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# The Importance of Consent Behaviors for Veterinary Procedures

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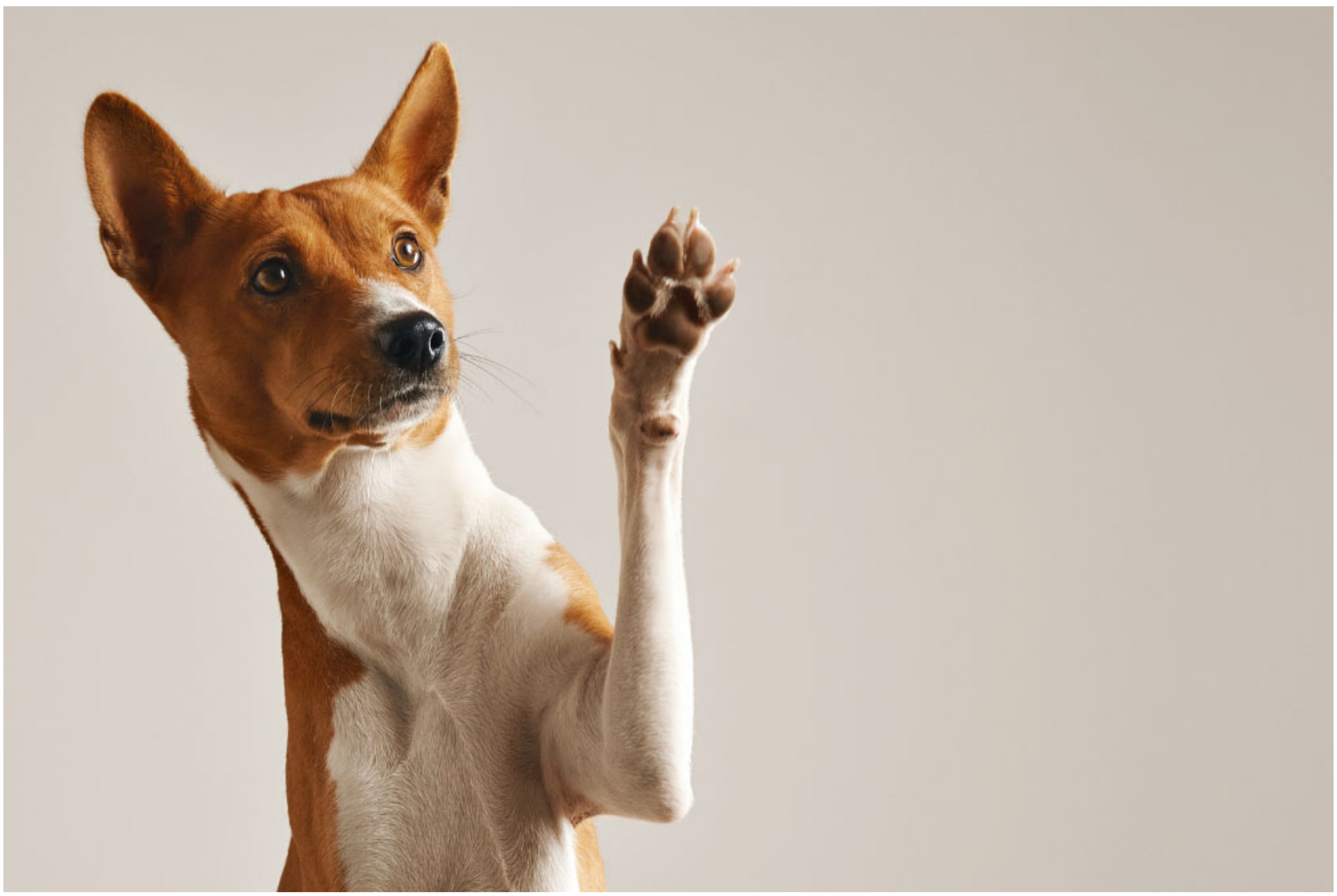

*Summary: Visiting the veterinarian is likely to be among the most stressful things a dog is regularly asked to do. With stress comes risk, not only of aggression towards staff and caregivers, but also of developing behaviors related to trauma. This article is an*

*overview of the different classes of stress-related behavior and introduces the concept of a trained "consent behavior." Working on consent behaviors as part of everyday training can go a long way to creating a safer, more predictable environment for a dog, minimizing stress and promoting agency.*

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Aggressive behaviours exhibited by animals in the veterinary clinic may be underpinned by either fear or pain.[1] However, as the overt behaviour is the same, and because aggression can prevent the veterinarian from being able to conduct a thorough medical assessment, it can be difficult for the veterinarian to deduce if the issue is a medical one (i.e., pain), where intervention may be necessary regardless of the animal's emotional valence, or a behavioural one (i.e., fear), where temporarily delaying medical intervention may be appropriate while the case is managed by a behaviour consultant.

