Never wrestle with a pig . . .

The use of positive reinforcement training (PRT) has slowly spread from the world of zoos to laboratory animal facilities housing non-human primates, chimpanzees or dogs.\textsuperscript{1–5} PRT is a powerful tool which, when used correctly, increases animal as well as animal caretaker welfare, increases quality of research, and even enables studies that otherwise could not have been performed. A quotation often attributed to George Bernhard Shaw says, ‘I learned long ago never to wrestle with a pig. You get dirty, and besides, the pig likes it’. In the laboratory, pigs seldom like to be wrestled with, and it is about time the pig-wrestling stops, and the PRT is introduced.

PRT is a concept named after one of the four learning principles in operant conditioning during which an individual learns an association between something he does and the consequences of that behaviour. Using positive reinforcement (PR), the trainer reinforces behaviour by adding something good. The consequences for the animal when showing that particular behaviour will, hence, be good and the likelihood of the animal showing that behaviour again will increase. If the pig backs away (the behaviour) from the gate when the trainer approaches the pen and the pig receives a piece of apple as a consequence, the pig will more likely back away from the gate the next time the trainer approaches.

If the pig does something unwanted by the trainer (e.g. pushes and bites the door of the pen when the trainer approaches), no reinforcement is given; a procedure termed negative punishment. In this manner, the trainer punishes an unwanted behaviour by taking away (withholding something good. Hence, the consequence for the animal when showing such behaviour will be bad, and the likelihood of the animal showing that specific behaviour again will decrease. These two operant procedures always complement each other, and if you are truly working with PRT, these two procedures will be the only operant procedures used.

The two last operant conditioning procedures should be avoided. Thus, no negative reinforcement (NR), i.e. applying pressure on the animal and relieving pressure when the wanted behaviour is shown by the animal, or positive punishment (PP), i.e. adding something aversive, when the animal performs an unwanted behaviour, should be used. These two operant procedures also complement each other. When slight pressure is applied to the animal two things may happen. The animal shows the wanted behaviour and the trainer releases the pressure (increasing the likelihood of the animal showing that behaviour again since the consequence was good – something bad went away). If the animal does something else, the trainer increases the pressure thus applying PP (adding something bad to decrease the likelihood of the animal showing that behaviour again). Training with aversives, either by applying them or by relieving them (which often means that you must apply them first . . .), may result in an animal not performing its best or in the worst case scenario induce a strong emotional response such as fear or aggression. In horses trained solely by PRT, the training increased the motivation of the animals for participating in the training sessions and their inclination to explore, and try to find solutions, when compared with horses trained using NR training.\textsuperscript{6}

Other types of learning that inevitably will be part of PRT are habituation, desensitization and classical conditioning. Habituation is a non-associative type of learning during which the animal will learn that a certain new thing or situation (e.g. an electrical clipper) is not dangerous and need not be reacted to. If the animal already reacts fearfully to the stimuli, desensitization is employed. Desensitization basically means learning that something you fear or dislike after all turns out not to be dangerous or aversive. In classical conditioning (Pavlovian conditioning), the animal will learn to associate two stimuli with each other (e.g. the sight of an electrical clipper and cat food or the sight of a syringe and pain). In PRT, classical conditioning is intentionally used to give value to an initial neutral stimulus such as a sound (produced by a ‘clicker’ or a whistle), which is then used as a marker for the correct behaviour (for details, please refer to Refs 7–9). Classical conditioning is a powerful, omnipresent factor that should not be underestimated and never ignored.

One major goal of PRT is to increase animal welfare. No matter how you choose to define animal welfare (and the nature of animal welfare can indeed be defined in several ways\textsuperscript{10–12}), PRT always seems to contribute positively to animal welfare. Even if the pigs are used in a short-term study, leaving no time for training specific behaviours needed for the particular study, training basic cooperative behaviours such as ‘follow-target’ could easily be done – even if training is only possible during the acclimatization period (for example, see Table 1). Such a training will add

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cognitive reinforcement to the lives of the pigs.\textsuperscript{13,14} Moreover, the pigs will react to the presence of the trainer with anticipation – and anticipation is most likely a positive feeling as demonstrated in e.g. young pigs\textsuperscript{15} and rats.\textsuperscript{16} It is also worth noting that when using PRT, the pig is actually working for something that she wants, and hence, she will experience quite a lot of ‘getting what I want’.

