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**DOG BEHAVIOUR –
EFFECT OF DELAY TO REINFORCEMENT**

A thesis submitted in partial fulfilment of a
Master of Applied Psychology (Behaviour Analysis)

at
The University of Waikato

by
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Abstract

Dogs were fed dry food as reinforcement and were required to touch a wand with their nose to get that reinforcement. In the first study, half the dogs were given immediate reinforcement, while for the remaining dogs reinforcement was delayed by two seconds. In the second study, dogs were food deprived for longer in an attempt to increase the food-motivation, and the position of the equipment was changed to increase the accuracy of detecting a correct response. The third study was a replication of the second, but was conducted outdoors. Number of reinforcers delivered and time between reinforcers was examined. All three studies demonstrated that a two second delay to reinforcement slows learning in dogs, and in some cases prevents learning altogether.

Acknowledgements

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Introduction

Humans have lived with domesticated dogs for hundreds of years. The relationship between the two species has generally been one of companionship and mutual advantage. The success of this relationship depends largely upon our success in training dogs. In turn, the effectiveness of this training relies, in part, on a science of learning, which includes such processes as classical or respondent conditioning and operant learning.

Operant conditioning is a learning process where “behaviour that operates on the environment can be modified by its consequences” (Martin & Pear, p.176). For example, a response or behaviour which is followed by pleasant consequences (such as using manners being followed by praise and/or tangible rewards) makes the original behaviour more likely to occur in the future. A response or behaviour which is followed by aversive consequences (such as becoming ill after eating a certain food) is less likely to occur in the future. This is how most of the learning of both humans and animals occurs, and how they are able to purposefully avoid some consequences and bring about others.

Instruction using operant processes is characterised by following responses with punishers or rewards, although modern approaches to dog training focus most on rewarding the desired behaviour. It is imperative to good training that the reward process is mostly carried out correctly, and with consistency and reliability. In order to achieve this, the factors which have the potential to affect and alter these processes should be taken into account. Such factors include the schedule, magnitude and immediacy of reinforcement, and the delay between the response of the organism and the resulting consequence, among others.

Schedules of reinforcement are specifications of when an organism's behaviours will be reinforced. For example, continuous reinforcement is where every instance of an organism's behaviour is reinforced, or a fixed-ratio schedule is where reinforcement is received after a pre-specified number of responses have occurred. The magnitude and immediacy of the reinforcement also have an effect on behaviour. Reinforcers which are immediate have more chance of having an effect on an organism's behaviour, as do reinforcers which are larger in magnitude (Perin, 1943).

The immediacy of reinforcement which affects behaviour, particularly the acquisition of behaviour, is often thought of in terms of delay to reinforcement, or the time which elapses between a response and the reinforcement. This delay has been shown to slow learning in some species and even prevent learning altogether, depending on the length of delay (Schlinger & Blakely, 1994 and Lattal, 2010).

In dog training, when people deliver reinforcement to their dogs in the form of praise, food, or some other reward, they are not always consistent. A period of time, however short, elapses between the response of the dog and when the reinforcement is actually delivered. The effect of this delay to reinforcement on dogs has not yet been thoroughly investigated, although other animals such as rats and pigeons have been used to study this delay (for example, Ploog & Williams, 2010 and Costa and Boakes, 2007).

Looking at research on delay to reinforcement with animals (usually rats, pigeons and fish), the learning of new responses can occur even when reinforcement is delayed by between one and thirty seconds, seen across a number of experiments (Vansickel, White & Byrne (2004) and Schlinger & Blakely (1994) and Lattal & Metzger (1994) and Sutphin, Byrne & Poling (1998) and Ploog & Williams (2010) and Keely, Feola & Lattal (2007)). As a result of different research results, there are

different conclusions concerning the maximum length of delay which can be present before learning will no longer occur, although this generally appears to be species specific. Increases in delay decrease the rate of responding and increase the time/number of trials taken to develop ('learn') a response (according to Weatherly, Stout, Rue & Melville (2000), Andrzejewski, Terry-Cain & Bersh (2004) and Bruner, Acuna & Gallardo (1998)). Signalling a delay by changing the colour of the stimulus (for example a key) also increases rate of responding (Schaal & Branch (1988)).

For example, Sutphin, Byrne and Poling (1998) conducted research on the effects of delay to reinforcement on rats' learning. The reinforcement in this case was water after the rats had been water deprived for 24 hours. The rats were required to press one of two levers, one of which would not deliver any consequences while the other would deliver the water, which was then delayed by 0, 8, 16, 32 and 64-s. Evidence of learning would be that the rats would push the lever which delivered the water rather than the lever which produced no consequences. The results showed the rats in the immediate reinforcement condition learned the target response (they responded far more on the lever which produced the reinforcement). As the delay to reinforcement increased, less of the rats allocated behaviour to the lever which produced the reinforcement in comparison to the immediate-reinforcement group, although the responding on the reinforcement lever still occurred.

Ploog and Williams (2010) also looked at delay to reinforcement in response learning (in this case learning of reversal patterns) using pigeons. The pigeons had a choice of two keys to peck; one key resulted in reinforcement after either a 0 or 2-s delay, while the other key delivered no reinforcement. The pigeons were required to discriminate between keys and learn reversal patterns, and their ability to pick up the discrimination and improvement in learning was measured. The results showed the

pigeons learned faster with a 0-s delay than with a 2-s delay, and there was greater improvement in learning for the 0-s delay, although both learning and improvement occurred for both delays.

As mentioned above, increasing the delay to reinforcement increases the time taken (or number of trials) taken to learn a novel response, and decreases the overall rate of responding. Weatherly, Stout, Rue and Melville (2000) demonstrated this effect of delay on rate of responding using rats. Food pellets were delivered on either a VI 15-s or a VI 60-s schedule of reinforcement, with delays of 0.04, 0.2, 1.0, 5.0 or 25-s to reinforcement. The rats had to press a lever to obtain the food. The results showed response rates decreased as the length of delay increased.

Andrzejewski, Terry-Cain and Bersh (2004) demonstrated that time/number of trials taken to learn a novel response increased with an increase in delay to reinforcement. Using rats, Andrzejewski et al. (2004) looked at the above effect of delay with a visual discrimination task. The rats were required to discriminate between two stimuli (light on/light off) to obtain reinforcement. The results showed the number of sessions taken to meet the discrimination response criteria increased with an increase in delay. The results also showed that learning occurred faster the shorter the delay to reinforcement.

Research with humans shows learning does not *generally* occur when reinforcement is delayed (Ramey & Ourth, 1971). If learning does occur, it occurs a lot faster with shorter or no delays (Ware & Terrell (1961) and Okouchi (2009)). However, this research is mostly conducted in a controlled laboratory setting. This present study attempted to examine these effects of delay on learning in a more natural setting with domesticated animals.

Based on the above findings, the processes and concepts of delay to reinforcement were applied to the training of a novel response in dogs, and research was conducted on whether these dogs could learn to perform this novel response with a 2-s delay to reinforcement. The initial research involved training one group of dogs to perform a novel response using food as reinforcement with a 2-s delay to the delivery of the reinforcement. Another group of dogs was trained in exactly the same way, but with no delay. This was done in a semi-controlled setting (the dog owners' homes) with as few distractions as possible. Based on the results of this research, (if dogs were able to learn new responses with delay to reinforcement), these experiments were replicated in a less controlled setting with distractions such as other dogs and people (at the local dog club).

This study examined whether dogs were able to learn a novel response with a 2-s delay to reinforcement. It was predicted they would learn, but that it would take more trials with the delay to reinforcement.

STUDY 1

Method

Subjects

Ten pet dogs were recruited by putting up posters at the local (Taupo) dog club and by approaching dog owning friends. The dogs were a mixture of breeds and ages. The owners were asked not to feed the dogs their regular morning or evening meal prior to research sessions to produce maximum food-motivation. The dogs were numbered for the study, followed by the number of the dogs in the study. For example, Dog 1 in the first study would be Dog 1.1, Dog 2 in the first study would be Dog 1.2 and so on. They were matched for size and then randomly assigned to either the immediate or the delayed group.

Apparatus

A mechanical food delivery device called a “Manners Minder”, operated by a remote control delivered one or two pieces of dried dog food at a time (as reinforcement to the dog in order to train a response). The remote control was altered to delay reinforcement by 2-s after the button was pushed. This time was chosen based on previous studies.

The food was delivered when a circular disc rotated within the container, pushing the food out through one of four holes in the disc. There were two discs which could be used, one with small holes, the other with larger holes, depending on the size of the food. The remote control had a single red button and was attached by a long wire to the Manners Minder. At the back of the machine was a dial which could be turned to allow for differing delay times of 0, 0.5, 1, 2, 4 and 8-s. In these studies,

only the 2-s delay was used (see diagram). When the food was delivered, the machine beeped; this occurred at the time the food was released, not when the button was pressed, so when reinforcement was immediate, the beep would sound immediately, but if the reinforcement was delayed by 2-s, the beep would sound 2-s after the remote control button had been pushed, signalling to the dog that reinforcement was available.

The target response for the dogs was to touch a weighted wand; this was a silver wand with a soft, red, ball-like top to it. This was attached to a larger, round weight at the bottom to enable it to stay upright. The height of the wand was adjustable.



