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# Can clicker training facilitate conditioning in dogs?

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### ABSTRACT

In the attempt to verify clicker training efficacy in shaping dogs' novel behaviours, we studied 51 domestic dogs. Learning was evaluated in three different conditions: when the primary reinforcer (food) was presented in association with (a) a clicker; (b) a spoken word, a condition absent in previous works on clicker; (c) alone. The three groups were balanced with respect to age, gender and breed; all dogs were naïve with respect to training experience and were shaped by two trainers. After reaching a learning criterion of 8 consecutive correct trials out of 10, each dog was tested for its ability to generalize the learned behaviour in two conditions, one similar and one different from the training condition.

All dogs in our study proved to be equally able to learn the novel behaviour and generalize it to different testing conditions, with no differences associated with the specific acoustic secondary reinforcer used or when the primary reinforcer was presented alone. Although it is always advisable to be cautious in drawing conclusions from non-significant results, here we discuss whether and when there might be a direct advantage in using the clicker method over other secondary or primary reinforcers to model dogs' behaviour.

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## 1. Introduction

The dog-human bond is special because it represents a unique example of coevolution dating back at around 15,000–30,000 years ago (for the debate on wolf/dog's domestication see for instance [Vilà et al., 1997](#); [Thalmann et al., 2013](#)). Dog companionship is primarily due to dogs' communicative, relational and cooperative skills that made them able to engage successful interactions with humans ([Bensky et al., 2013](#); [Kaminski and Nitzschner, 2013](#)). Very likely, these abilities made them particularly suitable, over the years of domestication, for numerous working roles.

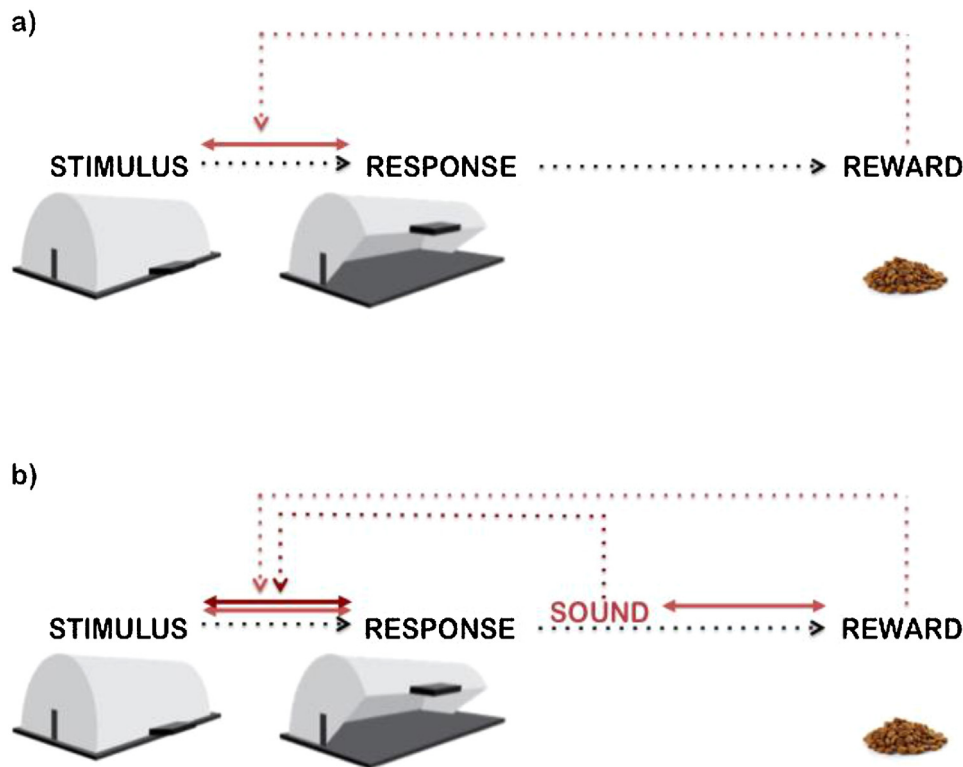
Dogs can be trained with methods based on individual learning through which the dog creates an association between antecedents and their consequences. A novel behaviour can be elicited using different strategies summarized well by [Kaplan et al. \(2002\)](#). Briefly, by means of modelling and luring the dog is respectively coaxed or guided by a treat in the desired position and then it is rewarded with the aim of reinforcing that final position and hence the behaviour to reach it; by means of capturing, when the dog spontaneously manifests the desired behaviour it gets a reward. These methods,

mostly known and applied by trainers and owners, suffer from intrinsic limitations, which are a repeated forced action from the outside, i.e. from the trainer in the modelling, and an unpredictable time from the dog showing the behaviour by chance in both luring and capturing. Alternatively, with the shaping technique it is possible to systematically reinforce increasingly closer approximations of the target behaviour. The final desired behaviour is reached by adjusting animal's spontaneous responses, which are small achievable steps progressively rewarded towards the definitive behaviour ([Skinner, 1951](#)).

