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Beyond operant conditioning:
Results of applying a cognitive-emotional training model to sea lions

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Introduction

Current animal training uses mainly operant conditioning techniques.

The incorporation of techniques and protocols derived from operant conditioning was a milestone in animal training. We passed from artesanal training models, dependent on trainers personal skills, to a technical model that allowed us to anticipate and plan our work. The training derivative from operant conditioning is characterized by:

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- Individual reinforcements, without social value.
- Extrinsic reinforcements.
- Secondary role of emotional processes. It is not given a high value to the emotions that the animal presents, unless there are emotional problems, such as fear or aggression.
- Secondary role of the ethology of the animal. We focus on that learning rules that are shared by many species, including ours.
- Training is valuable for its applications in the animal husbandry and exhibition of animals. The same word "operant" refers to the operational functionality.

Introduction

Training protocols derived from this model are generalists, often almost the same for different species. Operant conditioning is the "Esperanto", the universal language of learning.

This training model is functional but is obsolete regarding to what we know today about learning and behavior. It is time not to dismiss the known, that we know works, but to extend, supplement...

Introduction

Current knowledge makes possible and advisable:

- Design of specie-specific training protocols. There are specific behavioral and learning characteristics of each species that allow us to teach them differently, as for example the facility to empathize of dogs, the ability to perform certain types of deductions of pongids or the delight of resolving problems of many cetacean and otarids.
- Comprehensive learning .

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Introduction

- Use of social reinforcements. Social species have a special facility to establish emotional bonds and offer behaviors as a way to communicate and achieve social objectives, this can and should be used in the training.
- Construction and use of intrinsic reinforcements.
- Improvement of emotional management of animals. The quality of the emotional states that evokes the animal during its training should be the first evaluator of the quality of this training.
- Training is, also and above all, valuable as enrichment of animal life.

Introduction

The animal training has to turn the progress of knowledge into effective working protocols.

Our project proposes a model of training that incorporates and uses these parameters systematically and orderly.

Objetives of the project

- Systematization of a species-specific training protocol, reproducible and with reliable evaluators of success/progress..
- Use of the affection between the animal and its trainer as generator of behavior.
- Evaluation and search for the amusement of the animals to motivate them to train.
- Training as context where to carry out **enjoyable** activities and that represent mental and physical stimulation for the animal.

A. Timing:

1. Monitoring and evaluation of training (three months). We began working with several months of evaluation and monitoring of the methods of marine mammals, birds of prey and psittaciness trainers of the Madrid zoo.
   - Observation and data recording
   - Questionnaires to fill in by trainers. For our better understanding of trainers working protocols and vision about their own work an on-line survey on various aspects of training and their relationship with animals was included in the study.

A. Timing:

2. General design of a species-specific training model
3. Application of the model and adjustment of the working protocols (twelve months)
4. Evaluation of results

B. Subjects of study:

Due to their species-specific characteristics we focused the work on dolphins and sea lions, choosing to develop for twelve months the full working protocol in three specimens of sea lion:

- Elvis, Californian sea lion
- Eddie, Californian sea lion
- Simón, South American sea lion

C. Location:

- Pinnipeds and spheniscidae facilities of the Zoo Aquarium Madrid

Cognitive-Emotional training model

The proposed model is divided in three stages, each of which has different objectives and protocols.

1 Stage: Bonding and Communication

2 Stage: Teaching/shaping of behavior

3 Stage: Working with learned behavior

1 Stage: Bonding and Communication

This is one of the most relevant stages of this model, which also implies a way to train completely different from the usual.

The affection between animal and trainer **is usually avoided or eliminated**, which prevents the training being socially enriching.
Other times, **it is intuitively used**, this can generate problems of dependence or overattachment.

1 Stage: Bonding and Communication

We seek to construct the proper emotional bond between animal and trainer. To achieve it we must include the relationship as part of the work and the context of training.

We must teach the animal a series of signals coming from the coach, that will be the social language of the inter-specific group human/animal and would not include the teaching of conditioned reinforcers.

The communication code is **directly emitted by the trainer.**

1 Stage: Bonding and Communication

Objectives

- Construction of a **healthy bonding** between the animal and its trainer
- Creation of a **communication code** of general use between the trainer and the animal
- Teach the animal to learn

1 Stage: Bonding and Communication

Working Protocols

- Bonding sessions.
- Transition sessions. For animals whose continuous and exclusive work on individual drivers has prevented to activate their social or emotional abilities towards the trainer.
- Teaching of the communication code.

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1 Stage: Bonding and Communication

Working Protocols

- Teaching of calming and playing spaces. We generate in the animal a predisposition in four aspects or dimensions: emotional, mental, social and physical, that allow us to manage the activity and the emotional state of the animal, as well as the quality of the social relationship between the animal and the trainer. Since different levels of stress and the presence of anxiety may affect how the animals process the information we must have a tool to adjust this parameter.
- Teaching training structures. We teach the animals how we are going to teach them **before** starting the training of behaviors, not simultaneously.

2 Stage: Teaching/shaping of behavior

Only when we have an emotional relationship and a quality communication between animal an trainer and, in addition, the animal knows how he will receive the information necessary for the training, we will initiate the teaching of valuable behaviors (either for handling or for exhibitions).

