

The Importance of Greater Consideration for Farmed Animals

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Thank you all for taking part in this workshop on the Welfare and Management of Farmed Animals. Today, I would like us to study together about the future of the welfare and management of domestic animals such as livestock.

To begin, I will talk about why I believe we have to pay greater consideration to the welfare of domestic animals, and I will also touch upon the sensitivity and the cognitive abilities of domestic animals that I believe should form the basis of animal welfare. How then do we develop this basis for so-called domestic animal welfare? I will examine this question using the examples of cows, pigs and chickens. Later on, Mr. Kuwajima, the Products General Manager of Pal Meat, will talk about whether or not welfare-conscious based raising of domestic animals can be realized in practice. After that, we will discuss the future of the welfare and management of domestic animals together. That is the basic plan for today's workshop.

Firstly, I would like to talk about the need for consideration and to explain something about the sensitivity and the high levels of cognitive ability displayed by some domestic animals.

In Europe, where the earliest discussions regarding what should be considered in the care of domestic animals began, it was agreed that we must consider three main things.

The first is emotion. It is considered that domestic animals do undoubtedly experience negative emotions or feelings such as pain and fear. Accordingly, we should try to eliminate the causes of such emotions as far as possible. Likewise they also experience positive emotions, such as comfort and joy, so we should try to

promote anything that causes them to feel positive emotions as much as possible. That's the basic idea. Since both these positive and negative aspects are emotions, they cannot be measured directly. So how can we measure them? Some people try to evaluate domestic animals' emotional responses by checking how they avoid, approach, or run away from certain things, etc.

The second thing is the physical environment in which farm animals are raised. This should be designed in a way that minimizes the animals' stress as far as possible. Stress can be measured by physiological changes or by changes in hormone levels.

The third thing is to pay consideration to the natural impulses of animals. It seems that animals wish to behave in certain ways. Therefore, we compare the behavior of domestic animals with that of animals living naturally in the wild, and we watch the behavior of domestic animals when their activities are controlled. While doing that, we pay consideration to finding ways to allow these animals to behave more naturally.

Next, I will introduce several examples of what is going on emotionally with domestic animals using, as an index, their actions such as running away from or coming close to certain things. This can serve to indicate the degree of fear, etc., that they feel.

One example is a test that was devised by Prof. Kosako of the National Institute of Livestock and Grassland Science. This is a test conducted on cows. A cow is put into a cowshed and a person also remains in the shed keeping still. Then we measure the distance between the person and the cow. Next, the person approaches the cow and we note the distance at which the cow starts moving away when the person approaches. We measure this distance for both of these tests.

We must ask what kind of treatment people gave this cow in the past? In this case, people made contact with the cow when it was a calf for 20 minutes per day for the first three days following its birth. This was an experiment to see how much the running distance would change if new born calves were exposed to this degree of human contact. Among many species of animals, infants aged about three days tend to be very receptive. The first three days after birth is a period when a calf has to establish a relationship with its mother, so calves of this age tend to be very sensitive by necessity.

Looking at the results, in a situation with no differences from the previous experiment, when people try to approach a cow, it is found that they can get significantly closer to those cows that were exposed to human contact for 20 minutes per day for the first three days after birth. From this experiment, we can see that a cow's fear of humans can be eliminated by such contact.

My next slide shows a test that was performed by post-graduate students at my own Tohoku University. We have a livestock barn here. The researchers made a straight aisle running through it. Then they made a grazing area right at the back. On one side of the grazing area grass was growing. On the other side all the grass had been cut and put into an installed feeder. What the researchers wanted to find out was how fast the cows' approach speed to their food would be. That is what they tested. The result was that when the cows walked to the place where grass was growing, they moved significantly faster. Conversely, when they were fed raw grass from the same area that had been cut and placed in a feeder, they moved slower. This was one of the findings. One side has some grass growing, while the other side has the same grass placed in a feeder. Even environmental differences of this degree produced a different reaction in the cows. This means that the cows are engaging in complex cognition.

Next, the researchers allowed the cows to stay in the feeding area for 10 minutes. After that, the cows' hormone levels were measured. It was found that the

level of cortisol, which is a well-known stress hormone, was higher when the cows were fed from the feeder. Also, the level of oxytocin, a hormone released when the animals are comfortable, was higher when the cows were allowed to feed by grazing on growing grass. Physiological changes occur depending on whether cows graze on growing grass or are fed cut grass from a feeder. By taking these things as indices, we are asking questions about what the cows are thinking, and we ourselves are thinking about the environment in which domestic animals are raised and kept.

