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Superstar Rats Teach Empathy to Researchers

Speaker: Cathy Schuppli, MSc, PhD, DVM, University of British Columbia.

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Slide 1 (Superstar Rats Teach Empathy to Researchers)

>>*Neera:* Hello. Today is Thursday March 21, 2019. I am Neera Gopee, Director of the Division of Policy and Education at OLAW, and today it is my pleasure to welcome our speaker, Dr. Catherine Schuppli, to the [OLAW Online Seminars](#) to present **Superstar Rats Teach Empathy to Researchers**.

Cathy's personal and professional life has always been intertwined with animals, whether as a teenager living in Tanzania visiting the Serengeti for holidays, as a social scientist interviewing beef ranchers in Alberta, or as a veterinarian caring for laboratory rodents. Her compassion for animals and desire to safeguard their welfare has been the driving force in her career. Cathy has a Bachelor of Science in zoology from the University of Guelph and a Master of Science in zoology from the University of Alberta. She then went on to do a PhD in animal welfare at the University of British Columbia and more recently a DVM at the University of Saskatchewan. Cathy is currently a Clinical Assistant Professor in the Animal Welfare Program in the Faculty of Land and Food Systems and a Clinical Veterinarian in Animal Care Services at the University of British Columbia. Cathy's research interests include understanding the relationship of humans with animals, research ethics, and researching practical ways to improve the emotional experiences of animals involved in animal research. Her work attempts to apply research findings to improve policy and practice and resolve conflict related to animal welfare.

It's my pleasure to welcome you to the OLAW Online Seminar and now to hand the microphone over to Dr. Schuppli.

Slide 2 (Superstar Rats Teach Empathy)

>>*Cathy:* Thank you that introduction, Neera, and thank you OLAW for inviting me to participate in this webinar, thank you all today for attending this talk as well. This is my first time doing a webinar so I apologize if there is any awkwardness, I'll try to imagine you all out sitting out there.

Today I'm very excited to be speaking about a study that used research rats to influence the views of individuals working with research animals, with the goal of promoting positive welfare or refinement. I will begin by introducing you to the research team for which I am gratefully indebted to for all their hard work, for having lots of fun, and for enriching our lives.

Slide 3 ("Team Rats")

First, I'd like to introduce you to the rat team. This is a group of 7 amazing rats we call the "superstar rats": Orca, Grandin, Jane, Marie, Anne, Teresa, and Amelia. As you can see, we tried to choose famous female scientists as names, as well as other famous women.

Slide 4 ("Team People")

The second part of the team is the people team, the human members and collaborators: Bee-Li, Joyce, Vivian, Lara, Nevene, Sarah, Venessa, Andrea, Joanna, and Dan. Many of these were undergraduates who volunteered a lot of their time to this project.

Slide 5 (Rat Superstar Project Aim)

This team of rats and people played an extremely important role in a study whose overall aim was to test if exposure to well socialized rats, that demonstrate complex mental and behavioral capabilities, increases empathy of those working with research animals.

Slide 6 (People Matter)

So why did I embark on this study? Well, people matter. Within laboratory environments, I believe that a key element to achieving good animal welfare is having caring people who work with animals, and that includes both researchers and animal care staff. Caring people are likely more attentive to their research animals. In animal research, we often have animals under the care of a variety of people, often in very dispersed labs, and so we really rely on every individual to take care of the animals well. In the bigger picture, I believe implementation of refinements also requires people who are motivated to make changes. So, attitudes of people working with animals is critical to safeguarding animal welfare.

So what are the features of caring people and how do we get caring people?

Slide 7 (Empathy & Compassion)

Empathy and compassion are considered important aspects of animal care. Empathy serves to establish concern and connection with another being. It directs our attention towards another and makes us take an interest in what is going on with that other being. Empathy makes someone want to refrain from hurting and instead helping another. Thus, a lack of empathy makes us less interested in the situation of others and how we affect them. So in my view these are ideal qualities for safe guarding animal welfare.

Slide 8 (Belief in Animal Mind)

Another closely related and overlapping concept that evolved from psychology research on attitudes towards animals is the concept of Belief in Animal Mind, or BAM.

Belief in Animal Mind includes beliefs that animals are:

- Self-aware
- Capable of solving problems
- That they experience emotions such as fear, pleasure, depression, and so on.

Such perceived mental endowment of animals is known to foster empathetic feelings [Hills 1995].

Slide 9 (Belief in Animal Mind)

For example, research has shown that people who are proponents of Belief in Animal Mind are:

- More concerned about animal welfare
- They behave more humanely towards animals
- And they have more empathy to both animals and humans

So in conclusion then, it seems reasonable to think that the research community benefits from people who believe in animal mind with empathy and compassion. So how do we get such people?

Slide 10 (Educational Intervention)

That was the goal of this study. So my goal was to develop an “educational intervention” using rats that capitalized on features important to fostering empathy. Some research suggests that considering empathy with animals is an important factor that should be considered when creating humane educational programs [Apostol 2013].