Figure 1. Manners Minder – a remote-controlled food-delivery device, altered for the present study (see *Apparatus* above).

Procedure – pre-training

The dogs were first trained to feed from the Manners Minder. This training took place in a semi-controlled environment, such as in the dog owner's home (e.g., a lounge or garage) with as few distractions as possible. Generally the owner was required not to be present (in case they acted as a distraction) but in some cases not having the owner present was more of a distraction, in which case they were asked to be in the room at the time of training. This initial training included a number of basic steps;

- Feeding the dog by hand beside the Manners Minder – a single piece of food was placed into the experimenter's hand and offered to the dog. This was repeated until the dog was comfortably eating the food from the experimenter's hand (i.e., when the dog did not hesitate to eat).
- Putting food into the dish attached to the Manners Minder – the experimenter placed a single piece of food directly into the attached dish, pointing it out to the dog if necessary. If the dog would not eat from the dish, the previous step was repeated. The current step was repeated until the dog was comfortably eating from the dish.
- Operating the Manners Minder using the remote (without volume) – while the dog was looking directly at the machine, the remote control (which was set on the 0-s delay) was operated so one or two pieces of food were delivered into the dish. This step was repeated until the dog was comfortably eating from the dish without prompting from the

experimenter. If the dog would not eat from the dish when the machine was operated, the previous step was repeated.

- Turning the volume on ‘low’ setting (quietest beep) when the dog was reliably eating from the dish – the volume of the “beep” sound when reinforcement was delivered was set on ‘low’ and the above step was repeated to ensure the dog was still eating from the Manners Minder dish with the sound, and to get the dog to associate the sound with the delivery of the reinforcement. If the dog stopped eating from the dish, the previous step was repeated.
- Delivering the food using the remote control when the dog was looking at the experimenter, who called the dog’s attention and activated the Manners Minder as soon as the dog looked at him/her. If the dog associated the sound with the delivery of the reinforcement, it would immediately move to eat from the Manners Minder dish upon hearing the sound. The current step was repeated until this occurred; if it did not, the previous step was repeated. At first the experimenter may have had to point out the food in the dish to the dog.
- Delivering food when the dog moved one or two steps away from the Manners Minder (towards the experimenter). Luring with food and/or vocal encouragement was sometimes required – the dog was encouraged away from the Manners Minder. As soon as the dog moved one or two steps towards the experimenter, the machine was activated. The dog would then move back to the machine to collect the reinforcement. At first the experimenter may have had to point out the food in the dish to the dog. The current step was repeated until the dog

reliably moved back to the machine from this distance to collect the reinforcement from the dish. If the dog did not do this, the previous step was repeated.

- Delivering food when the dog moved three to five steps away from the Manners Minder (towards the experimenter). Luring with food and/or vocal encouragement was sometimes required – the dog was encouraged away from the Manners Minder. As soon as the dog moved three to five steps towards the experimenter, the machine was activated. The dog would then move back to the machine to collect the reinforcement. At first the experimenter may have had to point out the food in the dish to the dog. The current step was repeated until the dog reliably moved back to the machine from this distance to collect the reinforcement from the dish. If the dog did not do this, the previous step was repeated.
- Increasing distance and swapping sides – the dog was again lured away from the Manners Minder but further than before, and from different angles from the Manners Minder. As soon as the dog moved the required distance towards the experimenter, the machine was activated. The dog would then move back to the machine to collect the reinforcement. At first the experimenter may have had to point out the food in the dish to the dog. The current step was repeated until the dog reliably moved back to the machine from this distance to collect the reinforcement from the dish. If the dog did not do this, the previous step was repeated.

- The dog was considered trained when it moved to eat from the Manners Minder dish upon hearing the tone, from different positions in the room and from different distances.

Procedure – shaping target response

Subsequent sessions were used to shape the target response using either reinforcement which was delayed by 2-s or immediate reinforcement. The target response was the dog touching the top of a weighted wand with its nose. The dogs were paired for size and then randomly assigned to the immediate or delayed reinforcement groups. The dogs' own food was used as reinforcement (except for Dogs 1.3 and 1.4, whose food did not fit the Manners Minder, and so the owners agreed to the use of an equivalent amount of food which was provided).

Reinforcement either produced an immediate tone and food was delivered into the food dish attached to the Manners Minder, or the tone and food were delayed by 2-s after the behaviour occurred. The wand was placed two dog lengths away from the Manners Minder and this was set up before the dog entered the room (see Figure 2 for the set-up plan). Training of the target response started for each dog by shaping closer and closer approximations to this response. The dogs' behaviour was reinforced when it was;

- Looking in the direction of the wand and/or
- Moving in the direction of the wand and/or
- Moving closer to the wand and/or
- Touching the wand anywhere with any body part and/or
- Touching the wand anywhere with nose and/or
- Touching the top of the wand with nose,

although this plan was flexible and could be altered, depending on the responding of the dog. The response was considered ‘learned’ when the dog performed the target response ten times in a row without hesitation of more than 12-s. Hesitation was defined as looking or walking around, or engaging in behaviour other than the target response, for example sitting or lying down, sniffing objects, etc. Three sessions of a maximum time of half an hour were allowed for the dog to learn the target response. If the dogs in the immediate group did not learn within the three sessions, training was terminated. If the dogs in the delayed group did not learn within the three sessions, they were put into immediate reinforcement conditions and given another three sessions. During shaping sessions, if the dog did not respond for 1min, it was allowed approximately 30-s break for play, after which the session continued. The session ended after three gaps of no responding, when the food allocation ran out, or when the dog learned the response. All sessions were video recorded for further analysis. See Appendices B and C for details on the training of each of the ten dogs.

A special video analysis programme was developed to enable data from each video to be collected in a systematic way. This programme ran each video, and in the top right corner of the screen was a small square, operated by clicking the mouse cursor on it. The video speed could be sped up or slowed down, allowing the experimenter to accurately record the data. In these studies, the data to be collected was the time at which each reinforcer was delivered, which would also give the time between each reinforcer. The square was clicked every time the Manners Minder delivered a reinforcer, effectively recording this and storing it in an excel spreadsheet. In the case of the delayed group, it must be taken into account that the recorded time for the reinforcers was 2-s after the dog’s actual response. This data is shown in Figures 5, 6 and 7.

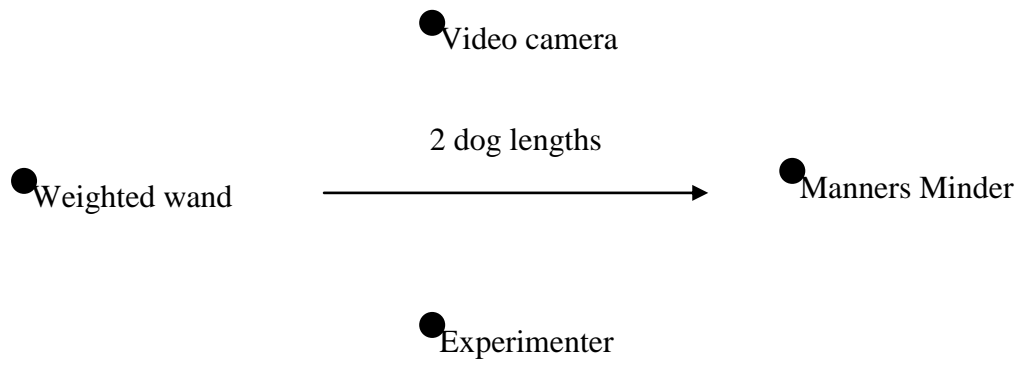


Figure 2. Set-up plan of equipment for Studies 1 and 2. Except for the distance of two dog lengths between the wand and the Manners Minder, the distance between all other elements could change depending on the space available.

Results

Figures 4 and 5 show the number of reinforcers per 3min bin, cumulative across all sessions, for each dog in both the immediate and the delayed groups, respectively. The vertical line in the graphs for the delayed group show where the delayed sessions stopped and the immediate sessions began. Figure 4 (the dogs in the immediate group) shows a steeper graph line indicating more reinforcers gained across a shorter period of time than Figure 5 (the dogs in the delayed group). In this figure, the graph is flatter and generally more sessions are present, although the latter sessions (immediate reinforcement conditions) tend to be represented by faster responding.