This graph in my slide illustrates the results of research performed on cattle in Canada by Rushen et al. In the experiment, a 'rough person' lightly struck at a cow with a dehorning scoop whenever the animal came close, while a 'kind person' stroked the cow whenever it came close. The cows were treated this way for five days. Then, during the following week, a third person milked the cow. The researchers measured the volume of milk produced and the animal's heart rate. Coming back to the person who behaved roughly toward the cow and the person who was kind to cow the previous week, what would happen if these people were to come in during the milking? In fact, when the rough person came into the room, the cow's milk production volume dropped significantly. Even if the cow was milked after being injected with oxytocin a lot of milk still remained in the cow's breast with the rough person was present. As for the heart rate, this also changed simply due to the presence of the person who treated the cow roughly for five days during the previous week. It became very high. This result shows that domestic animals have sufficient cognitive ability to be able to remember how they have been treated and by whom. My graph shows that the best milking result was achieved when nobody came in during the milking.

Many kinds of odd behavior can be observed in domesticated animals. In zoos, an elephant shakes its body from side to side. In the case of domestic animals, pigs nibble other pigs' tails, chickens peck other chickens, and calves suck other calves' umbilical cords. Also, cows curl their tongues round in this way. Such irrational behavior is common and it presents problems.

For example, the behavior itself wastes energy and time, and the welfare of the nibbled individuals is impaired. Chicken wings that are pecked may be injured. It is known that these kinds of behavior occur due to the restraint of strongly motivated instinctive behavior. They are known as 'displacement behavior' or 'redirected behavior'. By taking these things as an index, we try to analyze what domestic animals want to do. Domestic animals have rather simple minds so their actual behavior can be changed significantly by suppressing their instinctive behavior.

The next point I want to talk about is what sort of society do domestic animals build? In this summary, I have written about social behavior, but when I was making my slides, I noticed that the concept of society is rather difficult to talk about, so I changed the theme to "How domestic animals recognize their associates."

My slide shows an experiment that was conducted in Kendrick, England. You can see differences among the faces of the sheep. In this experiment, sheep were taught that food appears when they push a button placed under a face. The sheep were made to learn this over the course of a week, and the accuracy of their pushing is shown accordingly. The sheep learned up to a certain level. It was an experiment that attempted to measure how many days sheep can remember what they have learned. Testing was carried out over various periods, namely, from 75 days to 200 days, from 200 days to 400 days, from 400 days to 600 days, and from 600 days to 800 days after learning, to ascertain whether or not the sheep could still recognize the sheep face picture or not. For each time period, the accuracy rate was found to have dropped a little, but the experiment established that sheep could remember what to do more than 50% of the time in all of the periods. So sheep have some rather amazing cognitive abilities.

This is an experiment that our team performed. We installed a camera so that we could watch domestic animals and we measured the number of seconds that they continued to look at different objects. We showed the animals a picture of a sheep face, a goat face, as well as a dog, a giraffe, a horse, a cow, etc. And we showed

them the students who were conducting the experiment and the keepers who usually took care of them. We performed this experiment on Japanese Black Cows. These animals were not normally kept alone but were kept as part of a group of several cows. We showed them the faces of their companions too. Then we measured the number of seconds the cows looked at these pictures when each picture was presented for a three-minute period. The results were arranged in order of length of time from long to short. What the cows looked at for the longest time were the photos of their companions kept in the same barn. This was followed by their regular keepers' faces and then by the faces of the students. This result indicates that cows remember faces. Cows have a high level of cognitive ability, so they can remember faces easily and they can continue to recall them for several years.

Next, let's move on to a socially related subject. It turns out that cows exhibit caring behavior towards other cows, such as licking their bodies. This is a survey aimed at trying to find out which other cows they perform this behavior on. While one cow is licking another, the heart rate of the cow being licked drops. Something similar happens in the case of humans too. When we have a strong sense of security, our heart rate tends to drop. So from this, we can assume that cows probably get a feeling of peace and security from being licked.

