional contagion like empathy. It should be important information for animal welfare and livestock management.

P-62 Preliminary report on the behavior of wild orangutans (*Pongo abelli*) in Danum Valley, Borneo, Malyasia

Yuri Kawaguchi [1], Masaki Tomonaga [2]
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To investigate behavior of orangutans (*Pongo abelli*), which are evolutionarily near to human, can be a very important clue to understand about human cognitive evolution. However, we can not observe their "natural" behaviors in captivity, where several orangutans are too close as in their natural habitat, i.e., vast rainforest. We aimed to make intensive observations of wild orangutan's behavior. We stayed in Danum Valley, Borneo, Maleysia for one week from February 22, 2014. We went trekking twice or three times a day and after we found an orangutan we followed them. Through our stay, we saw at least 10 individuals and none of them was alone. Although orangutan is often described as "solitary animal", we observed many behaviors which can be called as social. It can be said that about orangutan, under certain situation, we often can see interactions between individuals, especially between male and female, juveniles, and siblings.

P-63 Receptor-specific roles of dopamine in male rat sexual behavior

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Department of Animal Sciences, Teikyo University of Science

Dopaminergic system has been believed to play a critical role in motivation of various social behaviors. In this study, we examined effect of D1 antagonist, SCH-23390 (SCH) or D2 antagonist, eticlopride hydrochloride (EP), on sociosexual behavior in male rats. Sexually experienced male rat were weekly treated with 3 doses (0, 0.1 and 0.4 mg / kg) of either SCH or EP followed by tests of olfactory preference for receptive females and copulatory behavior. EP effectively suppressed olfactory preference and copulatory pacing, but not intromission ratio (erectile function). In contrast, SCH had little or no effect on these behaviors. The data suggest that D2 plays relatively important roles, compared to that of D1, in sociosexual motivation of male rats.

P-64 Examination of the property of cognitive map in rats using shortcut task in lattice maze

Tomohiro Hayashi, Nobuya Sato
Kwansei Gakuin University

It has been considered that rats have a cognitive map since Tolman (1948).In order to investigate the property of cognitive map in rats, we examined whether they can take a shortcut route in a lattice maze.There were two phases in our experiment. In the first phase, the rats learned a route from the start box to the goal box in a lattice maze.In the second phase, in addition to the route learned in the first phase, another novel route that had never been traveled was available. This novel route was shorter than the learned route. Between each trial in the second phase, we introduced a procedure in which the rats had to travel from the goal box to the start box reversely.The result showed that the rats took the shortcut route. This suggests that rats can construct a cognitive map and use it to navigate.

P-65 The Personality of François' Langur (Trachypithecus francoisi): The First Glance

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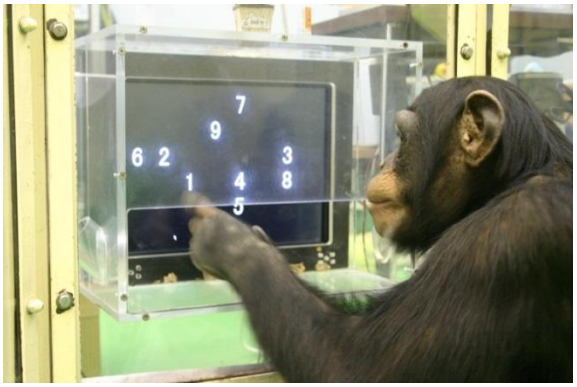
Personality refers to consistent individual differences in behavior across time and contexts, and has been reported to be related to health condition and capability of reproduction in several primate species. Adjective Rating Method has been used to assess animal personality and showed satisfactory reliability and validity in several primate species, including rhesus macaque (Macaca mulatta; Alexander Weiss et al, 2011; Nicole Maninger et al, 2003) and snub-nosed monkey (*Rhinopithecus roxellana*; Jian Jin & Yanjie Su, 2011). However, it hasn't been studied in François' langur *(Trachypithecus francoisi*), a species of leaf monkey living in southern China and northern Vietnam. Using questionnaires initially used in rhesus macaque (Alexander Weiss, 2011; Nicole Maninger, 2003) and fulfilled by care givers in François' Langur Breeding Center in Wuzhou, China, we analyzed adjective rating scores of personality of François' Langur. Principal component analysis of the two separate sets of items and two questionnaires together was done by SPSS 19.0. The results were similar. Part of the original questionnaires were extracted, and 4 main factors were revealed, including offensiveness, stability, warmth, and nervousness, which overall explained more than 50% of the variance in all three conditions. The revision of the questionnaires will facilitate the understanding of François' langur's personality as well as further testing in this species. In addition, the personality pattern of François' langur is similar to that of snub-nosed monkey (Jian Jin & Yanjie Su, 2011), which contains 5 main factors overall, including offensiveness, stability, warmth, nervousness, and emotional personality. Furthermore, it's different from that of rhesus monkey (Alexander Weiss, 2011). It's suggested that the comparison of the results of different species will shed light on the evolution of personality. More data of François' langur is being collected and examined, including capability of reproduction, health condition and behavioral data, which will lead to further understanding of the role of personality and the correlations between these factors. We hope the work will facilitate the understanding of personality and behavioral pattern of leaf monkey.