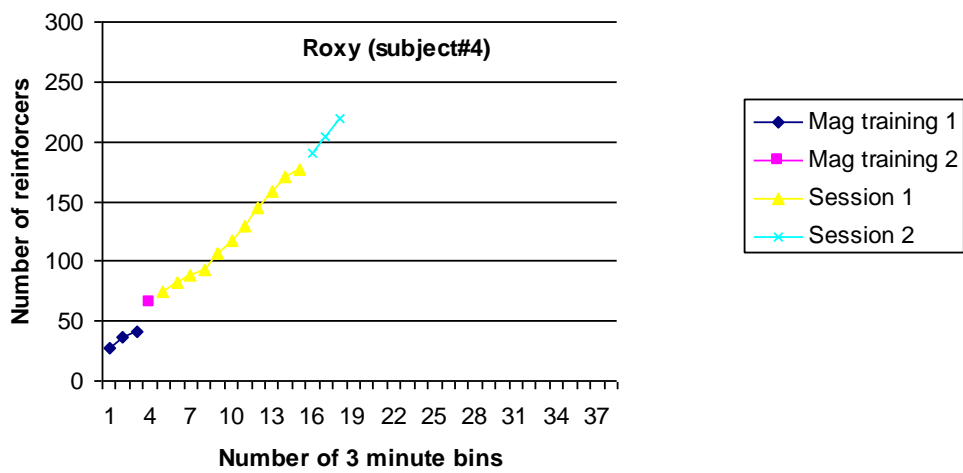
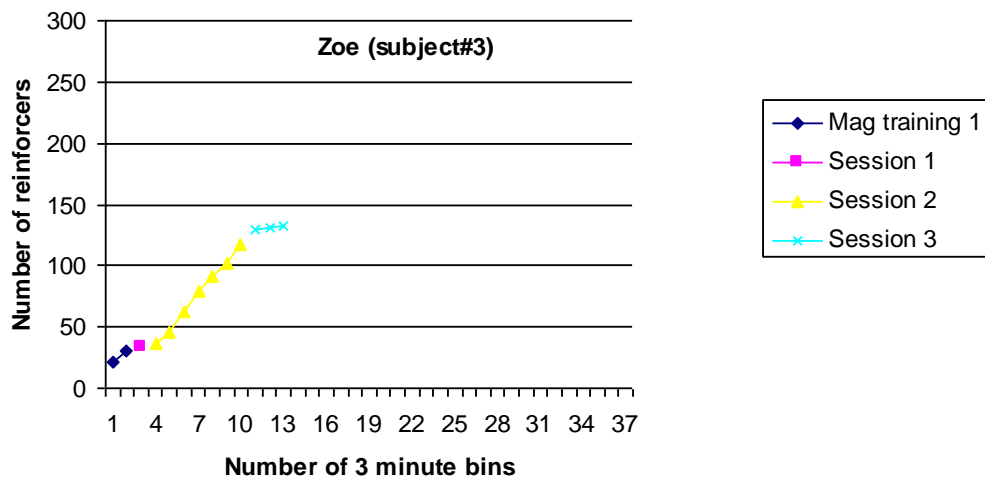
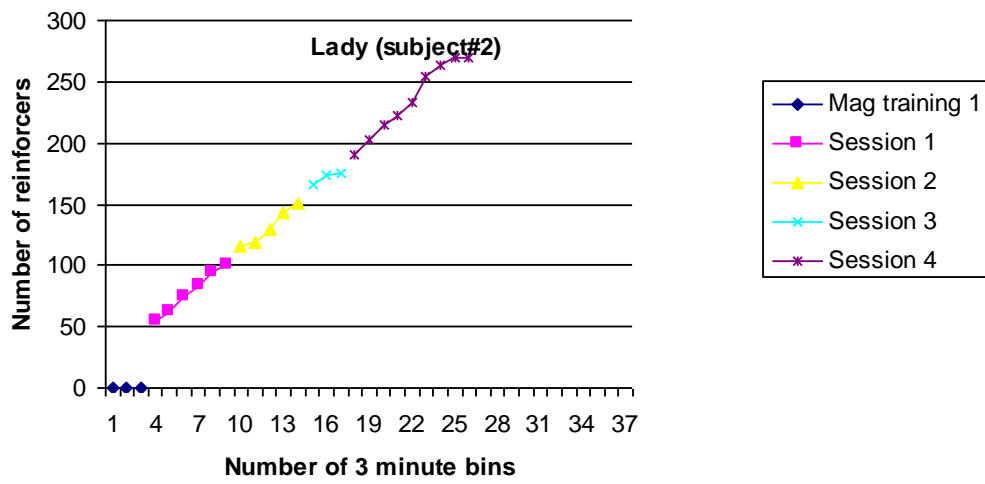
Figure 6 shows the cumulative time (in seconds) that each reinforcer was delivered for each dog. The graphs depicting the delayed group's results (Sassi, Beau, Jake, Orca and Diesel) show that these dogs are taking approximately double the amount of time to obtain roughly the same amount of reinforcers, demonstrating a slower learning curve.

From the immediate group, Dogs 1.4, 1.6 and 1.10 learned the target response within the three sessions, while Dogs 1.2 and 1.3 did not learn the response. From the delayed group, Dog 1.8 learned the response, and Dogs 1.1, 1.5, 1.7 and 1.9 did not learn the response. However, of these dogs, Dog 1.5 did learn it when trained with immediate reinforcement. Dog 1.2 did demonstrate some evidence of learning – she circled around near the wand consistently but did not get closer or touch it (with immediate reinforcement – see Appendices B and C). From the delayed group, Dogs 1.5 and 1.8 also demonstrated some evidence of learning a novel response; they learned to circle near the wand before learning the target response (in the case of Dog 1.8) and before being moved to immediate reinforcement conditions (in the case of

Dog 1.5), during which the target response was learned. Dogs 1.3 and 1.9 did not demonstrate any reliable or consistent responding which could be considered 'learning' using the criteria. The above information was taken from the experimenter's notes as well as the actual video footage. See Appendices B and C for more detail of each dog's results.

Issues of apparatus, method and criteria for inclusion

Dog 1.8 responded by touching the wand base rather than the top. Dogs 1.5 and 1.9 did not appear to be very motivated by food, especially in the case of Dog 1.9 who took three sessions to magazine train. Dogs 1.2 and 1.6 were very distracted when the owner left the room at the beginning of the training sessions. Dog 1.10 appeared to be responding to the sound of the food being pushed into the Manners Minder dish rather than the actual tone. See Appendices B and C for the full details of these observations.



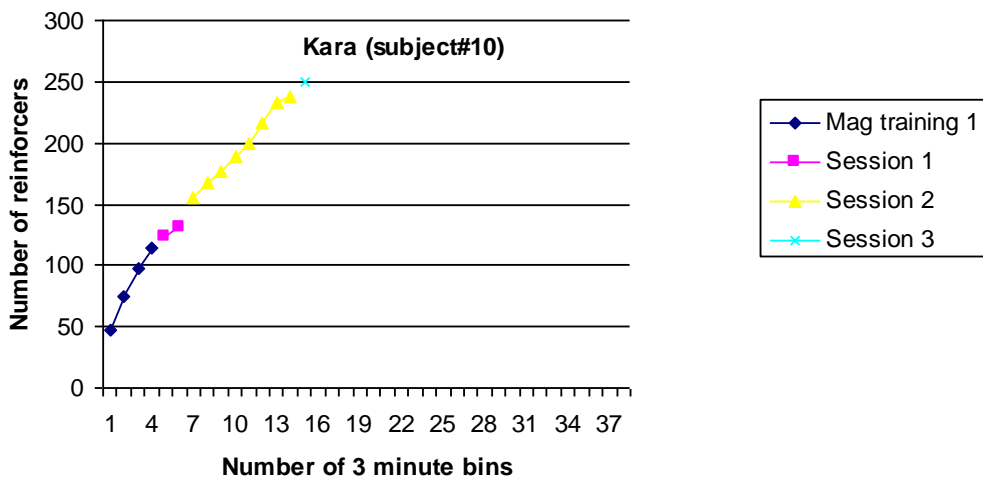
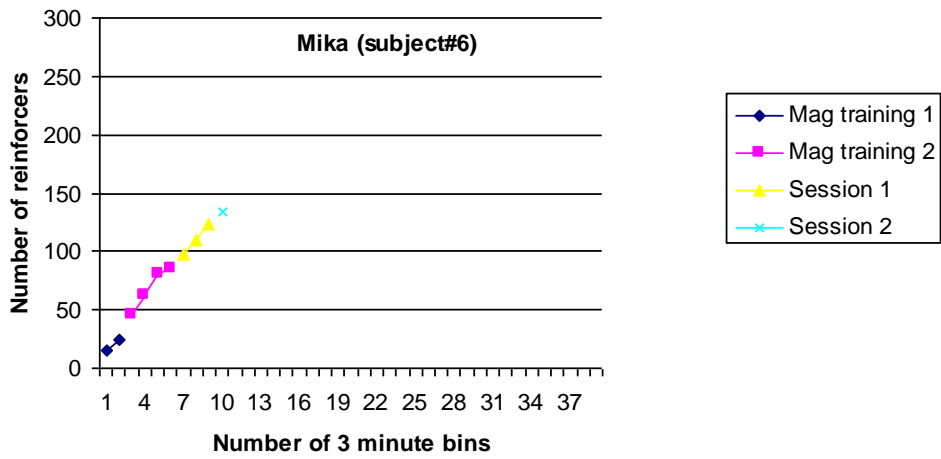
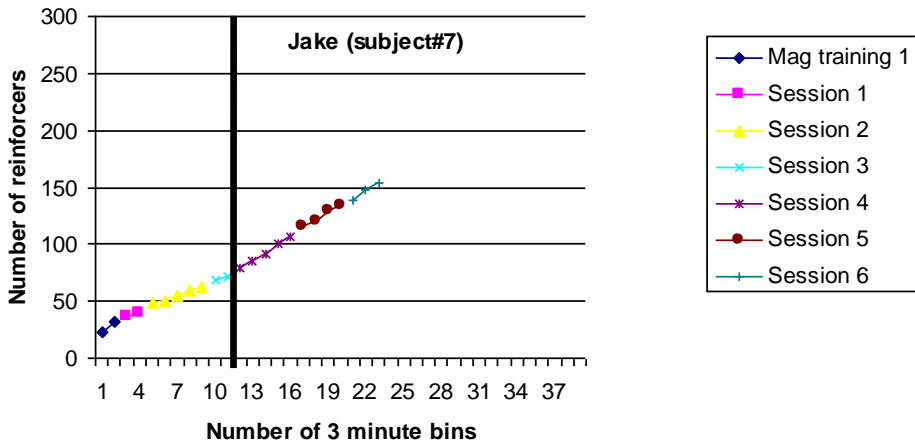
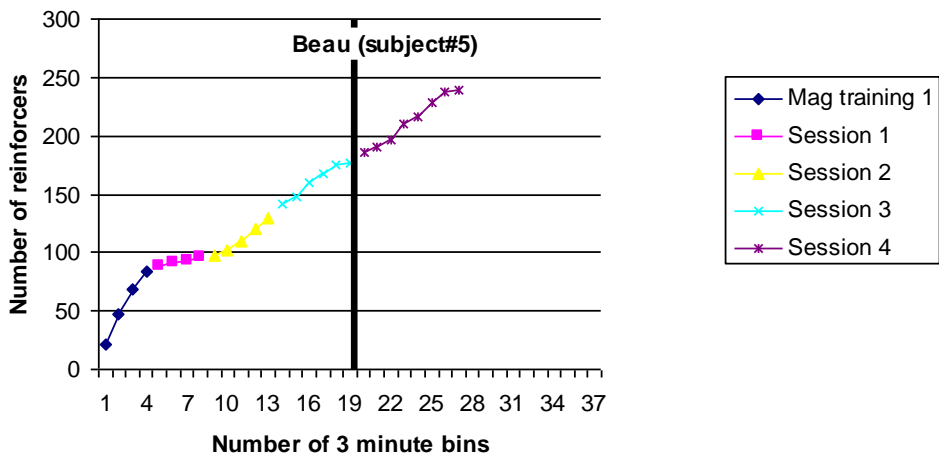
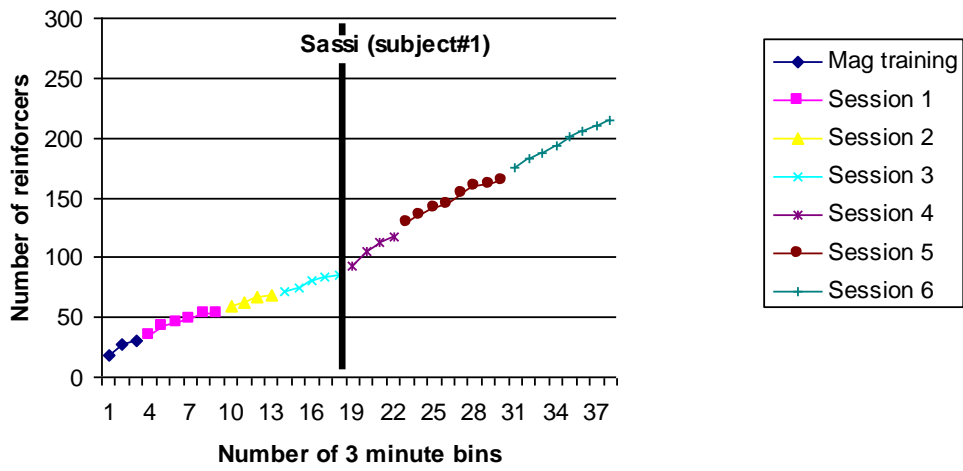