At my university, the University of British Columbia [UBC], as at many other institutions, and I’m sure in most of your institutions as well, there are mandatory training programs where animal researchers and animal care staff receive education and training about the species they work with, often including basic handling. These courses are mandatory at UBC. So we designed an intervention as part of one of these courses for rats, which was called: Introduction to Working with Rodents in Research.

The students enrolled in this class were exposed to either “regular”, which I call control, or “superstar” rats, the education intervention or the treatment rats, and I’ll explain those in more detail.

Slide 11 (Educational Intervention)

For the intervention, students observed 7 highly trained rats, the “superstar rats” that I introduced at the beginning of the talk; they observed them perform, and I’ll explain that more in detail later.

The intervention was designed to promote elements that are considered important to being empathetic, so it was designed to:

- Encourage feelings towards the rats by witnessing personalities, the relationship of the rats with handlers, and maybe even some anthropomorphizing. Feelings of compassion motivate us to direct our attention to others and take an interest in their experiences.
- The intervention also tried to provide direct experience with rats. So we know that the more direct experience with individual animals, the more likely we perceive them as deserving of empathy and compassion.
- And finally, the intervention tried to increase the understanding of the mental experiences of the rats. To help foster empathy, it helps to learn more about the mental experiences of animals, to increase the similarity between us and them. So the idea was that when students see these cool, superstar rats they'll go back to their labs and they'll think a little differently about their own research animals, for example, maybe be a little more attentive to how they're doing after surgery or other procedures.

The regular rats, or the control rats, involved students who were enrolled in the class. They just saw the typical rats that were not trained, that had a limited amount of handling or socialization with humans prior to the class.

Slide 12 (4 Phases)

The study involved 4 phases: socialization, training, educational intervention, and focus groups. So phase 1 and 2 were necessary to prepare the rats for the actual educational intervention to get them interacting and working calmly with people and to make them the superstars. The final phases 3 and 4 were used for showcasing the rats in the intervention and for evaluating whether intervention influenced attitudes, at least in the short term.

Slide 13 (Housing)

To give you a sense of the environment where the rats were housed, the rats were kept them in these two-level Critter Nation commercial pet cages. The rats were provided with a number of enrichments as shown in this picture.

Slide 14 (Lighting)

Their housing room was equipped with red lighting as you can see here. As many of you know, rats are nocturnal and they cannot see the wavelength red. So when red is on, it is as if it's night time for them. So that way we could work with them in the red light when they were most active and we thought training would work better in their active hours. However, ultimately the rats would end up in the room where the intervention took place, which had white lighting, so we did transition rats – to rooms – to areas with white lighting at some point.

Slide 15 (Phase 1 – Socialization)

Phase 1 of the study involved socialization. We started with 2 pregnant rats, a Sprague Dawley and a Long-Evans, from Charles River. Once they gave birth we started a gradual

and gentle socialization program, where we got the rats used to our presence and handling. We started with getting pups and dams used to our smell; we placed pieces of material into the nests that smelled of us (we actually wore them under our clothes). We put our hands in the cages to let them smell us and over time we'd touch the pups, eventually lift them up and so on. All the time, ensuring the mothers were okay with this.

Slide 16 (Phase 2 – Training)

The second phase was the training phase. And for training, we used positive reinforcement training techniques using a clicker and a target. I'm sure many of you have heard of these methods, very common in dogs, also used in research, especially for nonhuman primates and dogs. Training began at about 4 weeks of age. We started in the housing room, then moved to a different training room, and finally ended up in the classroom, where the intervention would take place. Here are just a couple of general observations about our training:

- We found that the Long-Evans rats were more successfully trained than the Sprague Dawleys
- Both male and female rats were initially trained, but males became a little less focused at the onset of puberty.

So ultimately, we continued with a small subset of females for the training program and the intervention.

Slide 17 ("Training Video")

Here is an example of some initial training. There's no audio but I'll walk you through it. We direct the rat to go to the scale with the target, we click, and then give the reward. Direct the rat to the box, click, feed the reward. Back to the scale, click, reward. We used cheerios as the reward and they loved that. We had no nipping issues at all related to the rewards.

Slide 18 (Phase 3 – Intervention)

So once the rats were trained, they were ready for the intervention. On the day of the intervention, Sara and Venessa, as shown here, would bring the rats into the classroom in this big transport box. In the classroom, we showcased the rats performing the tasks that we had trained. When it came time for handling, the handling exercises, the students were given the "superstar" rats to practice with.

Slide 19 (Intervention: Set up)

Here you can see roughly what the set up looked like. Students were seated around a u-shaped table. We would let the rats free-range on the tabletop. We called the rats by their names and we ourselves did not actually wear gloves. You can see the computer screens in the background, those computer screens were cycling a sort of a show of slides, some of which you saw earlier, that highlighted the individuals and their personalities. My own team came up with these characteristics of each rat.