We conducted a survey of which other cows the cows perform their licking behavior on. As a result, we ascertained that the most important factor is not whether the receiving animal is strong or weak at fighting - we could detect no differences in terms of fighting ability - but the difference in the two animals' birthdates. The important factors were that the two cows were born at about the same period and they shared a very long period of cohabitation. Also, cows that were blood relations tended to lick each other a lot. This signifies that cows possess the ability to recognize such things as well.

This next experiment was put together by Mr. Takeda. We wanted to find out if there are differences in how cows react when startled, depending on the

environment they are in. The experiment was conducted with two cows that were acquainted, with another two cows not acquainted, and with five cows that were all acquainted with each other. The experiment was aimed at discovering whether or not, when we showed them something that startles cows, it was helpful for them to be with their companions.

For the experiment the cows were strongly startled by dropping a bucket from the ceiling. Then their heart rates were measured. Also, the researcher created conflict situations such as showing food to the cows but not allowing them to eat it.

In both cases, when the cows were acquainted with each other, their average heart rates remained low, and this effect was particularly pronounced when five acquainted cows were together. So, sensitivity to stress is reduced when cows are together with their companions.

In Japan, 87% of dairy cows are kept in this way, and considering the fact that cows also have good cognitive ability and sensitivity, I think the present Japanese system is quite good.

The next experiment I would like to show you was performed by Matthews and Ladewig in New Zealand. So far we have been talking about cows, but pigs also have high levels of sensitivity and cognitive ability. Pigs can use their snouts to press buttons. In this experiment, which was set up to be like a learning experience, a button was installed on this experimental box, and it was arranged so that the pigs could obtain food when they pressed the button. Alternatively, their exercise area could become wider if they pressed the button, or they could meet their companions if they pressed it. With this kind of "problem setting box", the tasks are set in such ways as to allow the subjects to be rewarded after pressing the button just once, (or to ultimately obtain a reward only after pressing the button 5 times, 10 times, or 30 times). A pig is placed in this box, and in the case that the reward is food, even as the number of required pressing times is increased, the animals continued to press the button in order to keep

eating. My slide shows the situation for companions and the situation for exercise. When the button is pressed their exercise area is increased, and in the case of the other button, when the number of required pressings is increased gradually, their reaction drops. It's as if they are saying that they don't need to go or they don't need a wider area. In the case of the button they press in order to meet their companions, although the reaction is not as strong as in the case of the food button, the reaction drops off less sharply than in the case of the exercise area button. This experiment shows that pigs are more motivated to meet their companions than to obtain a wider exercise area.

There is a quotation from a book written by an Australian researcher named Hemsworth. The names of many researchers are noted. They performed experiments on pigs to investigate somatic growth and puberty, age of attaining sexual maturity, conception rates, puberty in males, reproduction from single litters, infant mortality up to three weeks of age, etc. These researchers compared the results of differences in the ways pigs were treated, such as, for example, when a pig comes close to a person who proceeds to stroke it, as compared to when a pig comes close to a person who then kicks it. These experiments compared the pigs' reactions to such treatment. The results showed higher figures for all measured effects when the pigs were treated with care. Somatic growth was greater, male and female pigs alike matured faster, the conception rate was higher, litter size was greater and the mortality rate was lower.

In this way, domestic animals want to have social relationships, but in reality, 83.1% of pregnant sows are kept alone in stalls. We need to consider how to improve the present situation.

This is an experiment that we performed. It was aimed at establishing how the behavior of domestic animals differs depending on whether they are kept enclosed in a barn or let out to pasture. These are egg-laying hens. This sort of feeding behavior and personal grooming is very often observed in the case of caged hens, but when they are allowed out to pasture, behavior such as

scanning the environment, walking around, and egg laying-related behavior increases. The hens begin to live in quite a different way. This means that environmental scanning, exercise and egg laying behavior are programmed into these animals as normal behavior. We compared their behavior when caged against their behavior when kept free-range in pasture in order to analogize what the animals' normal behavior was.