Figure 4. Cumulative number of reinforcers per 3 minute bin for dogs in the immediate group across all sessions.



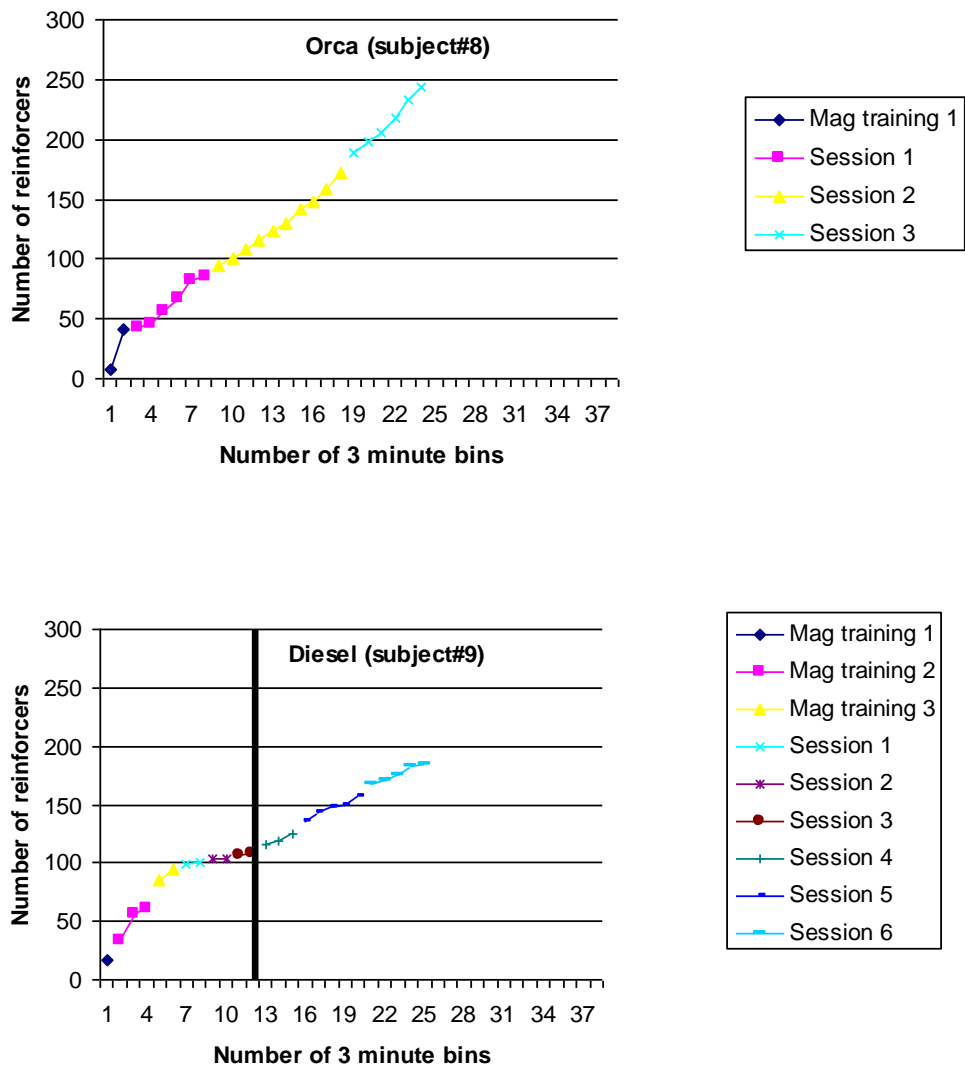
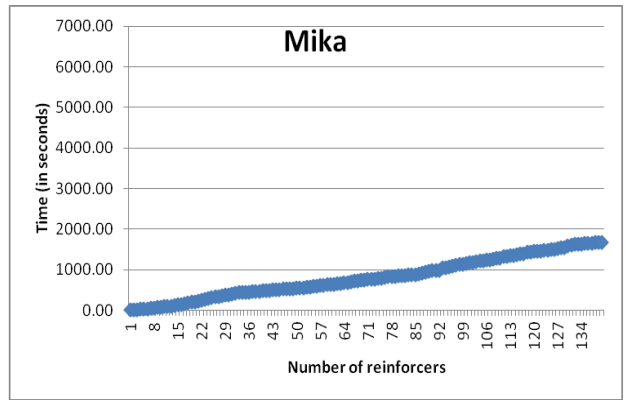
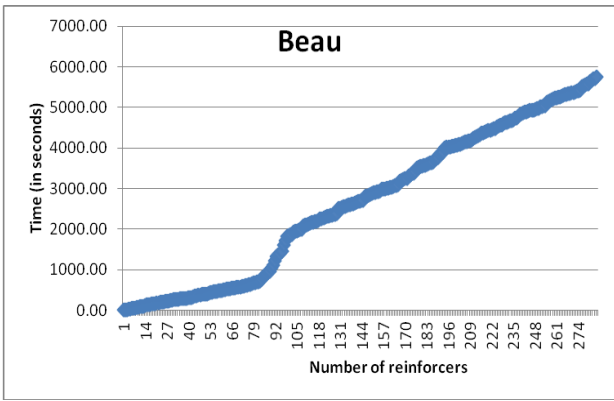
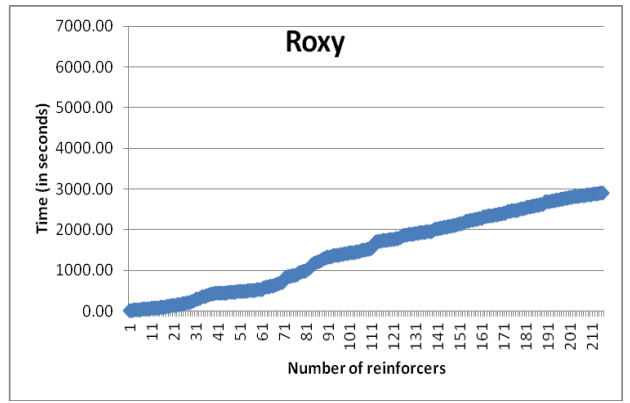
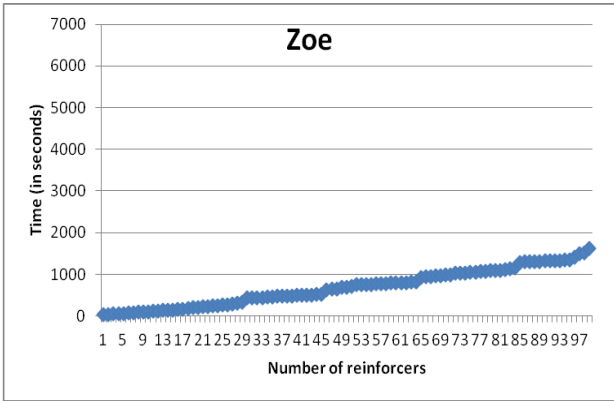
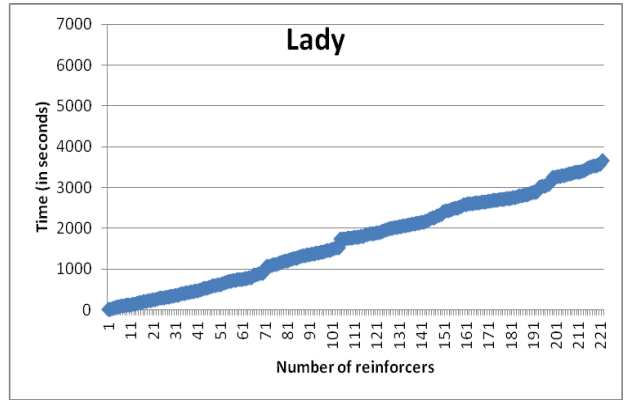
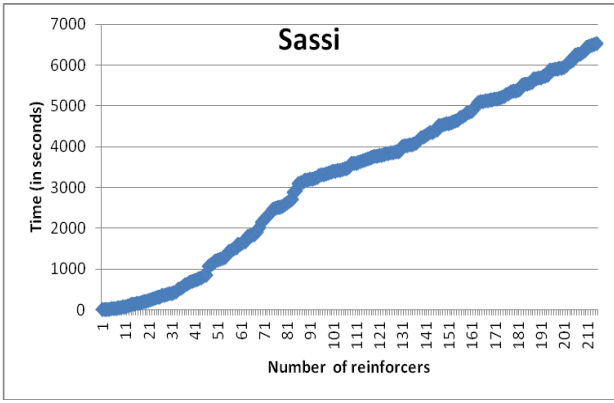