Professionals and pet guardians administering animal husbandry procedures can be confronted with similar behaviours. Although in these cases, the underlying cause of the behaviour is may well be fear rather than pain, the husbandry procedures can be equally as necessary as veterinary care. So, the inability to undertake these procedures can pose a welfare concern.[2]

Handling animals, especially those who may be in pain or experiencing aversive emotional arousal, carries an inherent risk. The risks are to both the handler and to the animal. For the handler, the risk and severity of injury is largely dependent on the animal's species, size, and training history as well as the individual's propensity to exhibit aggressive behaviours. Attending to an injury/illness is one of the leading causes of dog bites to veterinarians and to pet guardians in the home.[3,4] Injuries may result in hospitalisation, surgery, permanent damage, disfigurement, or amputation, as well as considerable financial costs for medical attention and loss of income.[3] Whilst muzzling can prevent injury to the handler,[5] for the animal, there is still risk of aversive emotional arousal (e.g., fear, anxiety). There is also a risk of harm from lack of medical intervention/husbandry (e.g., Dadone et al., 2016)[2] and, in some cases, death from anaesthesia required to perform routine husbandry tasks.[6]

There can be multiple stimuli underlying aggression in veterinary or husbandry situations. These can include pain, the handling that elicits pain both currently and formerly, physical and chemical restraint, various approach behaviours exhibited by the handler (e.g., reaching, walking or moving objects towards the animal), and the environmental context where pain or aversive emotional arousal occurred previously (e.g., the veterinary consultation room). Motor responses that can subsequently be exhibited by the animal may be either direct or socially mediated escape (i.e., "aggression"). It is important that handlers are aware of commonly exhibited behaviours that may perform an escape function, as well as those that commonly precede them. In canids, these can include "appeasing," "ambivalent," or direct escape behaviours such as moving or looking away, "whale eye," pinning ears back, cowering, lip-licking, panting, drooling, freezing, or elimination, as well as behaviours commonly listed under the label of aggression, such as growling, snarling, snapping, and biting. Negative reinforcement in the form of cessation of the aversive physical and emotional stimulation maintains these behaviours. As outlined below, a lack of escape routes can also trigger aggressive behaviours.[7]

The neurobiology underlying the aforementioned stimulus-response relationships is well known and its understanding should be encouraged in all animal professionals. This is because different suites of aversive stimuli produce reliable responses that can inform a handling/training plan. In all animals, including humans, aversive stimuli activate the *defense cascade*, a series of "states" (i.e., a suite of physiological and motor responses) that are exhibited depending on the intensity and proximity of the stimuli, whether direct escape is available, and how these factors change over time.[8,9] The states may be defined as follows:

*Arousal* occurs in response to a distant threat or perception of stimuli that have been previously paired with threat (e.g., a context where threat has previously been encountered but is not currently present). Heart rate and respiration increases, and both smooth and striated muscles increase in tone, stabilising posture and preparing striated muscles for ballistic movement.

*Freezing* is a high-arousal but passive response (i.e., absence of movement) in which the "fight or flight" response is actively inhibited via the ventrolateral periaqueductal gray, opposing the action of competing motor-inducing stimuli. Freezing occurs in response to perception of discrete cues or in contexts where aversive stimulation has occurred previously.[10] Disinhibition of the freeze response results in ballistic escape (direct or socially mediated) and it is common for animals to rapidly alternate between flight, flight, and freeze. Evolutionarily, freezing functions to decrease the risk of perception by a predator whilst simultaneously preparing the body for fight or flight.[11]