Visit to PRI

Date: July 19th and 20th 2014

Introduction to the Ai Project



Welcome to the Primate Research Institute (PRI), Kyoto University, In PRI, comparative cognitive studies with chimpanzees have long been conducted. The Ai Project, named after the chimpanzee Ai, the principal research partner, is long-running scientific endeavor that aims to illuminate the mind of the chimpanzee. On April 15th, 1978, Ai touched a computer keyboard for the first time. Since then, she – along with her fellow chimpanzees at the Primate Research Institute – has helped many researchers study various aspects of the chimpanzee mind, such as perception, memory, language, imitation, cooperation, and so forth. Since 1986, we have also been studying a group of wild chimpanzees at Bossou, Guinea, West Africa. Members of this community use various kinds of tools, including a pair of stones to crack open oil-palm nuts. Based on the long-term relationship between mother and infant, there is a unique chimpanzee way of learning called "education by master-apprenticeship". In the year 2000, three chimpanzee mothers at the Institute gave birth within a few months of each other. We developed a novel approach based on participant observation to study cognitive development in infant chimpanzees: although the PRI infants were being raised by their biological mothers, we tried to be closely involved in many aspects of their daily lives. In 2010, we also launched cognitive studies of wild bonobos, another species of chimpanzee living in the Congo Basin. Thus, we have made parallel efforts in the laboratory and in the wild, in order to take a holistic approach to understanding the minds of chimpanzees, our evolutionary neighbors. The key question for us is: what is uniquely human? Where did such uniqueness come from? How did we become what we are today? Please enjoy short visit to PRI arranged by us on 19th and 20th from 12 to 1pm to see the latest development in our projects.

Tetsuro Matsuzawa
Primate Research Institute, Kyoto University

人間とは何か，社会とは何かを正面から問う

岩波講座
コミュニケーションの認知科学 全5巻

［編集委員］安西祐一郎・今井むつみ・入來篤史・梅田 聡
片山容一・亀田達也・開 一夫・山岸俊男

コミュニケーションを「共存と情報共有のための基本機能」とみなし，言語，共感や互恵，安心や信頼，さらには母性や社会性がどのように生まれ備わってきたのかを探る．「人間とは何か」という究極の問いを真正面から考える．【内容案内進呈】

1 言語と身体性

今井むつみ・佐治伸郎 編

人間は，なぜ言語以前の身体の知覚や感情を言語という記号に結びつけられるようになったのか．音声言語の進化的基盤，子どもの言語獲得や意図理解，手話やジェスチャーの生成など，いわゆる「記号接地問題」を重層的に解く．A5判 本体3800円

4 社会のなかの共存

山岸俊男・亀田達也 編

なぜわれわれは他人の目を意識するのか．正義やモラルは生得的なものなのか．多数の人間が共存するためのしくみが，動物でもあるヒトの心のしくみとしてどう形づくられるのかを社会科学と生物学の両面から読み解く．A5判 本体3400円