Figure 5. Cumulative number of reinforcers per 3 minute bin for dogs in the delayed group across all sessions.



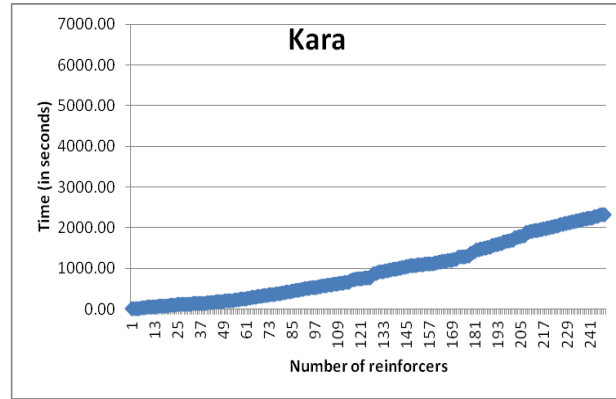
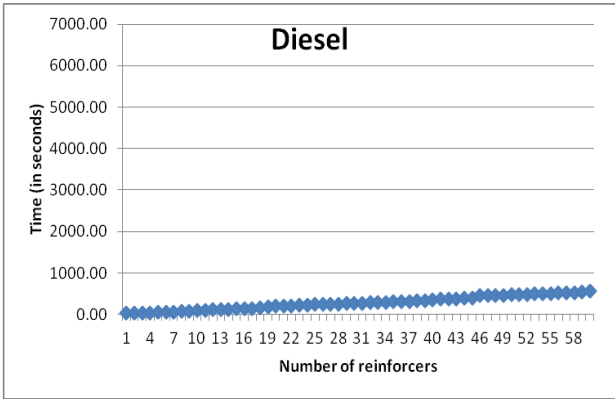
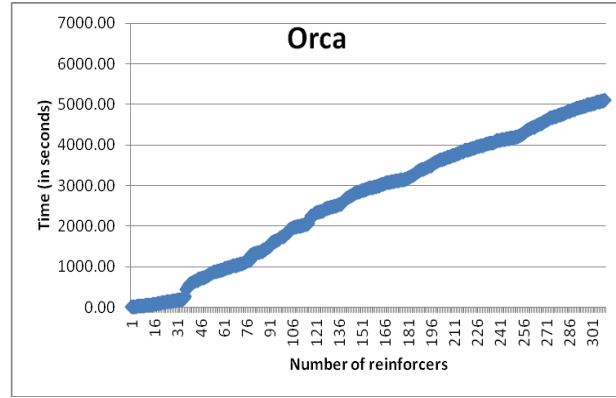
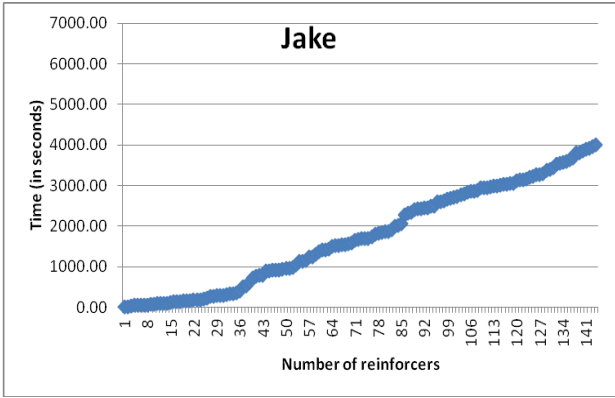


Figure 6. Cumulative time (in seconds) that each reinforcer was delivered for each dog in Study 1.

Discussion

The results of this study show that learning *can* occur with a delay to reinforcement of 2-s, although in most cases learning was demonstrated only under conditions of immediate reinforcement.

Based on the findings concerning the issues of apparatus, method and criteria for inclusion, the following changes were made. For a start, the weighted wand being put at its lowest height during shaping, as Dog 1.8 started touching its base rather than the top but this could still be considered learning. Only dogs who had meals in the morning and/or night, and not those who had constant access to food, were included in the second study, as continuous food access may have affected the food motivation for the dogs if they had already eaten that day. (The owners were asked this before being chosen to participate). This appeared to be the case for Dogs 1.5 and 1.9. The criteria for magazine training were also altered after Dog 1.9 took three sessions to magazine train; only those dogs that could be magazine-trained within one session (trained to reliably use the Manners Minder) were included in the second study (see Appendix C, pages 60 and 65). Owners were asked to be present where possible during the second study throughout the training process, as most dogs, especially Dogs 1.2 and 1.6 appeared to be more anxious (barking, running out of the room, and not eating from the Manners Minder) without the owner present (see Appendix C, pages 58 and 61). During Study 1, it was discovered that Dog 1.10 was responding more to the sound of the Manners Minder delivering the food rather than the actual tone which preceded it (as were some of the other dogs but not as noticeably – see Appendix C, page 66). In light of this, for Study 2, the tone was removed completely. The learning criteria were changed so that the dogs could touch the base of the wand

or the top, as both could be considered learning. See Appendices B and C for more details.

The study by Schlinger and Blakely (1994) on learning in rats demonstrated that if a signal produced by the animal's response occurs during the delay between the response and the reinforcement, learning is more likely to occur and the rates of acquisition and rates of responding is also significantly faster. This seemed to happen in the case of Dog 1.8. Although she was in the delayed group, she learned the target response even with the two second delay; she seemed to notice the "click" sound of the Manners Minder control which essentially acted as a signal that reinforcement was on the way, even though it was delayed. This could be likened to immediate reinforcement as the sound occurs immediately after the dog's response. The response of Dog 1.8 could also be compared to clicker training, which may, in fact, be a way to bridge the gap between response and reinforcement.

STUDY 2

Method

Subjects

Ten domesticated (pet) dogs, recruited by putting up posters at the local (Taupo) dog club and through word of mouth. Dogs who had constant access to food were not included in the study. As before, the dogs were numbered for the study, followed by the number of the dog in the study. For example, Dog 1 in the second study would be Dog 2.1, Dog 2 in the second study would be Dog 2.2 and so on. Again, the dogs were matched for size and then assigned to the immediate or the delayed group.

Apparatus

The same Manners Minder was used as the machine in Study 1 but with the tone removed and the weighted wand put at its lowest height.

Procedure

The procedure was the same as the procedure used for Study 1, but with the weighted wand set at its lowest height, only dogs who could be trained to reliably use the Manners Minder were included in the study, owners were asked to be present where possible, the tone of the Manners Minder was removed, and dogs could touch either the wand base *or* top to meet the learning criteria. The initial training included the same steps as used in Study 1. See Appendices B and C for the details on the training of each of the ten dogs.