*Fight or flight* are coordinated responses of the somatomotor (skeletal muscle), visceromotor (autonomic), and pain-modulation systems.[9] Projections into the spinal cord produce an analgesic response via non-opioid mechanisms,[12] while lateral periaqueductal gray activates species-typical motor patterns (e.g., running, attack)[7] and vocalisations (e.g., snarling, growling).[13] Modulation of these responses occurs in part through the corticostriatal loops,[14] indicating that these responses and their relationship to evocative stimuli are susceptible to conditioning.[15]

*Tonic immobility* is a form of terminal defense. It is a temporary paralysis exhibited when all other attempts at active escape have failed or are likely to fail.[9] As predators tend not to eat dead prey, tonic immobility functions to prevent a predator's attack/consumption response.[11] The description of tonic immobility by Kozlowska et al. (pg. 271)[9] is akin to some coercive training methods (e.g., Guide Dogs for the Blind, 2009)[16], "In laboratory settings, tonic immobility is elicited under conditions in which restraint and fear co-occur—for example, turning the animal upside down and restraining it until it stops struggling."

Tonic immobility differs from "learned helplessness"[17] in that tonic immobility occurs without prior conditioning (i.e., it is an unconditioned response and involves fundamentally different neurobiologcal processes.[9,18] However, it should be noted that both responses can be elicited by a conditioned stimulus previously paired with the aversive unconditioned stimulus.[19] In fact, these responses are *greater* when elicited by these cues, which has practical implications for veterinary and husbandry settings. Although it is vital for a handler to assess whether the animal is "relaxed or resigned," deducing whether the animal is experiencing tonic immobility or learned helplessness is of little practical consequence when discussing husbandry, welfare, and risk of aggression. In either case, the animal is exhibiting an extreme response to an intensely aversive stimulus and may be liable to exhibit various escape behaviours in response to cues paired with this experience.[19]

Freezing, tonic immobility, and learned helplessness are concrete examples of the disconnect between observable behaviour and emotional wellbeing. Professionals and pet guardians should be reminded that the goal of training should not simply be the absence of aggression. Although the animal's behaviour may be "compliant," this is not evidence of the absence of aversive emotional arousal,[20] nor the risk of aggression. It is for these reasons that the ethics of restraining a small, less dangerous animal should still be questioned (unless it is a medical necessity), even if the human is physically capable of this course of action.

Given that aggressive behaviours are risky and may prevent the animal from receiving adequate medical attention,[1,2] it is somewhat understandable that a handler naïve to the possibilities of reinforcement-emphasised training may elect to positively punish escape behaviours, particularly aggressive ones. However, this strategy is not recommended for several reasons. Firstly, endogenous analgesic effects during defensive states minimise the sensation of pain,[7] and thus the effectiveness of punishment. This then leaves the human to either "ratchet" the aversiveness,[21] abandon their medical/husbandry attempts or, preferably, change strategies. Also, punishment carries the risks of developing a Pavlovian fear response towards the initial veterinary/husbandry stimulation, worsening the animal's emotional and perhaps behavioural response further. Moreover, if direct escape, "appeasement" or "warning" behaviours (e.g., growling) are punished (or extinguished) but the valence of the emotional arousal remains the same (i.e., the animal is still afraid), then the risk of escalating aggression including "bites without warning" increases.[22]

Like punishment, "flooding" is another intervention that has historically been recommended to prevent and "treat" aggression during veterinary and husbandry procedures. Flooding differs from tonic immobility and learned helplessness in that it is an extinction procedure in which the aversive conditioned stimulis (but not the unconditioned stimulus is presented at full intensity whilst escape and avoidance responses are prevented.[23] In veterinary and husbandry contexts, response prevention occurs in the form of physical restraint.[16] However, preventing escape not only results in aversive emotional arousal from extinction, it may also pose risks of physical injury due to the animal struggling to escape, and may indeed evoke the aggressive behaviours the handler was attempting to prevent.[1]

Pharmaceuticals have increasingly been used in veterinary practice to reduce fearful and aggressive behaviour.[24] A comprehensive discussion of pharmaceuticals as adjuncts or alternatives to physical restraint is beyond the scope of this work. But regardless of whether drugs are used or not, aggression and the aforementioned risk of harm to both parties can be minimized if the human is aware of and responding appropriately to appeasing, ambivalent, and/or direct escape behaviours. These behaviours represent less dangerous responses, lower on the defense cascade, and so should not be suppressed or extinguished, chemically or otherwise. Although still not ideal, these behaviours are preferable to aggressive behaviours, freezing, tonic immobility, and learned helplessness because they allow a handler to modify their plan.