2 Stage: Teaching/shaping of behavior

Objectives

In this case the objetives follows a necessary order.

1. Getting from the animal the desire behavior

Only when we get the behavior we can continue with the:

2. Comprehending the behavior by the animal

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2 Stage: Teaching/shaping of behavior

Working Protocols

1. To achieve the behavior:
   - Use of the general training structures. This work is almost equal to the traditional work and uses as the main engine of learning the operant conditioning (including the use of conditioned reinforcers). However in our proposal this way of working is not perpetuated, it is just limited to the period of getting the behavior from the animal.
   - Shaping of innate behaviors.
   - Combinations of the two previous.

2 Stage: Teaching/shaping of behavior

Working Protocols

2. To comprehend the behavior:

Problem resolution with the behaviors previously achieved. We offer the animal a set of contradictory information such that:

- valuable information is the one achieved previously with associative learning and comes from the trainer,
- while the misleading (that takes them to perform behaviors which are not the desired) comes from the environment and even from the presence and attraction to individual reinforcements such as food.

Solving problems is also self-satisfactory, so this **is the first step to reach the intrinsic reinforcement of behavior** and links directly with the next and final phase of our proposal of training.

3 Stage: Working with learned behavior

As Bandura said, it is not the same to acquire a behavior than to perform a learned behavior.

One of the main limitations of current training models is that uses learning processes throughout the work, it keeps the animal as an apprentice, making more plastic behaviors but also requiring a greater maintenance than if the self-rewarding processes of the behavior are activated.

3 Stage: Working with learned behavior

Objectives

- Incorporate the behavior as an element of desirable interaction (social reinforcement) with its trainer.
- Activate intrinsic reinforcement processes of behavior.
- Get the animal to work with relaxed concentration

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3 Stage: Working with learned behavior

Working Protocols

- Work commitment.
- Occasional reinforcement of the effort of the animal and not its behaviors.
- Coordinated play throug the use of the playing space.
- Problem resolution.
- Emotional stability.
- Use of the calming space.
- Use of the innate shaped behaviors.
- Sequencing intrinsic and non-intrinsic reinforcing value behaviors.

Results evaluation

Training record for monitoring and evaluation of the proposed model

For data collection we designed a model form so we could evaluate the results and progress. Unfortunately in this occasion it was not possible for the trainers to fill it systematically, because it interfered with other aspects of their work.

Results evaluation

Documentation of the work evolution in video. Therefore the results have been documented in videos that reflect the application of the protocols and the progress made in each animal.

Videos are available for those of you interested in watching them.

Results evaluation

Opinion of the trainers. We believe that the views of the team's trainers are relevant, because of their extensive experience training this species, and these specific individuals, and for their possibility to recognize improvements in the training.

Results

General benefits

Although the number of animals is very low to reach final conclusions, the set of data collected and the opinions of the trainers agree to point out the following benefits:

- **Decrease in the number of extrinsic primary reinforcements** (fish) to maintain or improve the quality of training.
- **Greater consistency of the trained behaviors.**
- **Improvement of the relationship of animals with trainers**, sometimes preferring the affective and/or playful contact instead of food rewards.
- **Decreased stress** in animals, improvement of its management and reduction of emotional ups and downs during the training.
- **General improvement of the animals behavior** in the facility and of the interaction with other individuals.

Problems and limitations

General

Due to the characteristics of the training model it is necessary that new trainers that are incorporated to the staff must carry out the stage of bonding and communication to maintain the results obtained by the trainers already bonded to the animal.

Problems and limitations

Californian Sea Lion:

Eddie and Elvis showed a timely increase of their stress levels during the approach of problems (comprehensive learning), which was successfully managed through the use of the calming space trained to the effect.

Problems and limitations

South American Sea Lion:

Simon had an important difficulty to achieve long intrinsically reinforced behavior sequences, which were only achieved occasionally. This was attributed by the trainers to the quiet nature of the subject.

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Conclusions

According to the group of participants in this project the proposed model had provided :

In relation to animal training

- More organized and systematic work.
- Reliable data collection
- Ease of choice of criteria and moments of progress
- Ease of planning of sessions and exhibitions

Conclusions

In relation to animals

- An species-specific trainig model improves results and increase the benefits that animals obtaine when are trained.
- Promoting intrinsic reinforcement processes the animals enjoy more the training and reduces the need for extrinsic reinforcers.
- The emotional relationship of animals with their trainers can be an element of social enrichment for social animals.
- Activation of cognitive processes involves greater consistency of training and greater involvement of the animal in the process.
- The incorporation of calming and playing spaces allows to manage optimally the emotional alterations that arise during training.

Recommendations

In our opinion the benefits and results previously described **make advisable to incorporate the comprehensive learning, intrinsic reinforcement and emotional management processes** not only in the sea lions, but in any species subjected to training.

Bonding between animal and trainer should not be avoided or left to the intuition of the trainer, but supervised and optimized to make it useful as reinforcement and social enrichment for the animal.

Recommendations

Systematized working protocols with objective evaluators of success/progress allow:

- a simple data collection
- greater speed in the acquisition of the trainer skills
- a more consistent training
- and also reduces biases allowing to unify results and to replicate the experimental conditions when researches using trained animal are carried out.

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