One positive side-effect of PRT, that has not been scientifically approached, is the effect of PRT on the animal caretakers. The majority of animal caretakers are very fond of animals, and being allowed to interact positively with their animals and, moreover, getting a positive response from the pig in the form of increased contact-seeking and less anxiety will intuitively increase the animal caretakers’ motivation and joy of tending to their animals. On a more practical level, training basic cooperative behaviours will make the daily routines with the pigs easier and safer by decreasing vocalizing from pigs being restrained and ergonomic challenges such as lifting, holding and chasing pigs. Large sows and boars can be trained to leave the area where the caretaker is mucking out. Especially in long-term studies, teaching the animals simple routines, such as being weighed, may be time-saving. Imagine 16 minipigs that are to be weighed once a week for a year. It will take two persons one hour to weigh these pigs, i.e. a total of 104 hours per year. If you train the pigs to go to the scale, stand still, and then run back to their pen, one person could do the weekly weighing, i.e. 52 hours per year. It will take 45 min to train each pig, i.e. 12 h. In this way, you will have saved 40 h of hard work when the study finishes after a year.

PRT improves the quality of the research by normalizing several haematologic and serum chemistry values related to acute stress.\textsuperscript{2} Moreover, PRT also enables the performance of scientific studies that otherwise would not be possible. In our facility, a study on pigs was done and this required the monitoring of blood gasses (\text{PaO}_2 and \text{PaCO}_2) in the waking state. Sampling was done through surgically implanted vascular access ports, and the pigs had to be awake, calm, not stressed and not under the influence of any drugs (i.e. not anaesthetized or sedated). This study could not have been done without investing time in training the pigs to cooperate voluntarily with the veterinarian and the technicians.

All of these positive effects depend by and large on the talents of the trainer. Some animal caretakers may find animal training very interesting and rewarding, while other could not care less. Thus, it may be necessary to divide the staff into trainers and non-trainers. The non-trainers may have difficulties in accepting that time is used for PRT, as it may require the non-trainers to take care of all other duties while their colleagues are training the animals. Management-wise this is a challenge that must not be underestimated. It is very important to find ways of engaging the non-trainers, making sure that they benefit from the training as well, e.g. by being involved when decisions are made on which behaviours to train. Only animal caretakers with an interest in training animals should be doing it.

Pigs are efficient learners and using PFT (and never PP or negative handling) will result in animals with a reduced level of fear of humans. The trainer must avoid reinforcing unwanted behaviours that are annoying or even dangerous to the staff or the trainer. In pigs, an increasing level of exploratory behaviour aimed at people in the pen often seems to be a consequence of PRT (personal observations), and the trainer must be very careful never to reinforce any unwanted behaviour directed towards the trainer/handler. Consequently, it is imperative that the trainer knows when and what he is reinforcing. One mistake often made is that the inexperienced trainer tries to eliminate unwanted behaviours such as nosing-on-trainer by pushing the pig away. First, this is an intended PP (which should be avoided in PRT), and moreover, the pig often finds pushing enjoyable and reinforcing and hence the trainer will get more nosing-on-trainer behaviour.

The education of the trainers is thus a crucial point if the best possible use of PRT is to be made, and it must be remembered that investing time and money in educating animal trainers and training the pigs will most likely benefit both pigs and staff. So do not wrestle with the pig – train her …

**REFERENCES**


16 Van Der Harst JE, Baars AM, Spruijt BM. Announced rewards counteract the impairment of anticipatory behaviour in socially stressed rats. Behav Brain Res 2005;161:183–9