One way to avoid these undesirable behaviours, without utilising punishment or flooding, is by training a "consent" behaviour. Consent behaviours can aid in the prevention and remediation of aggressive behaviours evoked by veterinary and husbandry procedures by making the procedure contingent on the exhibition of an operant behaviour, which is then positively reinforced. In essence, the veterinary or husbandry procedure functions as a "distraction" parameter for the consent behaviour. However, in order for the consent behaviour to occur, the sum total valence of the outcome (i.e., stimulation + reinforcer) must be appetitive. This differs from traditional reinforcement-emphasised procedures where the primary feedback gained by the handler is simply a lack of escape. As mentioned previously, lack of escape does not necessarily indicate a lack of fear or anxiety. Freezing, learned helplessness, and tonic immobility are just some examples where the animal may appear to be "compliant," but they are still experiencing significant aversive emotional arousal and may still be liable to aggress. Consent behaviours minimise this risk because movement, specifically movement motivated by the appetitive approach system,[25] is incompatible with passive defensive states.

In traditional reinforcement-emphasised protocols, when the aversiveness of the procedure does outweigh the effectiveness of the reinforcer and direct or socially mediated escape is exhibited, the handler is posed with a conundrum: Do they reinforce the escape behaviour (which may be aggressive) or extinguish it, risking not only the aversive emotional arousal that accompanies it but also escalation along the defense cascade due to the presence of an inescapable threat? In protocols that utilise a consent behaviour, this is not a conundrum at all. Escape is *never* prevented. It can even be positively reinforced because the alternatives—extinction and the risk of escalation—are far worse outcomes. It is always preferable for direct escape to have a stronger reinforcement history than socially mediated escape and for threat behaviours to have a stronger reinforcement history than attack behaviours. Further, the addition of an appetitive terminal outcome opens the possibility of counterconditioning, reducing/nullifying the aversiveness of the initial stimulation.

Thus, consent behaviours give the handler a clearer way to assess the degree to which the animal is comfortable with the veterinary or husbandry procedures. In doing so, it also decreases the risk of aversive emotional arousal and, therefore, aggressive behaviours across trials. This is because, if the aversiveness of the stimulation exceeds the effectiveness of the reinforcer, it will positively punish the operant behaviour. In colloquial terms, consent will be withdrawn. However, as the behaviour itself is somewhat arbitrary, there is little practical consequence other than to prompt the handler to lower or "split" their handling criteria (i.e., the distraction parameter) into smaller approximations on the following trial. The presence/absence of a consent behaviour therefore gives a clearer, more humane indication of the animal's emotional valence than the absence of escape behaviours.

A consent behaviour is usually some form of "targeting," where the animal touches a target with part or all of its body. The behaviour is then positively reinforced. Numerous behaviours may assist the handler in undertaking their duties. For example, a paw or hoof target may be appropriate for nail/hoof care, opening the mouth can assist with dental care, nose touching a target overhead may assist a jugular blood draw. Although little published literature exists on the topic, this form of training is relatively commonplace in zoos and aquariums. For example, Dadone et al. (2016)[2] trained a herd of reticulated giraffes to each place a specified front hoof on a target block prior to diagnostic radiographs and routine hoof trimming. The authors noted that a no-restraint, cooperative approach with open avenues for direct escape were needed to reduce incidence and risk of aggression. Further, the ability to perform these veterinary and husbandry tasks regularly, without the use of anaesthetic, improved the animals' overall welfare.

As in Dadone et al., the training plan itself involves defining the behaviours to be trained, arranging antecedents, planning the approximations to be reinforced, evaluating the animal's response to the training, and finally, altering the plan if necessary. The target behaviours can be installed by shaping, but luring may also appropriate in the initial acquisition phases. In line with errorless training, approximations of the caregiving procedure are introduced as distraction parameters until the animal is capable of holding the target behaviour for the duration of the veterinary/husbandry procedure. Once the target behaviour can readily be prompted in its terminal form and maintained throughout approximations of the procedure, the handler may elect to install the final evocative stimulus (i.e., the cue).