As with the previous study, the videos were run through the same data recording programme to enable the collection of the times at which each reinforcer was delivered, as well as the time between each reinforcer. This data is depicted in Figures 8, 9 and 10.

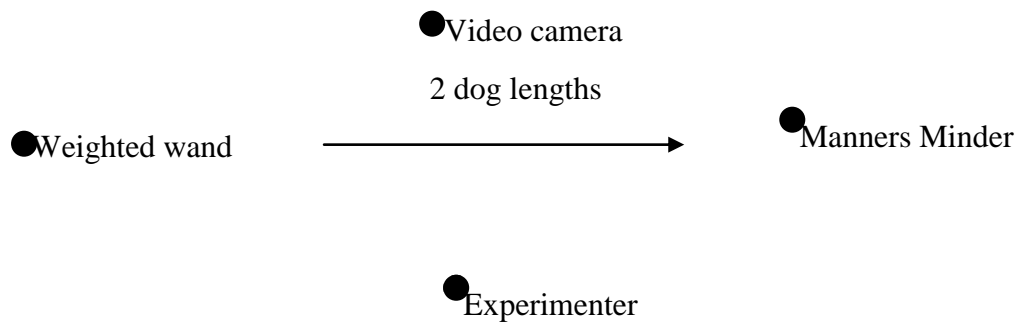


Figure 2. Set-up plan of equipment for Studies 1 and 2. Except for the distance of two dog lengths between the wand and the Manners Minder, the distance between all other elements could change depending on the space available.

Results

Figures 7 and 8 were produced in the same way as the figures depicting the results for Study 1; the graphs depict the number of reinforcers per 3min bin, cumulative across all sessions, for each dog in both the immediate and the delayed groups. Again, the graphs for the dogs in the immediate group show a steeper graph line indicating more reinforcers gained across a shorter period of time than those for the dogs in the delayed group. In the figures depicting the dogs' responding under delayed reinforcement conditions, the graph line is flatter across more sessions until the dogs move into the immediate reinforcement phase, which tend to follow the same pattern of more responses.

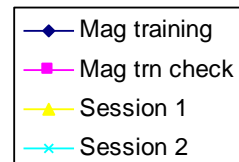
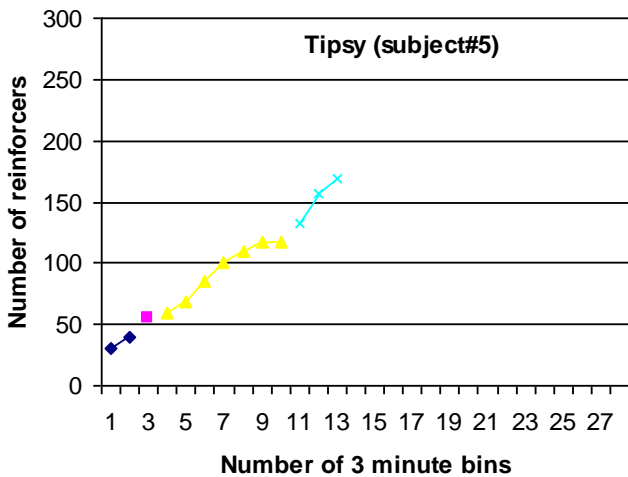
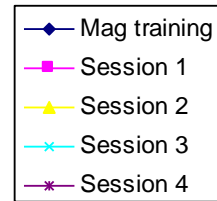
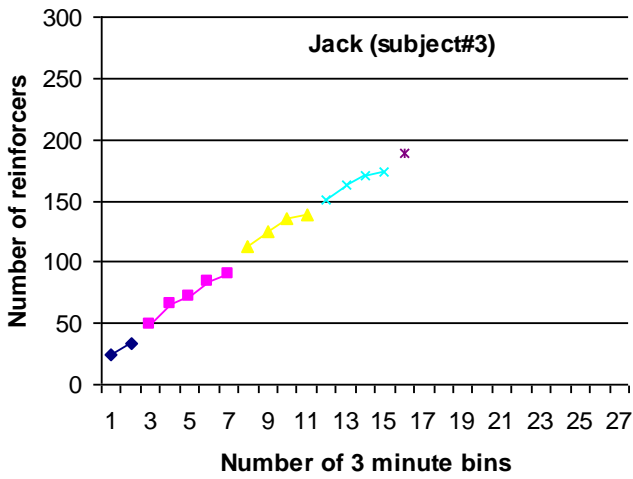
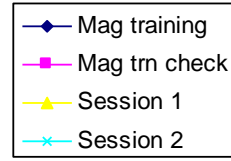
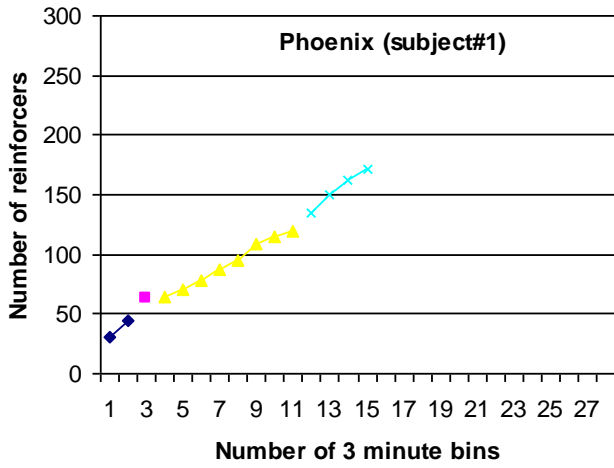
Figure 9 depicts the cumulative time (in seconds) that each reinforcer was delivered for each dog in Study 2. As with Figure 6 for Study 1, the graphs depicting the results for those dogs who received the delayed reinforcement (Cara, Narla, Stanley, Wagg and Clover) again show that some of these dogs are taking approximately double the amount of time to obtain roughly the same amount of reinforcers, demonstrating a slower learning curve.

As with the first study, most dogs learned the target response under immediate reinforcement conditions, while none of the dogs learned it with the two second delay. From the immediate group, Dogs 2.1, 2.3 and 2.5 learned the target response within the three sessions. Dogs 2.7 and 2.9 did not learn the response. From the delayed reinforcement group, none of the five dogs learned the response, but of these dogs, 2.6, 2.8 and 2.10 learned it when trained with immediate reinforcement. Dogs 2.2, 2.4 and 2.9 did not demonstrate any reliable or consistent responding which could be considered 'learning' using my criteria. Dog 2.7 did demonstrate some evidence of learning – he began to move in the same direction (towards the wand) consistently but

nothing further. From the delayed group, Dogs 2.6, 2.8 and 2.10 learned to move in a certain direction (towards the experimenter or the wand), or to perform a sequence of responses, but these were not always consistent. See Appendices E and F for the details of each dog's results.

Issues with apparatus and method

Dogs 2.2, 2.4 and 2.6 did not respond much at first but were also not distracted during this time. In the case of Dogs 2.4, 2.7 and 2.9, it was difficult for the experimenter to tell in which direction the dog was actually walking or looking due to the experimenter's position in relation to the weighted wand. In addition to this, Dog 2.7 did not appear to notice the wand at all. See Appendices E and F for the full details of these observations.