Slide 20 ("Marie")

For example, here's a slide of Marie. Marie is 100% food motivated. Would sell her siblings for treats.

Slide 21 ("Grandin")

Another slide is Grandin. Grandin probably loves to fetch more than any dog.

Slide 22 ("Video of Rat Intervention Showcase")

So, I'll go through an example of a shortened version of some of the same things that the students would see.

Slide 23 (Phase 4 – Focus Groups)

After completion of the class, the students were asked to join me for a pizza lunch where we chatted about their impressions of the class, their perspectives of the rats, and their views on how they might interact with rats going forward. Here's a summary of focus groups:

- We had 8 focus groups about 3 to 6 people per group.
- We had 3 control and 5 intervention groups
- There were 29 participants (25 researchers, 4 veterinary technicians)
- 20 females, 9 males
- The researchers were mostly graduate students and post-docs
- Their areas of research ranged from neuroscience to immunology
- And 50% had previous experience with rats, either as researchers or a few had them as pets at some point.

Slide 24 (Phase 4 – Focus Groups)

During the focus group, I asked participants 8 open-ended questions which were recorded and transcribed. And here are several examples of some of the questions:

- First, what was your experience when you handled the rats?
- Did you learn anything new about the rats?
- Do you feel your experiences with the rats in the class might influence how you care for and interact with your rats later?

Slide 25 (Focus Groups – Analysis)

For analysis of the focus groups, transcripts were analyzed using qualitative analyses. I used a method called "constant comparison". Which is basically, involves reading over the transcripts many times, dividing the text into small components or segments which were classified, and this process continued until emergent patterns appeared within all the data. And these were subsequently identified as themes. And today I will use quotes to illustrate a few themes.

Slide 26 (3 Major Themes)

Today I'll present 3 major themes. The majority of the results I present will be from the intervention focus groups. I have a few comments from control groups and I'll point those

out when they come. Of course, a major question in this study is whether there was evidence of empathy or belief in animal mind. Many comments demonstrated that the intervention supported an empathetic perspective and people were proponents of belief in animal mind, in some cases as a result of the intervention and in other cases participants entered the class with those beliefs. So, the next few slides will show you some results from the intervention.

Slide 27 (Evidence of Empathy/Belief in Animal Mind (BAM))

First, rats are amazing! So remember, a goal of the intervention was to promote an emotional response to rats. The intervention definitely promoted an emotional response. All participants in the intervention recounted a sense of amazement and surprise when they watched the rats perform. They were also impressed by their intelligence as reflected in what they could be trained to do. For example, this researcher said: "Yeah my dog can't do any of that." Note that this language or description was lacking from the control groups.

Slide 28 (Evidence of Empathy/BAM)

Participants commented that the intervention helped them to see that the rats had personalities and it made them want to meet the rat. For example, this researcher said: "I thought it was funny that they knew their names and they could respond to their names. It made them like they had their own separate little personalities, especially with the slide up there. So when I went to handle the rat, I was like "who is this?" I wanted to know, which is weird because in my lab it's just numbers."

Slide 29 (Evidence of Empathy/BAM)

There was also evidence that participants believed rats were capable of experiencing emotions and that it was reciprocated. For example, this researcher said: "They enjoy the handlers, they enjoy the interaction."

And another researcher said: "So now I know they would understand if I give them love. I feel like they would understand it, so I can actually make their lives better by giving them more attention."

Slide 30 (A Nudge in the Right Direction)

Another important finding is that the participation in the intervention reminded students of their moral responsibilities to their research subjects, which they felt was good. I call this a "nudge in the right direction". This researcher said: "It's a really good way of reminding us students that these are animals, creatures. They are intelligent, they aren't just a tool. Treat them humanely, treat them correctly. I think it's just a good reminder and oh yeah, they are adorable."

Slide 31 (A Nudge in the Right Direction)

[This researcher said: "I think about them differently now. "Y" and I just anesthetize rats and take their brain out. We actually got to see more of what they're capable of. I have a bit more respect for them."]

So, overall there was good support for the prediction that those who participated in the intervention were positively affected by the rats and that this did foster empathy and compassion. For the control groups, in contrast, few comments were related to the rats that they met in class.

Slide 32 (Evidence of Empathy/BAM)

So, moving on to the control groups, as I mentioned there were few comments related to the rats they met in class, however, some participants did mention that they were cute. The focus of discussion in the control classes were mostly on what was learned in class and often on the technical aspects. For example, when asked about their general impressions of doing the handling exercise with rats, this researcher said: "Yeah, I learned that thing that once I grab the rat outside the cage, and I should turn around so the rat may not get into the cage again, that's something I learned new here."