There are arguments for and against utilising a discrete exogenous cue delivered by the handler. Firstly, having cues under stimulus control gives the handler flexibility to initiate procedures when and if required. However, in animals with a history of aversive training, failure to exhibit the target behaviour on cue may have resulted in aversive stimulation (i.e., negative reinforcement). This scenario could risk the behaviour not performing a "consent" role, where the absolute valence of the outcome is appetitive, but rather resulting from coercion, where the behaviour is evoked simply to avoid an aversive outcome. Furthermore, emotional ambivalence is still a possibility in animals with no history of aversive training. In such cases, the conditioned stimuli for the appetitive reinforcer and aversive stimulation elicit an ambivalent emotional response due to significantly conflicting valences. It should be noted that ambivalence is still an aversive emotional response and, as trainers, we must avoid putting animals in situations that may elicit this. To reduce this risk, some trainers elect to maintain selfinitiated responses (i.e., the target behaviour is evoked by contextual and endogenous stimuli.[26]

A number of different reinforcement strategies have been utilised when training cooperative care. One option involves reinforcement that is contingent on the cooccurrence of the consent behaviour and then the caregiving procedure. Essentially, if the animal withdraws the body part from the target, that trial is not reinforced. However, if high-value reinforcers are used or if the animal is in a deprived state (e.g., hungry), these factors may contribute to the evocation of the consent behaviour, despite conflicting emotional arousal. In animals with a history of aggression in particular, this situation can be volatile.

There are sound arguments in favour of reinforcing trials where the behaviour was maintained throughout the procedure *and* where the target behaviour was withdrawn. Firstly, while the training goal is for the animal to exhibit the consent behaviour for the duration of the procedure, it is always preferable for the animal to exhibit non-aggressive, direct escape rather than aggression when the aversiveness of the procedure outweighs the value of the reinforcer. Further, although the cessation of aversive stimulation following the "withdrawal of consent" (i.e., direct escape of the individual body part or direct escape from the training location) negatively reinforces this behaviour, offering an additional appetitive outcome in the form of a positive reinforcer opens the possibility of counterconditioning to the aversive stimulation. Given that the escape behaviour was already negatively reinforced, the subsequent positive reinforcement strategy does not add any significant extra risk of failure to the training plan.

In order to reduce the risk of conflicting emotional arousal further, some trainers will even reinforce both exhibition and non-exhibition of the consent behaviour (endogenously or exogenously cued). Again, although traditional reasoning might argue that reinforcing non-criterion responses will adversely impact the training, this is not what occurs in practice. Unpublished case studies have demonstrated that progress towards the training goal is not ill-affected by reinforcing non-criterion responses in this context.[26] It is possible that the mechanism underlying this phenomenon is that the presence of an appetitive outcome on non-criterion trials reduces ambivalent (i.e., aversive) emotional arousal. It is interesting to note parallels in human therapy. Two goals are for the client to 1) begin "to regulate arousal and tolerate intense emotions that would otherwise trigger high states of arousal and potentially activate the defense cascade," (Kozlowska et al pg. 276)[9] and 2) remain in the "window of tolerance" (Ogden et al., 2006, pg. 26),[27] where physiological arousal not just minimises the risk of escalation along the defense cascade but also maximises the effectiveness of conditioning.[28] It is hypothesised that a similar physiological process may be at play here, whereby the appetitive outcome negates any ambivalent/aversive emotional responses to the caregiving situation, therefore reducing physiological stress and allowing training to progress.

As mentioned prior, there is little peer-reviewed literature investigating the use of consent behaviours in the prevention and remediation of aggression. However, the published data that exists does indeed support the hypothesis that this is an effective tool. Like any intervention, we must have evidence that it not only "works" in achieving the behavioural goal but that the likely neural mechanisms underlying the behaviour are concordant with appetitive or, at minimum, low-arousal emotional responses to promote welfare. Although this cannot be verified in veterinary and husbandry settings, handlers can maximise the potential for this occurrence by utilising procedures demonstrated to result in appetitive/low-arousal responses. Training a consent behaviour is one such option that has had great success in a variety of species in a variety of settings. Although consent behaviours take time and resources to install, this protocol is most in keeping with *Least Intrusive, Minimally Aversive* principles.

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