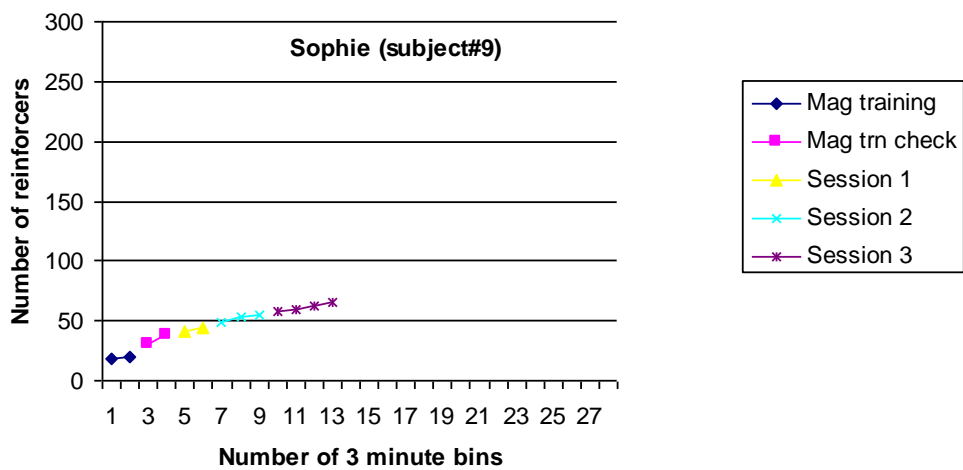
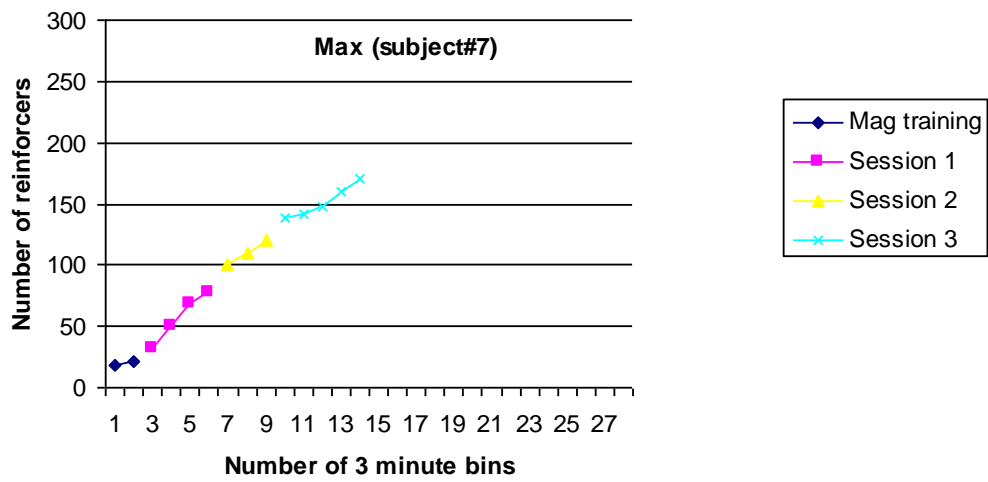
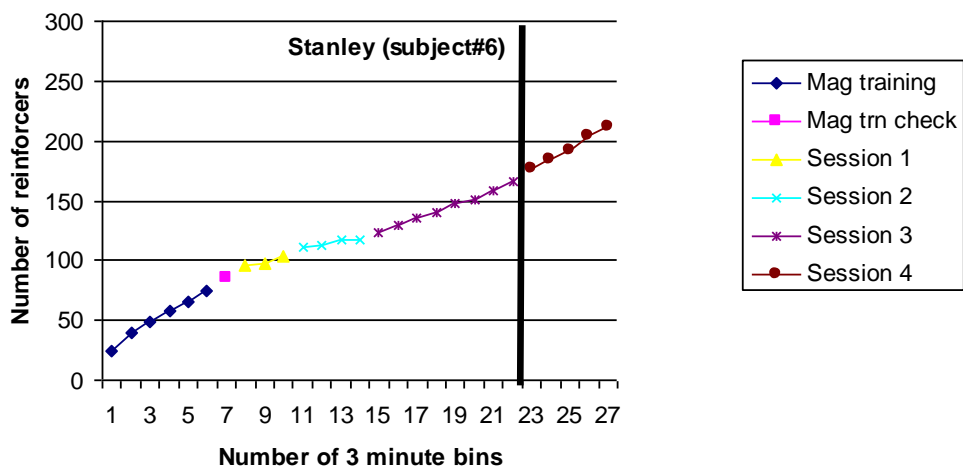
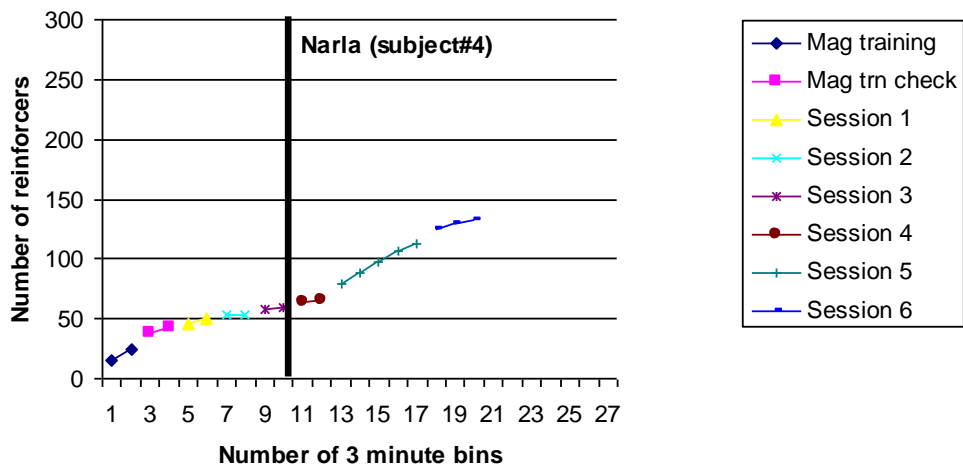
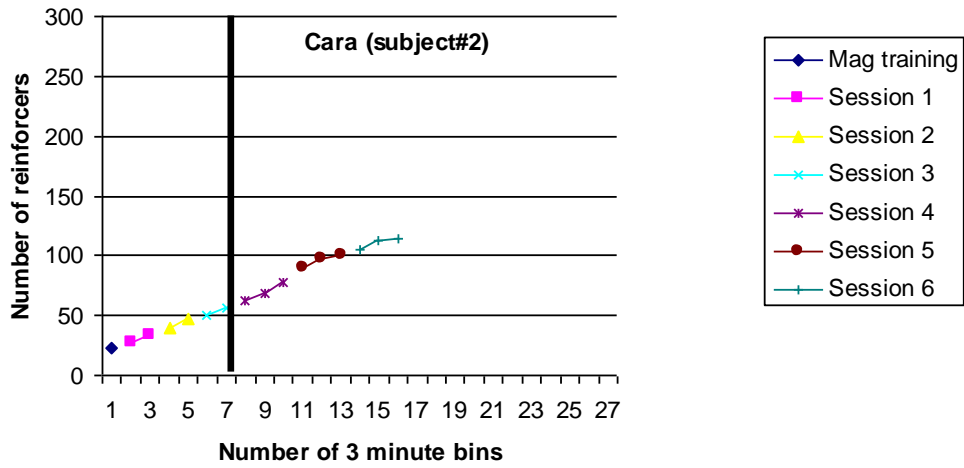


Figure 7. Cumulative number of reinforcers per 3 minute bin for dogs in the immediate group across all sessions.