When the sensitivity, social cognition ability, etc., of domestic animals are clarified, it becomes only natural from the standpoint of ethics that we take reasonable care of their welfare. I am sure that you feel this too. So now, I am going to talk a little bit about animal welfare based on such ethical considerations. Speaking of animal welfare, there is the common injunction to "be kind to animals," so you may have that kind of image. "Be kind" means to love animals, take care of them and protect them, so the subject of this concept is people. As I will introduce in more detail later, the Japanese Animal Protection and Control Law has as its main purpose the cultivation of the emotion of love. This law is intended to nurture people's love of living things, and it is centered on the concept of taking proper care of animals throughout their lives. Also, it does not require us to view animals objectively. So there is a possibility that individuals may develop ways of treating animals that are self-righteous. I personally feel this to be a weak point of the animal protection concept.

On the other hand, consideration for animals in the Western world takes the form of "animal welfare". Under "animal welfare", animals should be allowed to live according to how they wish, so the subject of this concept is the animal, and people's emotions are irrelevant. We should respect the lives of animals that have high levels of sensitivity and cognitive ability and as far as possible allow them to live in the way they wish. Under this concept, people's attitudes toward animals are objective. The idea is to think about such subjects as animal pain and suffering, adaptation, freedom of behavior, etc.

However, as I said earlier, because animal welfare is an objective concept and does not address emotion, it is

actually rather difficult to follow in practice. In animal welfare, it has been recognized that it is very difficult to persuade people or to get them to learn through practice alone without employing the motivation provided by emotion.

Hence, one thing that is referred to extensively in the world of animal welfare is cognitive behavioral therapy. This is based on the idea that cognition comes first and behavior follows on from it. Without the recognition that people should pay consideration to animals, there can be no activity. Then again, in animal protection, emotion is the main consideration. My own feeling is that what is required globally is an integration of these two concepts.

On the other hand, as you will understand if you read the Animal Protection and Control Law, its purpose is to encourage the spirit and to cultivate the sentiment of caring for animals. However, the objective of the act is not very clearly expressed. That is to some extent a weak point.

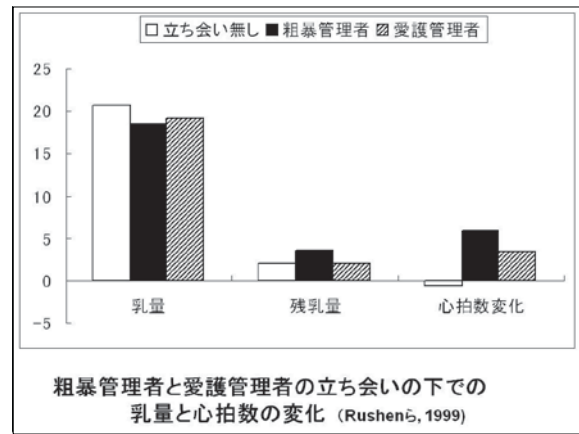
Everybody, I would like you to please read the text of the Animal Protection and Control Law. As protected animals, it lists first of all domestic animals such as cows, horses, pigs, sheep and goats. This is a revised law based on previous animal welfare legislation, and through it we should recognize again that its provisions should be applied to these domestic animals.

Animal welfare is a concept that comes from the West and, in my opinion it needs to be integrated with animal protection worldwide.

Thank you very much.



【Slide 1】



【Slide 5】

- ## 1. 何に配慮するのか？
- ①情動: 苦痛の排除と快適の促進
負の情動: 痛み、恐れ、葛藤、空腹、渇き
正の情動: 快適、充足、喜び
これらは、直接計れない
→回避・逃避、それらができない時の変容行動
→接近、睡眠
 - ②飼育環境への適応: 生理的变化(ストレス)
 - ③自然性: 正常な行動の発現
自由への配慮 = 自然の生活と比較