Slide 33 (Witness to Human-Animal Relationship)

The second major theme was related to the type of human-animal relationship that was displayed in the intervention, between the handlers (us) and the rats. There were many discussions about this. And in those discussions the relationship was considered as more pet-like, and several sub-themes arose from that.

Slide 34 (Witness to Human-Animal Relationship)

First, this intervention improved the learning environment and handling skills for participants. How did it do that? The class reduced fear of being bitten while learning how to handle rats. Many had fears of being bitten coming into the class. However, because they witnessed the way in which the handlers interacted with their rats – the handlers being us – they could easily see that rats were calm and unstressed and having fun.

For example, this researcher said: "I saw how you were handling the rats and you were using your hands. When I first saw them, I was a little taken aback and then I just noticed that you were comfortable with them and that made me feel like they wouldn't bite."

Slide 35 (Witness to Human-Animal Relationship)

The second theme related to the human-animal relationship was the consequences of knowing your research animal. While the goal of this study was not to show people how to follow the approach we used in our intervention, such as clicker training rats and developing relationships with rats, we were simply trying to influence attitudes. Nevertheless, participants talked a lot about this – how our approach – about our approach and they imagined what it would be like to implement a similar kind of

socialization and training program in their own labs and what the consequences would be if they did that.

There were differing views and concerns about becoming attached, bonded, or connected to their research subjects. And whether getting to know their research subject would result in a greater emotional burden for animal researchers, in particular when animals needed to be euthanized as part of the research. For some participants, this was considered an acceptable burden because this was the moral responsibility of doing the work, at least the rats were treated well and with respect during their time as research subjects. For others, this burden was considered too difficult.

Slide 36 (Witness to Human-Animal Relationship)

For example, this researcher hypothesized that: "As a researcher, it would be a lot harder to sacrifice them. I think because usually they just have numbers, right? Them having names and you having that connection with them – I think I already have a hard time with the sacrifice – so I think it might make it even harder. But at least they lived a happy, fun little life, right?"

Slide 37 Witness to Human-Animal Relationship)

As mentioned, the human-animal relationship witnessed by participants was described as pet-like. Some comments suggested a moral unease about blurring the boundary between pets and the traditional view of research animals. And the traditional view is one of viewing animals as a means to an end, rather than as pets or animals where we – where people have personal connections. For example, naming was not permitted in one facility because it fostered a personal relationship. As this animal technician described: "So our boss said, just said, no one's naming anything. We're just doing it the researcher way."

Slide 38 (3. Data Validity)

The last theme that I will discuss today is related to data validity. It was very interesting that many focus groups discussed the potential consequences of such a program (again, the training, and socialization, etc.) the consequences of this program on data – on their own data.

Slide 39 (Data Validity)

There was lack of consensus on how the human-animal relationship affects data. In some cases, it was viewed as positively in the sense that it reduced stress [in rats] which equals better data. For example, this researcher said: "If we could just get them into the anaesthetization chamber a lot more easily, it would reduce a lot of stress. I mean even stress could sometimes influence experimental results."

Slide 40 (Data Validity)

In contrast, others viewed this negatively, via bias. For example, that familiarity with individual research subjects increased risk of bias. For example, this researcher suggested: "That's also kind of important for us because we have to do blind study right.

We shouldn't really know them [rats] at all because that might compromise the study. If you have a favorite one, then we may give them better treats or whatever." So, overall there was lack of consensus on what the best approach was to ensure data integrity.

Slide 41 (Conclusions)

So, to finish up with some conclusions. There were a variety of benefits, limitations, challenges, and opportunities that arose from the results. The intervention had some benefits, for example:

- I believe it shows promise for promoting empathy and compassion
- It reminds us of our moral obligations towards research animals
- It improves the learning environment for handling by reducing fear of being bitten
- And finally, such an intervention has the potential to impact a large number of people. As I mentioned earlier, many institutions have similar classes around the world, so there is a lot of scope for implementing something like this for a large number of people.

Slide 42 (Conclusions)

There were also a lot of challenges that were raised by the results:

- The comment related to data validity suggest that there is a need for explicit discussions regarding the variety of variables impacting data and how to balance them with welfare. For those with views that it had negative effects, there was failure to acknowledge that all handling and husbandry, for example, lack of socialization or high levels of socialization, are also factors that potentially impact data. And I'll just remind you that these were young researchers starting their careers in science.
- The longer-term benefits need to be evaluated. This was a short-term study looking at immediate impacts. Obviously, our hope would be for longer-term impacts but we didn't evaluate them.
- Related to the longer-term impacts, though, is the issue of overcoming barriers within laboratory cultures. We know from anthropology research that the culture of individual labs plays a big role in the way the lab treats and cares for their animals. So even if single participants returned with a new approach, they might quickly fall back into their old habits. Key role models can be important and some participants in my study pointed out that they found this to be important in their own labs. So our data showed us that role modeling the relationship of handlers with rats was helpful. So hopefully some of these participants can go back and act as role models in their own labs. In general, though, I believe it's important to foster such a culture within the science community as a whole.

