



## Editorial

## Beware the misdirection offense: the truth about shock, aversives and punishment



There are a number of interesting and valuable papers in this issue, but two are important: [Masson et al. \(2018\)](#) and [Todd \(2018\)](#). These papers will be widely cited because they make related cogent arguments about the primary issue that is at the core of living with other individuals: alignment of behavioral priorities and desires. [Masson et al. \(2018\)](#) reviews the data that support the ineffectiveness and dangers of using electric shock/e-collars/e-stim/shock to address unwanted behaviors, while [Todd \(2018\)](#) takes a broader view and asks why it is so difficult to convince people to try non-violent redress at first, rather than at last, or if ever.

Alignment of human behavioral priorities and desires with those of others, regardless of species, is potentially fraught with miscommunication, misunderstanding, and struggle. That characterization is true if both parties are behaviorally normal, and becomes extreme if either or both parties have pathological behaviors.

As behaviors deviate from our priorities and expectations, or from 'normal' – and we can see the parallel in our daily political lives—one or both parties may attempt to control the behavior of the other. At the core of all punishment based strategies, including the use to shock/e-stim collars, is this issue of control.

By itself, control is not necessarily evil—it can be a life-saving, humane choice. However, in all situations involving shock/e-stim, positive punishment and negative reinforcement the goal is remarkably singular: to stop a behavior. When we make a singular decision to emphasize only a cessation of something, we do so regardless of whether the behavior has been selected for and/or is species typical, contextually appropriate, a variant of normal, and conveying information about the target's underlying physical, physiological, cognitive and emotional states that could inform the reasons for the behaviors and the mechanisms driving them. In the absence of answering these focal questions ([Table 1](#)) pertaining to the behavior, the decision to intervene to effect cessation is based only on unilateral desire. In complex social interactions, such a decision is neither rational, nor informed, but it's a painfully common human response.

If we wish to become more humane and promote better welfare and mental health for the non-human animals in our care and lives, when faced with a behavior we wish to stop—regardless of the species—we must logically and stepwise work through this list of questions. Doing so will suggest potential interventions at each level, and roles for human behavioral responses. This list of questions will almost never suggest use of any aversive method available to simply stop the behavior. Police departments have a pyramid of force that is determined by a very similar list of questions, and 'stop at any cost' is a rare choice, indeed. The reasoned

action approach discussed in [Todd \(2018\)](#) has similar goals and has been used to explain and predict behavior change within human social systems. It can also work in settings where humans work and interact with non-human animals.

Before we can enact the preferred strategies recommended by [Ziv \(2017\)](#), [Todd \(2018\)](#), [Masson et al. \(2018\)](#) we must address the imperative to simply stop a behavior and ask how this intent, alone, has affected training and interventional approaches.

The overwhelming majority of studies using shock highlight injurious physical and/or behavioral outcomes that constitute risk across contexts ([Ziv, 2017](#); [Masson et al., 2018](#)). The data are such that, as [Masson et al. \(2018\)](#) note, these outcomes are no longer arguable. Yet most studies using aversives/punishment like e-stim/shock never evaluate these costs which accrue when aversives are used to attain a diminution or cessation of easily witnessed, undesirable behavior. This is remarkable since if the intervention had been pharmacological, no one would be permitted to evaluate any outcome without also evaluating these costs to and risks for the recipient. Without such evaluation, any assessment of effect is—at best—pseudoscientific.

Were one seeking to license or justify the use of a pharmacologic intervention for such behavior the following steps would be mandatory: one would be constrained to detail the pathology and support using data deviations from normal, report and support a mechanism of action, show that this intervention was superior to some other or that it made a tangible difference in the behavior, in the direction anticipated and that there were no or extremely minor ancillary changes that are not in a direction considered desired or normal.

In terms of the latter, were the intervention an aversive like shock, those seeking to license it as a treatment would have to show that it did not interfere with normal behaviors, augment stress or cause physical or physiological change. Rather than demonstrating an understanding of why such requirements are crucial, some authors ([Fernandes et al., 2017](#)) have instead chosen a 'misdirection offense' which suggests that aversive methods cause no more pain, stress or welfare compromise than do other situations in which dogs routinely find themselves. Such misdirection is found in the authors' admission that "...at least at some level, aversive-based methods generate stress in dogs." ([Fernandes et al., 2017](#); page 11). The accompanying assumption is many other things in the lives of dogs also generate stress, so the aversive intervention is no more damaging than routine life events. It would logically follow that until we can learn how relatively unpleasant such life events are, there is no reason to avoid aversive interventions.