【Slide 2】

自然性の抑制による行動の変容

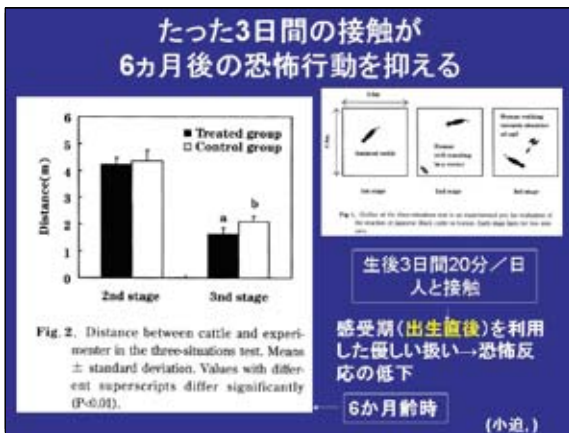
内的に強く動機づけられた行動の抑制

↓

転位行動 転嫁行動 真空行動

エネルギー時間浪費 エネルギー時間浪費

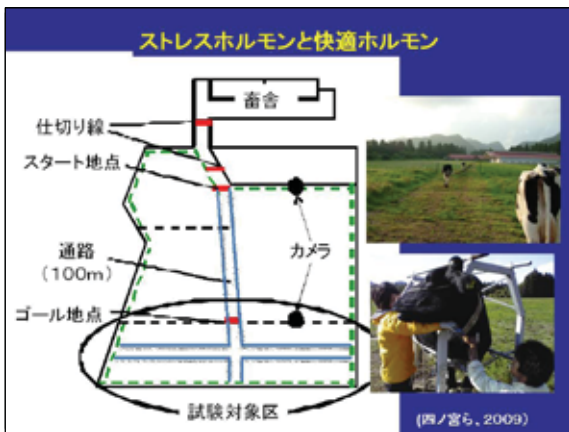
【Slide 6】



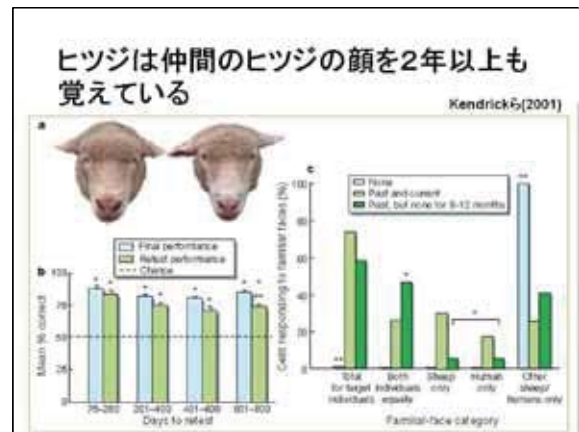
【Slide 3】



【Slide 7】



【Slide 4】



【Slide 9】

ウシは仲間(同居)のウシや、いつも世話する管理人をよく見る

Sato & Yoshikawa(1996)

【Slide 9】



【Slide 13】

社会的舐行動Social Grooming

【Slide 10】

ブタも運動よりも仲間との再会が好き

Matthews & Ladewig(1994)

【Slide 14】

舐行動と心拍数

社会的舐行動に影響する社会的要因

(Sato & Tsurumizu, 1993)

(Sato et al., 1993)

【Slide 11】

Table 7.1. The effects of handling treatments on performance of pigs in experimental conditions.

Performance criteria	取り扱い		Reference
	丁寧	雑暴的	
0-4 weeks (kg/day ⁻¹)	0.205	0.192	Dryden and Seabrook (1996)
0-5 weeks (kg/day ⁻¹)	0.533	0.509	Hemsworth and Barnett (1991)
0-10 weeks (kg/day ⁻¹)	0.656	0.641	Hemsworth and Barnett (1991)
5-10 weeks (kg/day ⁻¹)	0.779	0.773	Hemsworth and Barnett (1991)
7-13 weeks (kg/day ⁻¹)	0.453	0.404	Gonyou et al. (1987)
8-18 weeks (kg/day ⁻¹)	0.897	0.837	Gonyou et al. (1984)
11-22 weeks (kg/day ⁻¹)	0.709	0.669	Hemsworth et al. (1981a)
各機采動(%)	169.0	171.8	Hemsworth and Barnett (1991)
完給率 (%)	88	33	Hemsworth et al. (1987)
各機采動(%)	161	193	Hemsworth et al. (1987)
1歳生存産子数	10.1	9.3	Seabrook (1991)
分娩前までの死亡率 (%)	11.1	15.2	Seabrook (1991)

(Hemsworth & Coleman, 1998)

【Slide 15】

ウシでは仲間がいるとストレスレベルが低い

表 11. 各場面での平均心拍数 (bpm)

	新奇物提示	驚愕	葛藤
顔見知り2頭区	66.1± 3.4	72.9±11.3	63.5± 3.5
非顔見知り2頭区	72.3±12.9	74.9±11.8	66.9± 4.0
顔見知り5頭区	60.8±11.2	63.4± 8.9	63.0±10.6
非顔見知り5頭区	74.3± 9.3	80.3± 7.0	78.1± 8.6
平均値±SD.			