Slide 43 (Conclusions)

This study highlighted the challenges related to human-animal relationship. There was moral unease about viewing rats as pets and there were concerns for the potential emotional burden of becoming more attached. And these are very important considerations but also positive opportunities.

First these findings point to the importance of providing support for researchers so that they can cope with the emotional burden when they do develop relationships with their animals. For example, this might be in the form of better support groups, recognitions of challenges, and so on.

Slide 44 (A Good Life for Both Animals & Humans)

However, I also see this as a positive opportunity where the good life for animals is tied to the good life for humans. While it's true that people feel sad about euthanizing animals or causing harm, I feel that a very powerful way of coping with this is to feel confident that you were able to provide a good life for those animals, and here I include not just the type of relationships but other refinements such as improved housing, etc. I'll leave you with one quote from a member of my own research team who was interviewed herself about her experiences using animals in research. She spoke about how she felt better about euthanasia because she had given the rats a better life. And I believe that this is a powerful message.

So Nevene said: "And in my mind, I'm so happy that they got to hang out and have what I see as a more positive welfare-filled life than some of the other rats at the facility. To me, the positive part of the relationship outweighs that single feeling of grief every single time."

Slide 45 (Thank You)

So in conclusion, I would like again to thank all of you for your attention. It was a pleasure to share my work with you. And in particular, I would like to thank Johns Hopkins Center for Alternatives to Animal Testing who funded this project. If you have any questions I'd be happy to answer them. If there's no time, please feel free to contact me via the email that's listed on this slide [cathy.schuppli@ubc.ca].

Slide 46 (Questions)

>>Neera: Thank you, Dr. Schuppli. That was terrific. And I am sure the listeners do have questions. Listeners, please type your questions into the chat box on your webinar screen. OLAW may edit the questions for clarity, duplication, and fidelity to today's topic. We will start first with a few questions that we received before the webinar.

Slide 47 (Question 1)

Cathy, what were the criteria used for selecting the "Superstar" rats?

>>Cathy: Thank you for that question. We started with 23 pups and we worked with all of them for a period of time. Eventually it became impractical to train every rat so we started to select a subset and we used criteria, sort of based on their ability to learn and ability to be calm and perform in a variety of settings. So ultimately we continued with a small subset of females for the training program, and these were, as mentioned, mostly the Long-Evans rats.

Slide 48 (Question 2)

>>*Neera*: Thank you, next question. How can institutions apply the results of your study to train or educate animal users?

>>*Cathy*: Thank you, the video is available, just, for anyone who wants it. Please contact me at via the email address and I'll send you a copy or a link to the copy. I'd like to get it online so you can download it but I haven't got that organized yet, unfortunately. I have not tried using the video alone in our own training program to see if it is as effective as using actual rats. However, several institutions around the world have taken my video and have incorporated it into their own education programs with researchers. Unfortunately I haven't heard back from anyone about how it's going. For example, the RSPCA in the UK is using it in their educational materials for training early scientists and animal care technicians. So I'd encourage you to borrow it if you'd like it. One thing I would add though is that I think in the training programs that we shouldn't shy away from speaking about animal emotions. In animal research, these contradictory notions of both empathy and instrumentalism (using animals as a means to an end) are always present. And in the process of becoming scientists, we should make sure that the animal is not distanced or anonymous in that process.

Slide 49 (Question 3)

>>*Neera*: Thank you. And so true. So question 3: How is such an intensive approach (the animal training, etc., that you described) applicable to large scale studies?

>>*Cathy*: Thank you, yeah. That's a common question and probably related to the focus that the participants in the intervention also had on that aspect of seeing the rats. So just first, my intent was not to suggest that everyone needs to go out and use positive reinforcement training, although I'd love that. There are certainly lots of logistical challenges and limitations, such as working with animals in highly biosecure facilities for implementing such a program. But there are other aspects that could be important, for example, the time taken to get your animals used to handling to minimize stress, etc. I do think that we have to be careful to not underestimate the impacts that poor welfare has on data, and so we need to keep in mind the potential benefits of such approaches that do improve animal welfare. So maybe it's not positive reinforcement training but it could be better enriched housing, appropriate handling, such as the tube handling published by Gouveia and Hurst, or adequate socialization programs, for example.

Slide 50 (Question 4)

>>*Neera*: Okay, thank you, Cathy. So, the fourth question was: What was the duration of your study and are there plans to follow-up with participants in the long-term?

>>*Cathy*: Yeah, that would be fantastic. So the study was about one year. The rats were showcased for about 4 months or so. And yeah, it would be very important to follow-up with participants further out from the intervention to see whether the intervention had an

impact or what challenges they faced. I had that intent, but so far, I was only able to follow up one person one year later. She did speak to us about how she definitely remembered the intervention and she had thought about it many times. Since graduate students and postdocs are pretty transient, at this point I think I would need to start with a new group of rats, solely with the intention of following people long-term. But I think that's very important and that would be great and I hopefully I can do that.