**Table 1**

Questions to ask about all behaviors one wishes to modify or stop

1. Is this a behavior that has been selected for (e.g., canine herding behaviors)?
2. Is this a species typical behavior (e.g., feline urine spraying)?
3. Is this behavior contextually appropriate (e.g., growling and lunging only at people who are truly risks to the dog's or human's safety)?
4. Is this behavior a variant of normal (e.g., licking fur), or is this behavior abnormal, deviating in form, frequency, intensity, duration or context from the range of 'normal' (e.g., chewing and licking the skin and leg until bone is exposed)?
5. Does this behavior convey information about the target's underlying:
  - a. physical state?
  - b. physiological state?
  - c. cognitive state?
  - d. emotional state?
6. What does the above information tell us about the global reasons or drivers of the behaviors and the physiological, neurochemical mechanisms driving them?

Such reasoning is pseudoscience. Such conclusions beg the question of context, and context drives every facet of behavior.

The cessation of a behavior we do not desire may not be in the best interests of the individual exhibiting the behavior, and as a result of stopping that behavior, we may do other harm to which we are blinded unless test for such harm. These are basic scientific treatment principles. If we want those with whom we interact, regardless of species, to exhibit a different behavior we need to work through the logic in **Table 1**, consider our choices and do everything possible to encourage alternate behaviors as suggested by the responses to the questions. If we do not do this we must realize that there are no pinpoint surgical excisions with aversives, and this concern grows with frequency, intensity of stimulus and lack of discretion. While we might attenuate what we perceive to be an undesirable behavior, all surrounding affiliated behaviors, many of which might be normal or appetitive and so could have lead to beneficial learning, also cease. As a result, we deprive the animals in our care of choice and flexibility, and there is no doubt those are welfare violations.

As appalling as this misdirection offense is, it is not the biggest failing of those who support (or at least do not contest) aversive methods, including e-stim/shock. The biggest failing of those who defend such aversives is that efficacy data are lacking. Simply, there are few well designed studies comparing outcomes of shock/punishment/aversives and other non-aversive interventions (but see [Ziv, 2017](#) and [Masson et al., 2018](#) for reviews).

Were we to treat aversives as we do pharmacologics, we would require a comparison with another methods of redress, in a way that was biologically meaningful (e.g., counts of behaviors, combined predicted changes in physiological parameters, et cetera). I would argue that for a method to be effective we would need measures that demonstrate less stress and distress as a result of the intervention, and that substantiate the replacement of more problematic, distressing and out of context behaviors, with those that are more contextual, more normal, and more beneficial to the patient.

Within this scientific framework, which is no more than would be expected to say that a pharmacologic intervention may prove useful, no study has supported the superior efficacy of the aversive. There is a likely reason for this outcome: telling someone what not to do never helps them to learn an appropriate or desired behavior, and the only thing shock or punishment does is to tell you what someone doesn't want, which has nothing to do with truly modifying behavior ([Overall, 2006](#)).

The simple truth is that we should abandon aversives because they lack efficacy. Aversives, including shock/e-stim, fail three essential levels of scientific testing.

- They fail the test of logic. If you want someone to do something different—tell them what it is, not simply what you do not want for them to do. In a world where there may be only one correct answer, no one is likely to find it by iteratively stumbling through one wrong answer after another. In fact, we have excellent data on what occurs when this happens, and it's called 'learned helplessness'.
- The 'side effect' profile is not desirable or supportable.
- There are no replicable data supporting efficacy.

So what can we do? It is time for us to stop being susceptible to misdirection and instead focusing on data-driven care of those for whom we have oversight. The importance of the [Masson et al. \(2018\)](#) and [Todd \(2018\)](#) papers is clear and we will see applications their approach in other papers in this volume.

Breed bans could be construed as the ultimate form of 'punishment' for perceived risk. But do they work? [Mora et al. \(2018\)](#) examined fatal dog bites in Spain against a backdrop of breed-based regulations. Rather than supporting bans, their research supports the establishment of an excellent reporting system for all bites, and an inter-disciplinary approach that can understand and provide redress for both human and canine factors contributing to bites.

In a survey study, [Luño et al. \(2018\)](#) sought to evaluate the extent of owner reported 'emotional eating' in dogs. One interesting finding of this study was the owner report that their perception of emotional eating was associated with being an unhappy dog who did not eat when the owner was absent. These are both classic autonomic nervous system responses to social stress, suggesting lack of social contact for some dogs may be viewed as punishing.