The use of positive reinforcement through shaping is a good candidate as a generic method and its successful use dates back to the work of [Most \(1910/1954\)](#) and [Konorski and Miller \(1937\)](#), who anticipated the task analysis of the behaviourism and its employment in operant conditioning ([Skinner, 1938](#); [Burch and Pickel, 1990](#); [Mills, 2005](#)). Operant conditioning is a process of learning whereby an association is formed between an arbitrary stimulus and an arbitrary response in virtue of a positive reinforcer. An instance is shown in [Fig. 1a](#): a dog is rewarded to emit a response (push the handle) in the presence of a stimulus (a bread box). The effect of the reward is that of strengthening the association between the stimulus and the response ([Skinner, 1951](#)). Another form of conditioning exists and it is called classical conditioning. Differently from the operant conditioning, in classical conditioning an initially neutral stimulus (e.g. a bell) is repeatedly paired with a second

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**Fig. 1.** Clicker training in theory.

(a) Diagram of the association formed by means of operant conditioning. (b) Combination of operant and classical conditioning as it is presented during clicker training.

unconditioned stimulus (e.g. food) that naturally evokes an unconditioned response (e.g. salivary reflex). After subsequent pairings of the two stimuli, the neutral stimulus becomes conditioned, as it is capable to evoke by itself the unconditioned response. In this form of conditioning, the dog learns that the conditioned stimulus is a predictor of the unconditioned one, which in case of food is a reward (Pavlov, 1927). The two forms of associative learning (operant and classical) can be used in combination. This is what happens in the so-called clicker training. In clicker training, the animal is reinforced to emit a response as it would happen in operant conditioning, but as soon as it displays the response and before the arrival of the reward, a conditioned stimulus (a distinct “click clack” sound emitted when a mechanical device is pressed and released) is provided (Fig. 1b). Because the clicker reliably anticipates the reward (i.e. the unconditioned stimulus) it then becomes a conditioned stimulus or secondary reinforcer.

The acoustic secondary reinforcer, in clicker training, is used also to mark the exact behaviour that results in food. While training a new and desirable behaviour, the clicker is retained to be effective in that the animal may instantaneously identify the precise behaviour that is rewarded and should be repeated in the immediate future. Also, the sound is meaning to fill in the temporal delay between the behavioural response and the primary reinforcer (Pryor, 1999).

An increasing number of professional dogs’ trainers and pet owners is using clicker training to shape dogs’ and other domestic animals’ behaviour (Lindsay, 2000; Tillman, 2000). Pioneered by Marian Breland and her husband for training animals at a distance (Gillaspy and Bihm, 2002), today growing popularity of the technique is accompanied by the idea that dogs trained with food alone are slower in learning and that clicker is the most effective stimulus to be used as a secondary reinforcer (Pryor, 2005). Indeed, the clicker sound has specific features that can be more effective than the use of a word or a whistle, commonly adopted by trainers and

owners, as for instance consistency across persons and moments, and high detectability.

Despite the alleged efficacy of clicker training, scientific evidence in its support is still lacking (Miklósi, 2015). In order to address the efficacy of learning through clicker training, one possibility is that of systematically comparing the training time needed to learn a new behaviour when clicker training is used as compared to other training methods. Two studies investigated this issue using clicker with horses (McCall and Burgin, 2002; Williams et al., 2004) and in both cases no reduction in training time was recorded when learning was assisted with clicker rather than without clicker. Similarly, results obtained with dogs showed no advantage related to clicker use: dogs trained with the clicker learned the new behaviour in the same amount of time as dogs trained with food alone (Smith and Davies, 2008).

Another possibility to verify training efficacy is that of evaluating the strength of conditioning, which can be assessed throughout extinction. Extinction occurs when the secondary reinforcer is presented alone and, since it no longer predicts the arrival of the primary reinforcer, conditioned responding gradually stops (Gleitman et al., 1954). If clicker training is more effective in shaping a new behaviour, this should resist longer to extinction than when it has been shaped with other training methods. One study on horses showed that no difference in extinction emerged between the groups trained with clicker and with food alone (McCall and Burgin, 2002). Conversely, a study on dogs showed that dogs trained with clicker required more trials to extinct the behaviour than dogs trained with food alone (Smith and Davies, 2008). However, a difference of treatment existed in this experiment between the two groups of dogs (i.e. those trained with clicker and those trained without secondary reinforcer): during extinction trials, the reward was withheld from both conditions, but dog in the clicker condition continued to get the secondary reinforcer whenever the target behaviour was displayed. The fact that dogs trained with the clicker

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