Slide 51 (Question 5)

>>*Neera*: Okay, so the fifth question: Can you elaborate on how your results affect or impact compassion fatigue?

>>*Cathy*: Yeah, this is a very an important consideration and one that fortunately I think has been receiving more attention lately. I'm sure many of you have seen presentations or heard or read about compassion fatigue or heard the term culture of care. Unfortunately, there is little evidence-based research on therapeutic interventions in the animal care fields. We have to rely a lot on what is taken from compassion fatigue in human medicine. I personally would rather that people don't cope by shutting down. I think that engaging in positive interactions with animals leads to increased morale and job satisfaction in caregivers, which leads ultimately to better care and improved animal well-being. It's important for both animals and humans, and this is true and has been found in human medicine as well; however, of course we do need to be mindful of the impacts.

A culture of care, which is used a lot, is a term or a culture that supports well-being of animals and people. Areas that have been suggested as important to culture of care include creating an environment where staff feel empowered to come forward with concerns or suggestions they have to improve animal care and use programs. One that respects and nurtures staff compassion. Cultures where there are mechanisms to support open communications about these issues. Programs that recognize good work of staff and researchers. Senior management or administrators that reinforce commitment to animal welfare and the 3Rs and acknowledge the challenges in the job when there is grief or loss of the animal.

In the human medicine programs, sort of mindfulness programs are very important and there's evidence that they work, so something similar in animals I think is important, basically, where people can self-recognize when problems are occurring and self-care for themselves.

I did some interviews in a previous study with researchers and others, IACUC members basically, and I heard interesting stories around different ways of dealing with this. There was one example where technicians really needed their principle investigator to come in the lab so they could sort of share the burden. However, their actual investigator didn't want to come into the lab because he felt morally uncomfortable about that process, about the animals being in research. So they both had these similar concerns and they

dealt with them differently, but it's important, I think to acknowledge that and share more, perhaps.

There are a variety of things that are in the literature now and that institutions are implementing, and I think that's great and I'm glad they're receiving attention. I don't think we've solved the problem yet. So yeah, it's a good question.

Slide 52 (Question 6)

>>*Neera*: Okay. So you mentioned this during your talk and I guess we would like a little bit more elaboration. In your opinion, how do you think your results affect the integrity of research data and reproducibility?

>>*Cathy*: Yeah, I think this is a very important question and for me, I think there are two important aspects to this. First, I'm sure many of you heard about the current discussions going on about the translatability crisis of the animal model. The problems with the animal model, why aren't we getting enough final clinical outcomes for a lot of the work? The second part is the increasing evidence of the impacts of many variables on data validity, including how we house, care, and interact with animals. And I think these variables potentially play a role in this crisis and Joe Garner et al. [2017] have a nice paper that sort of parses out all these different components.

We cannot ignore things like appropriate socialization of rats or other species or finding ways to reduce stress and improve wellbeing, including possibly positive reinforcement training, because these may be essential to an effective animal model, ultimately. Again, keep in mind that my study was aimed at fostering a culture of empathy, but I do think that's also tied to creating a generation of scientists who are ethically motivated to safeguard animal welfare but also to be vigilant and honest about the strengths and weaknesses of the animal model itself. To look for improvements where possible, for example.

Slide 53 (Question 7)

>>*Neera*: Okay, thank you, Cathy. So, did you ever consider carrying out a pre and post-intervention survey on empathetic attitudes to see if attitudes changed over time?

>>*Cathy*: Yes. I did and I had originally set out to do that. There's a couple of validated surveys out there that assess empathetic attitudes and belief in animal mind. I did plan on doing a pre/post comparison. However when I started, I had so few participants actually take the survey before the class, that I ended up having to give up. While I did approach everyone via email to ask them to volunteer for the study, very few participants actually volunteered ahead of time. But I would walk into the class in the morning before it started and talk about my study, and that's mostly when people agreed to participate. So, I just had to kind of accept that the best data I could get from this group of people was the focus group immediately following the class. And that was the easiest way – the focus

group – having it at that time was also the easiest way to get them to volunteer to talk to me. So these are typical limitations of these kinds of survey/interview type studies.

Slide 54 (Questions)

>>*Neera*: So we're getting some interesting questions in for you, Cathy.

[Question 8]

First question: How was the IRB human subjects process handled? And were the participants told about the purpose of the study up front?

>>*Cathy*: Right, good question. So I had the pleasure of dealing with both IRB and IACUC on the study, so that was challenging. The IRB – it's a little bit tricky because the IRB of course wants full transparency to anyone in terms of the consent process and what they're informed about, but yes, we didn't want to influence the results by saying too much in the consent process and in – there was an introductory letter that sort of gave an overview and then there was the official consent process. I can't remember the exact wording, but we kind of pitched it more along the lines of – this is a training class, we'd like to improve the training class, and we'd like their input on how to do that. They're going to work with some rats and that sort of thing.