[Marion et al. \(2018\)](#) illustrate the role of early social contact in moderating aggressiveness to humans in livestock-guarding dogs. Quite simply, dogs with minimal human contact as pups, have less flexibility in behavioral responses with humans. This is an extreme version of telling them what not to do, but not telling them what behavior you think is desirable. Not surprisingly, this strategy results in outcomes fraught with risk.

[Uccheddu et al. \(2018\)](#) vividly demonstrate why assumptions of mechanism can be dangerous. We seldom have excellent neurologic data on cases that have behavioral presentations, so this case is valuable. It's a reminder to those who believe that aversives "fix problems" that what you need to fix and what you think you need to fix may be two quite different things.

Testing outcomes is critical even when asserting a positive interventional effect in a system that delivers only rewards. In a well designed study, [Naik et al. \(2018\)](#) evaluated meal feeding vs. a food dispensing toy on overall activity in client owned cats. Using accelerometer generated activity counts (an objective measure) there were no differences in activity when the cats were meal fed compared with when they obtained their food from a food toy. The authors wisely raise the issue of multiple unmeasured, unconsidered benefits which has relevance for those who think they understand how their intervention will affect change.

[Beugnet \(2018\)](#) assessed litterbox preferences in a field study of cats who were patients at a veterinary practice, again with some unexpected results. Anticipating that cats may prefer some newer substrates, this well designed, well analyzed study supports why it is so important to actually collect the data in a comparative manner. These cats did not behave as anticipated.

Cognitive bias tests ([Mendl et al., 2009](#)) are being increasingly used to assess behavioral, cognitive, and emotional damage in rescued, neglected, impaired or damaged animals. While we have objective measures of changes in physical state, most measures of affective state have not been objective. Cognitive bias is one way of assessing how affective state alters function. The typical prediction is that the impaired individual can recognize rewards and

non-rewards, but has difficulty interpreting or exploring ambiguous signals. That result was not supported here for rescued equids (McGuire et al., 2018) and the discussion of why that may be the case is important. Likewise, Muñoz et al. (2018) failed to detect any anticipated effect of equine stereotypies on performance in thoroughbreds. Attribution of mechanism to outcomes without testing is risky.

Thompson and Haigh (2018) highlight the importance of exclusion, the perception of exclusion and devaluation of some types of knowledge in scientific skepticism of disciplines like equitation science. The arguments reviewed parallel those by trainers using aversive methods in dogs. While scientific training should enhance the ability to evaluate effectiveness of interventions and handling strategies, one need not be a scientist to have excellent observational skills and a logical mind that makes clear correlations. The ability to test those correlations is something that must be taught, but the ability to make them accurately need not require the type of formal training that can be so emotionally off-putting for horse or dog people. There is an apocryphal story about the evolutionary biologist, Ernst Mayr, when he was scientifically classifying the large avifauna of New Guinea birds by species. The residents of New Guinea had their own naming and classification system and, when compared, of hundreds of birds, Mayr's scientific system and the native system clustered only 2 bird species differently. There is no replacement for excellent observational skills. One less obvious point from this paper is that if scientists are viewed as only telling equestrians that they are wrong, cooperation is unlikely. This theme of punishment, as we have seen, crosses species and disciplines.

Torcivia and McDonnell (2018) evaluate the effects of positive reinforcement-based systematic desensitization and counter-conditioning on the behavior of ponies used in a teaching lab. These ponies had developed fears and related undesirable behaviors as sequelae to being used to teach students physical exams. The documentation of improvement is one of the commendable outcomes of this work. Such interventions could also play a role in preventing such outcomes, and may also have a role in teaching students how to better learn to approach physical examination, perhaps by starting on a model.

Interestingly, the same themes discussed above about effects of aversive experiences on behaviors are relevant for designing a humane handling setting for guinea pigs used in animal-assisted therapy. Gut et al. (2018) sought to assess factors affecting stress and well-being in a complex, well designed study. Their finding that the inability to choose to retreat and actually retreat was associated with freezing behavior—simply stopping—should give pause to those who think that cessation of behavior, alone, is desirable. The nuanced approach taken in this study is a model for welfare studies, especially of species for which we may not think we have all the answers.

Every paper in this issue, without deliberately seeking to do so, supports the conclusion of Ziv (2017), Todd (2018) and Masson et al.