(Takedaら, 2003)

【Slide 12】





妊娠豚の83.1%がストール飼育

【Slide 16】

西欧は「自立者への配慮」文化

① welfare = wel + faron = 望み通りに生活する
 ↓
 -to go
 according to desire

② 苦悩suffering (情動based) + 適応coping (機能based) + 自然性(perfectionism)
 →これが健康に通じる必要条件

③ 5つの自由

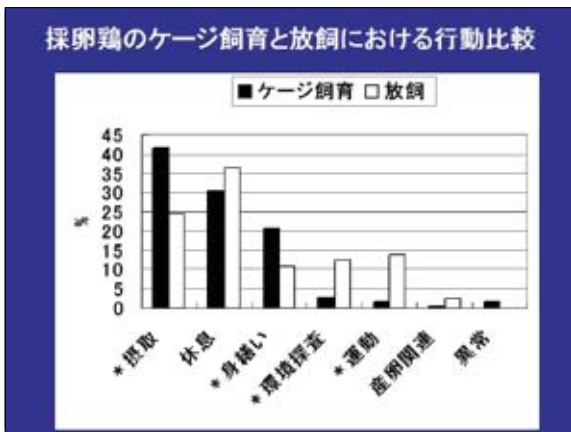
- ・空腹及び渇きからの自由
- ・不快からの自由
- ・疼痛、損傷、疾病からの自由
- ・正常行動発現の自由
- ・恐怖及び苦悩からの自由

④ 3つのR

- ・「置換」: Replacement
- ・「削減」: Reduction
- ・「改良」: Refinement

科学的に捉えようとしている

【Slide 20】



【Slide 17】

動物の愛護及び管理に関する法律 (2005)

(目的) この法律は、動物の虐待の防止、動物の適正な取扱いその他動物の愛護に関する事項を定めて国民の間に動物を愛護する風風を招来し、生命尊重、友愛及び平和の情懐の涵養に資するとともに、動物の管理に関する事項を定めて動物による人の生命、身体及び財産に対する侵害を防止することを目的とする。

(基本原則) 動物が命あるものであることにかんがみ、何人も、動物をみだりに殺し、傷つけ、又は苦しめることのないようにするのみでなく、人と動物の共生に配慮しつつ、その習性を考慮して適正に取り扱うようしなければならない。

(罰則) 「愛護動物」とは、次の各号に掲げる動物をいう。

- 1 牛、馬、豚、めん羊、やぎ、犬、ねこ、いえうさぎ、鶏、いばと及びあひる
- 2 前号に掲げるものを除くほか、人が占有している動物で哺乳類、鳥類又は爬虫類に属するもの

【Slide 21】



産卵鶏の98.7%がケージ飼育

【Slide 18】

表 6.1 各文明における「動物への配慮」の特徴

	動物との物理的接触度	動物個体への配慮	野生動物との関係	動物種の存続への配慮
西欧 (砂漠の遊牧民)	飼育を通じた動物群との関係であり、濃い	共感→アニマルウェルフェア	自然性が資源であり、薄い	なし
日本 (農耕民)	使役を通して特定個体との関係であり、濃い	殺生禁止共感→愛護	自然が豊かであり、里地・里山の動物は身近感をもつ	放生があるがまを認める
狩猟採集民	狩る・狩られるという瞬間的関係のため、薄い	なし	自然が豊かであり、生態系の一部と認識	畏敬、再生産

注: 表内の「共感→アニマルウェルフェア」は「行為の客観性中心」に、日本側の「殺生禁止共感→愛護」は「情中心」に、日本側の「自然が豊かであり、里地・里山の動物は身近感をもつ」は「融合必要」にそれぞれ注釈されている。

【Slide 22】

3. 配慮は人類共通の倫理

日本 愛護

定義: かわいがり保護すること
 主体: 本人
 姿勢: 愛という情動
 目的: 情懐の涵養
 内容: 殺生禁止・終生飼養

西欧 福祉

定義: 望み通りに生活する
 主体: 相手(動物)
 姿勢: 客体の尊重
 目的: 生きている間の幸せ
 内容: 客体の苦痛・適応・自由

【Slide 19】

2005年

2009年

【Slide 23】