We definitely tried to steer away from any language that would suggest we were trying to promote empathy or change attitudes and that sort of thing. We just kind of made it more around we would like your feedback on how the class is going. So yeah, we did edit at some point the consent form because there was something in it that seemed a little – maybe a bit more that way. It's really tough, but the IRBs were aware of this issue and we weren't doing anything harmful to the participants who volunteered. So by not being completely transparent, it wasn't likely to cause any negative impact or harm to the participants, so not so serious as it might be for certain – for other clinical kinds of studies. Yeah, otherwise the process went pretty well. Our biggest challenge was just actually getting people to volunteer.

[Question 9]

>>*Neera*: Okay. So how long did the actual training of the rats, those superstar rats, take?

>>*Cathy*: Right. Yeah, good question. In hindsight, I wish we'd kept more detail because it was really a secondary goal for us personally to kind of learn more. This was my first time training rats as well, so we wanted to learn how to do that effectively, but that wasn't our primary goal. Our primary goals – we weren't trying to speed it up or whatever. And also some of the two main people who helped training were also learning, so keep that in mind.

I can't say precisely how long it took. I mean it was – I think it took – it took a pretty long time, probably several months, but at the same time we were doing – the actual clicker

association is really fast. Getting them onto the scale and the target training was pretty fast. I can't say for sure, but it was probably a couple of weeks easily done. But then we realized – we started with the idea – let's demonstrate lab-specific kinds of skills, then we thought let's expand that to make the rats a little bit more fun looking. So then we opened it up to whatever the rats were willing to do. And we definitely tried to capitalize on the rat's individual propensities or likes of doing certain things, which some rats did – really were good at fetching, others were less adventurous and did different things. There were a lot more things that were not on the video that we did train them to do. We'd tell them go pick the syringe up, go pick this blood container up, and they'd go off and do that. We did some like various walking on their hind legs and some high fiving and some jumping and stuff.

So it's hard for me, unfortunately, to really say for sure how long it took partly because we were learning and just trying a bunch of different things. It was a pretty intensive process overall. We did after I finished and the rats were getting older, we started to try to look at training more and we've tried to do a few specific things like use them to go into the induction box. We were trying to train them to calmly tolerate isoflurane introduction through positive reinforcement training. For that we spent more time and we documented very carefully every day with videos how they were progressing and things like that. So, I have some of that information.

>>*Neera*: So you ended up with your little personal assistants and cheerleaders at your side, pretty much?

>>*Cathy*: Yeah, for sure. No, in the end I had that huge team of people were all mostly volunteer undergraduate students who came in religiously to train the rats to do things. Yeah, it was fun.

[Question 10]

>>*Neera*: So here's another question I think is on everyone's mind: Were the trained rats euthanized? And if so, who did the euthanasia, and did you consider adoption?

>>*Cathy*: Right, good question. We definitely considered adoption. We did adopt out some of the males. It is interesting. Our institution does allow adoption on a case-by-case basis, and I – we are pretty open in our tours with undergrads and so on. And I used to tell people all the time when they came through, does anyone want to adopt these rats? You don't get a lot of people, unfortunately. Even the people who worked with them, their apartments didn't allow them to have rats and stuff like that. It wasn't easy even though I pushed hard for that. So we did use the rats. We thought to carry on with just practicing training and doing a variety of things, not specifically an intervention, and we did that for quite a while. They did age up to close to two years, most of them. So they did live in the research setting with a lot of interaction.

I ended up, for the ones that were euthanized who were, most of them, I ended up euthanizing them. I also have an interest in improving euthanasia methods as well, so I used them for a variety of things like pre-dosing with midazolam, fentanyl – a few things like that for induction. I used them to test out a few things around improving the euthanasia process. I did also, I will say, a few rats, there was a researcher who worked on – a neuroscientist who did something with really elderly rats and of course it's hard to have a lot of elderly rats because of their illnesses that they get. So he basically anesthetized them and it was a non-recovery, so I did let him have a couple of my rats for that.

[Question 11]

>>*Neera*: Okay. Another question: Will you plan to continue this type of training as a part of regular training for your staff at your institution?

>>*Cathy*: Yeah, it's a good question. So yeah, I am doing this currently. We are trying to make this a more normal thing. Now, obviously this right now we're focused in one facility where this is a bit easier. It's mostly a large animal facility with some small number of rodents and it's conventional, it's just a lot easier. So we are implementing this not just for rats.

We have a plan and we're currently in the process of developing the SOPS and the training materials so every animal that comes in that facility will have some basic positive reinforcement training for things like going on to the scale to be weighed and some basic kind of exams and that kind of stuff. That's our plan. We're not – we don't have like some institutions that have animal trainers with the larger animals and stuff that are on staff, we don't have that so we're struggling with how to train our staff and make it time manageable to implement it. But there's a strong interest.