(2018) that aversive practices including shock and entrapment have no role preventing or amending undesirable, problematic and pathological behaviors. Furthermore, such techniques are a threat to welfare, mental and emotional health and well-being. It is past time to move on to humane interventions that favor how we now know learning works at the neuronal level. The data have spoken, and we should not be misdirected.

Karen L. Overall  
Philadelphia, Pennsylvania, USA

## References

- Fernandes, J.G., Olsson, I.A.S., de Castro, A.C.V., 2017. Do aversive-based training methods actually compromise dog welfare?: A literature-based review. *Appl. Anim. Behav. Sci.* 196, 1–12.
- Gut, W., Crump, L., Zinsstag, J., Hattendorf, J., Hediger, K., 2018. The effect of human interaction on guinea pig behavior in animal-assisted therapy. *J. Vet. Behav.: Clin. Appl. Res.* 56–64.
- Luño, I., Palacio, J., García-Belenguer, S., González-Martínez, Á., Rosado, B., 2018. Emotional eating in companion dogs: Owners' perception and relation with feeding habits, eating behavior, and emotional state. *J. Vet. Behav.: Clin. Appl. Res.* 17–23.
- Marion, M., Béata, C., Sarcey, G., Delfante, S., Marlois, N., 2018. Study of aggressiveness in livestock-guarding dogs based on rearing method. *J. Vet. Behav.: Clin. Appl. Res.* 14–16.
- Masson, S., de la Vega, S., Gazzano, A., Mariti, C., Pereira, G.D.C., Halsberghe, C., Leyvraz, A.M., McPeake, K., Schoening, B., 2018. Electronic training devices: Discussion on the pros and cons of their use in dogs as a basis for the position statement of the European Society of Veterinary Clinical Ethology. *J. Vet. Behav.: Clin. Appl. Res.* 71–75.
- McGuire, M.C., Johnson-Ulrich, Z., Robeson, A., Zeigler-Hill, V., Vonk, J., 2018. I say thee "neigh": Rescued equids are optimistic in a judgment bias test. *J. Vet. Behav.: Clin. Appl. Res.* 85–91.
- Mendl, M., Burman, O.H.P., Parker, R.M.A., Paul, E.S., 2009. Cognitive bias as an indicator of animal emotion and welfare: emerging evidence and underlying mechanisms. *Appl. Anim. Behav. Sci.* 118, 161–181.
- Mora, E., Fonseca, G.M., Navarro, P., Castaño, A., Lucena, J., 2018. Fatal dog attacks in Spain under a breed-specific legislation: A ten year retrospective study. *J. Vet. Behav.: Clin. Appl. Res.* 76–84.
- Muñoz, L., León, C., Cruces, J., Ortiz, R., Briones, M., 2018. Locomotor stereotypies and racing performance in thoroughbred horses. *J. Vet. Behav.: Clin. Appl. Res.* 24–27.
- Naik, R., Witzel, A., Albright, J.D., Siegfried, K., Gruen, M.E., Thomson, A., Price, J., Lascelles, B.D.X., 2018. Pilot study evaluating the effect of feeding method on overall activity of neutered indoor pet cats. *J. Vet. Behav.: Clin. Appl. Res.* 9–13.
- Overall, K.L., 2006. Why electric shock is not behavior modification. *J. Vet. Behav.: Clin. Appl. Res.* 1, 1–4.
- Thompson, K., Haigh, L., 2018. Perceptions of equitation science revealed in an online forum: Improving equine health and welfare by communicating science to equestrians and equestrians to scientists. *J. Vet. Behav.: Clin. Appl. Res.* 1–8.
- Todd, Z., 2018. Barriers to the adoption of humane dog training methods. *J. Vet. Behav.: Clin. Appl. Res.* 28–34.
- Torcivia, C., McDonnell, S.M., 2018. Case series report: Systematic rehabilitation of specific health care procedure aversions in 5 ponies. *J. Vet. Behav.: Clin. Appl. Res.* 41–51.
- Uccheddu, S., Gallucci, A., Briguglio, P., Cossu, G., Pais, M., Pirrone, F., 2018. Tail chasing in a dog with brain atrophy: A case report. *J. Vet. Behav.: Clin. Appl. Res.* 52–55.
- Villeneuve-Beugnet, V., Beugnet, F., 2018. Field assessment of cats' litter box substrate preferences. *J. Vet. Behav.: Clin. Appl. Res.* 65–70.
- Ziv, G., 2017. The effects of using aversive training methods in dogs – A review. *J. Vet. Behav.: Clin. Appl. Res.* 19, 50–60.