続 刊

2 共 感

梅田 聡 編

なぜ共感を問題にするのか．これまでの共感研究の歴史をたどりながら，その生起メカニズムについて考える．

3 母性と社会性の起源

開 一夫 編

母子間相互作用を社会的認知の基盤として捉え，「模倣」や「教授」など人間に固有なコミュニケーションの概念について議論する．

5 自立と支援

片山容一 編

病気や障害をもつ人びと，あるいは子どもや高齢者といかに寄り添って生きていくべきか．現場で何が問われているかを明らかにする．

想像するちから —チンパンジーが教えてくれた人間の心

松沢哲郎

チンパンジーには人間の言語のようなことばはない．けれども，彼らなりの心があり，ある意味で人間以上に深いいきずながある．進化の隣人を知ることで到達した人間観を，30余年に及ぶ研究の集大成として語りつくす．四六判 本体2000円

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214 **仲間とかかわる心の進化** —チンパンジーの社会的知性 平田 聡
仲間と協力する，仲間をあざむく，高度な知性をもったがために，心の病を患う可能性すらあるチンパンジー． 本体1200円

221 **ヒトはなぜ絵を描くのか** —芸術認知科学への招待 齋藤亜矢
ヒトとは何か？ キーワードは想像と創造．チンパンジーとの比較，芸術と科学から迫る． 【カラー口絵1丁】本体1300円

198 **犬のココロをよむ** —伴侶動物学からわかること 菊水健史・永澤美保
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謝辞

日本動物心理学会第 74 回大会を開催するに当たり、格別のご高配を賜りまことにありがとうございました。皆様のご支援によりまして円滑な運営ができますことをご報告申し上げ厚くお礼申し上げます。なお、敬称は略させていただきました。

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- 京都大学「心の先端研究ユニット」

共催

- 文部科学省新学術領域「共感性の進化・神経基盤」
  - 特別シンポジウム「Higher behavioral functions in animals; their mind and evolution」の共催
- 文部科学省新学術領域「こころの時間学-現在・過去・未来の起源を求めて-」
  - 特別シンポジウム「The science of mental time」の共催

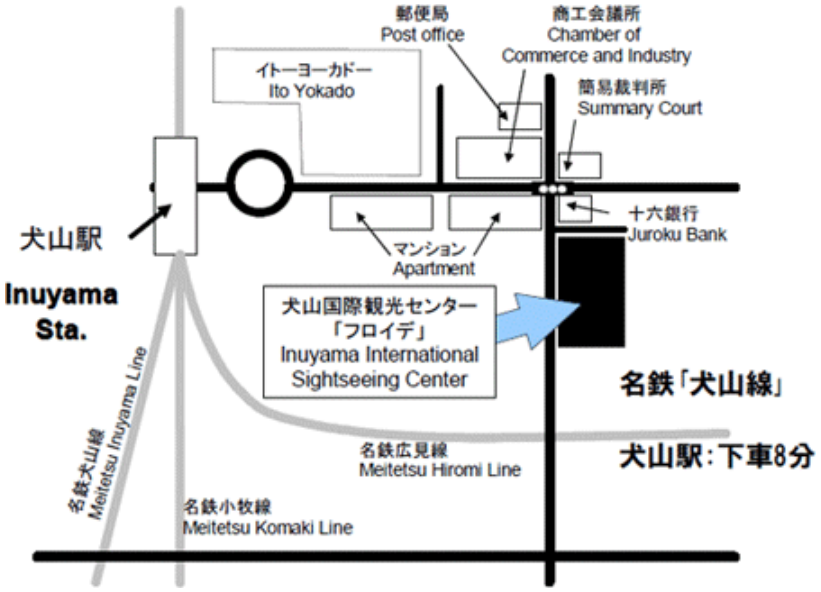
なお、本大会の運営にあたり、日本学術振興会研究拠点形成事業（A.先端拠点形成型）「心の起源を探る比較認知科学研究の国際連携拠点形成」の援助を受けました。また、公開シンポジウムにつきましては、科研費「研究成果公開促進費」の援助を受けました。

The 74th Annual Meeting of the Japanese Society for Animal Psychology

July 19th(Sat)- 21st(Mon), 2014, Inuyama

Hosted by

the Primate Research Institute, Kyoto University



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