We're also trying, which is kind of fun, with the animal welfare program at UBC, we do have this huge number of undergrads who want anything to do with animals. And so we have a lot of courses that we involve students with the laboratory animals. And we bring them in. So we try to integrate – we have a rat handling program that's the pre-vet and animal welfare club and they all go through a little training. They basically come in several times per week and they handle our training animals, in part to get the animals used to being handled for class and also to enrich the lives of those undergrads coming in. That's been going on for a few years and we have about 30 students every year who volunteer to do that. We're always trying to find ways of bringing in other people to also help with the human-animal interactions. We are trying to do this on a bigger scale.

>>*Neera*: And for those participants who may be interested in incorporating your video as part of their training program, you said that they can contact you and it can be made available to them, right?

>>*Cathy*: Sure, absolutely, yeah.

[Question 12]

>>*Neera*: Great. So, we have two more questions. Do you have plans to train PIs or heads of labs? Since this was effective with young researchers, but research culture is a potential issue, this would potentially help change the culture faster. Do you have plans to train PIs or heads of labs?

>>*Cathy*: Yeah, I don't have specific plans but that's a very, very good question. And this is a really much bigger question around culture, and it's hugely important. And, you know, there's evidence in other areas, Temple Grandin has done a lot of work around slaughterhouse culture and how these management and more senior members of that culture are critical to shifting cultures.

So, I would agree and there's also evidence in the literature for, I don't know, the changing of scientists through their young, their early career to late stage. And there is evidence that things like empathy – not that these are – obviously not cruel people or have no empathy, but these things become marginalized a little bit through the process of becoming a scientist. You look at animals more as objects. That's just the way it's happened, and I saw evidence of that even in my own participants. There was a range of experience levels and the brand new scientists, never worked with rats, again this is a little anecdotal, but they were more open to the idea of seeing rats – had more emotion around it, whereas the slightly more senior researchers that came into the intervention, they even commented on that themselves that it changed for them in their own careers and they saw young people having more of that than they did, etc.

So yeah, it is a real issue, so it would be great to do that. Obviously those PIs are not coming into the classes anymore, but we do have a regular series at UBC on laboratory animal welfare that many of them attend so maybe there's ways of going back to the labs, the PIs, and doing a similar intervention. That'd be a great idea.

[Question 13]

>>*Neera*: So one final question is: How did you maintain an SPF status when in an open environment?

>>*Cathy*: Yeah, that's challenging for any of these kind of methods, that's true. We didn't have to worry about it too much in this particular facility that we worked in. It wasn't really a major issue other than paying attention to exposure to like pet rats outside. You know, having people – making sure everybody – because some people did have pet rats and they had the appropriate showering, etc., when they come in to our facility. But in that facility it was pretty conventional so yes, these were clean rats, but we didn't have any issues. But it's also the training program facility where all the people come in and so it's a bit harder to control disease because you get a variety of people coming in and you make assumptions about that they're coming in with the appropriate showering, etc. But

we do accept that this is not a high biosecure facility, for the rodents anyway. It wasn't a big issue in my case, but it would be in other facilities, absolutely.

Slide 55 (The 4th R: Rehoming/Retirement/Release - options for laboratory animal research subjects when the study has ended)

>>Neera: Well, we've come to the end of the questions to such an interesting topic. It's a hot topic, of course. If you listeners think of additional questions in the next week or two, as you reflect on this webinar, please send them in to us, and we will impose on Cathy to answer them, and then we'll amend them to the end of the transcript, which we will be posting on the OLAW website in a week or two. So, now I would like to thank you Cathy. Cathy, you've been incredibly generous with your time. I'd like to thank the University of British Columbia for loaning you to us. And I want to thank all of you listeners for participating in our webinar, with special thanks to those who sent in questions.

The next OLAW Online Seminar will be on June 13, 2019, please mark your calendars, when Dr. Lara Helwig from Brown University will talk to us about exploring what options exist [for laboratory animals] including adoption, retirement, and release, when to exercise these options, and how to plan for these options when designing studies which involve animals and have completed – at the end of their studies, what are the options available to these animals. This talk titled **The 4th R – Rehoming/Retirement/Release – options for laboratory animal research subjects when the study has ended** will highlight what guidance is available from professional organizations and federal, state, and local regulatory agencies. Developing and establishing institutional policies to facilitate these options and working with other interested parties (such as research administration, IACUC, legal, and communications) will also be discussed. The talk will explore establishing criteria for which animals are suitable for these options from both a veterinary and legal perspective and the due diligence required to ensure that they will be provided for in their new home. Logistical challenges drawn from past experiences will be shared along with lessons learned and caveats for future ventures.

I wish everyone a good spring and look forward to having all of you join us for our next webinar in the summer of 2019. Good bye!

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