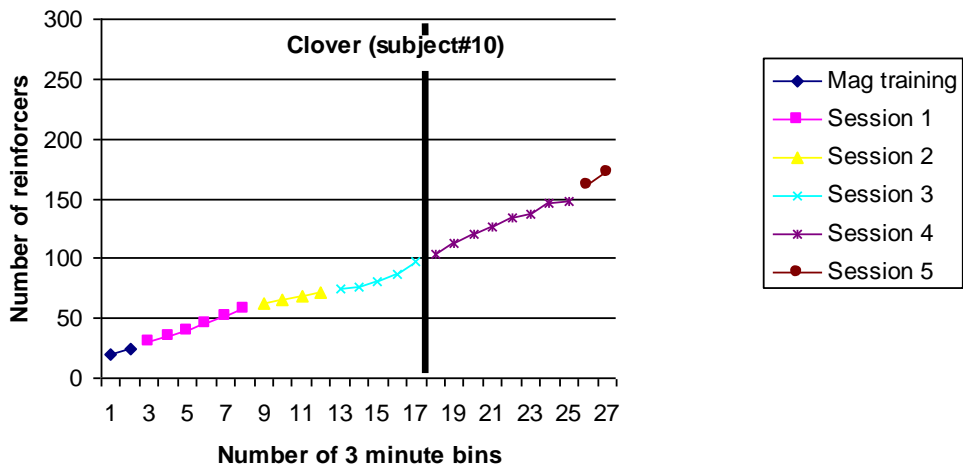
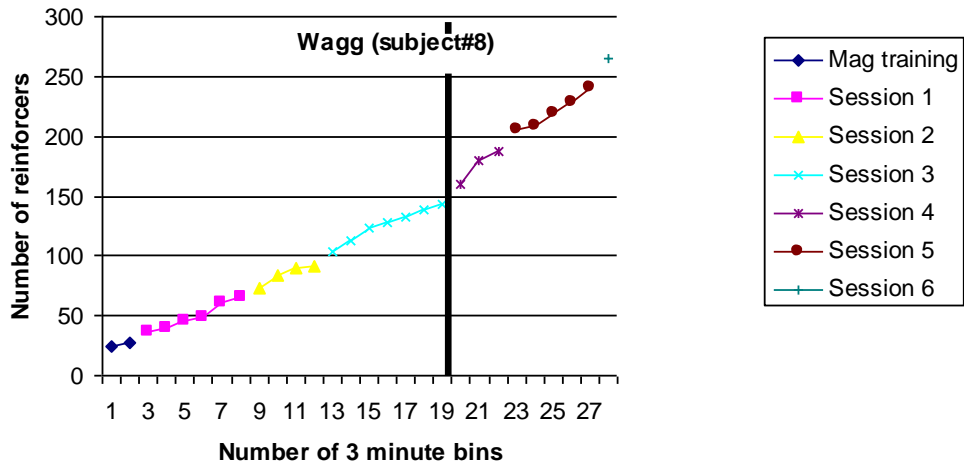
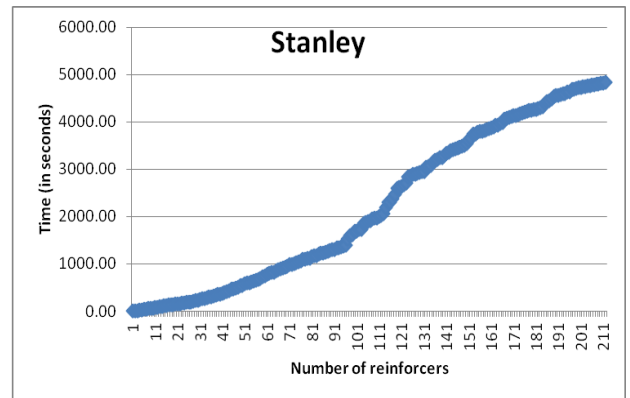
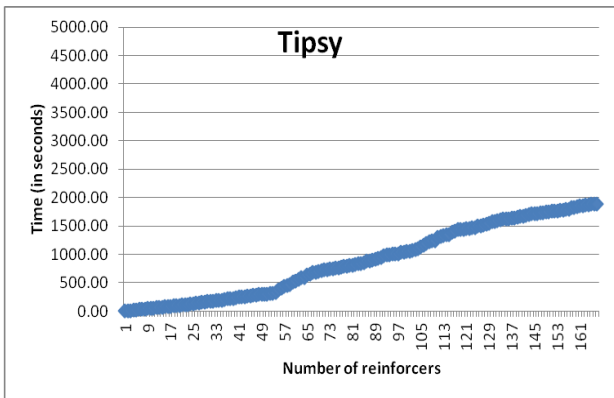
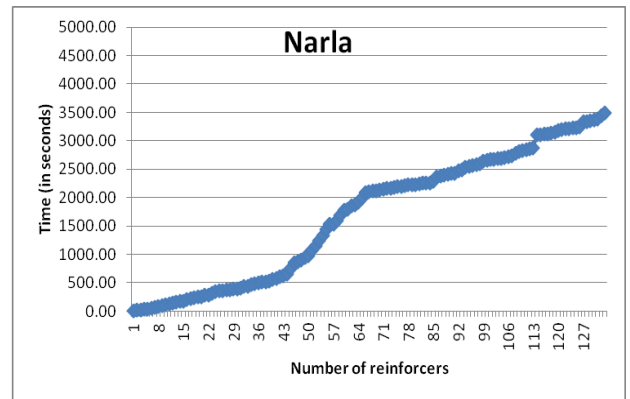
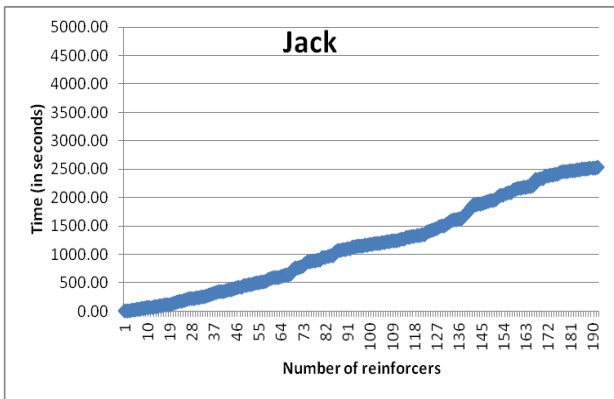
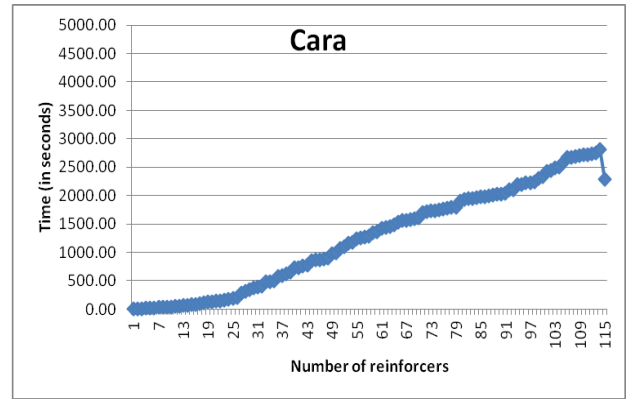
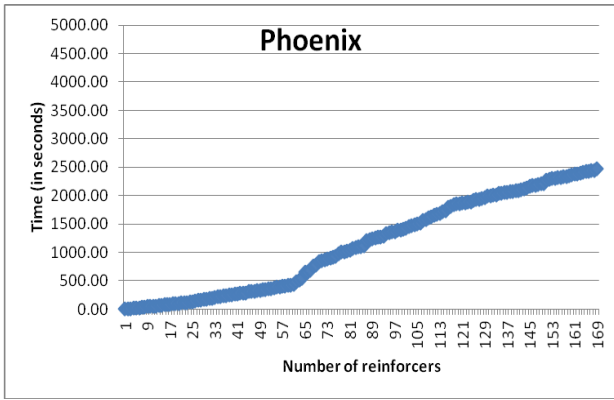


Figure 8. Cumulative number of reinforcers per 3 minute bin for dogs in the delayed group across all sessions.



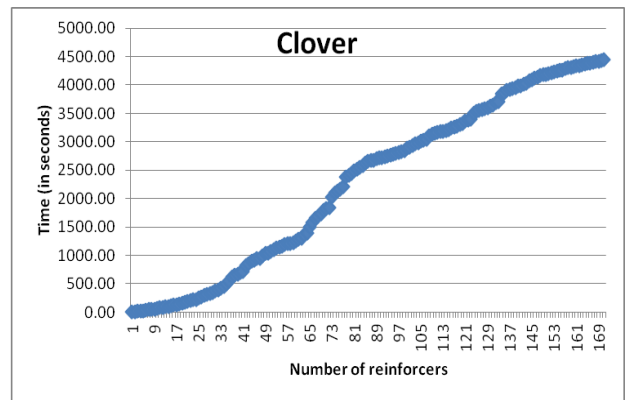
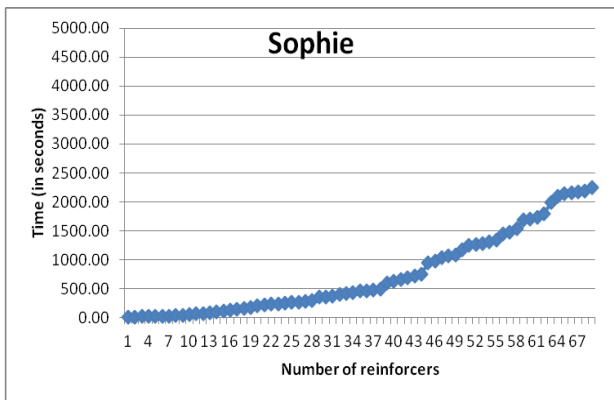
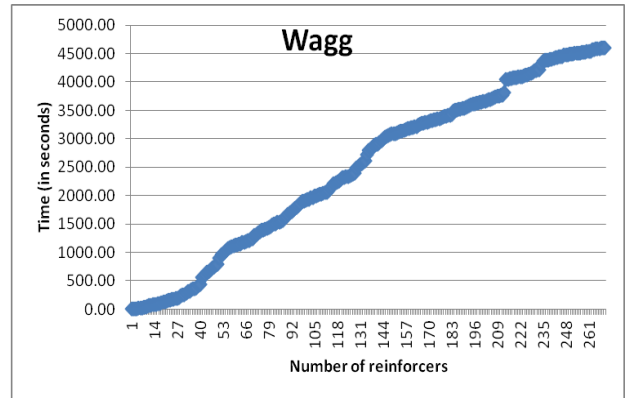
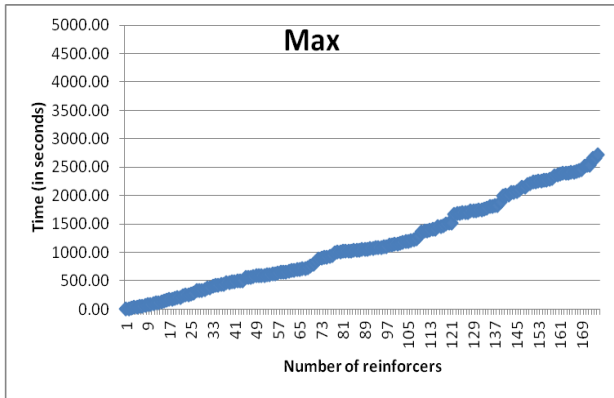


Figure 9. Cumulative time (in seconds) that each reinforcer was delivered for each dog in Study 2.

Discussion

The results of this study again demonstrate that dogs can learn with a short delay to reinforcement, although the target response for this study was only mastered by the dogs in the immediate group.

As with the previous study, apparatus-related and methodological issues were discovered which required alteration, and so the following changes were made for Study 3. The space between the Manners Minder and the wand was changed to one dog length, as the focus was on the learning of a specific response and distance was not an issue. In the case of Dogs 2.2 and 2.6, they were not responding much at all, often sitting or lying down during the session. The distance between the Manners Minder and the wand was reduced to attempt to bring the dogs' focus back to the wand. (See Appendix F, pages 72 and 76). The set-up plan was changed, as after viewing the previous videos, it was found that some responses that were being reinforced should not have been, for example the dog walking in a direction other than *directly* towards the wand, due to the viewing angle of the experimenter. This was the case for Dogs 2.4, 2.7 and 2.9. The set-up for Study 3 was also an attempt to get the dogs to actually notice the wand; as in the case of Dog 2.7, he did not notice the wand at all (see Appendix F, pages 74, 78 and 80. See Figure 2 for the set-up plan for Study 3). The dogs in the following study were not matched for size as this did not seem to impact on the outcome of the previous studies. Study 1, along with the current study, looked at dogs' learning in a fairly controlled environment; a third study was needed to look at the same effects of delay to reinforcement but in a more natural environment.

STUDY 3

Method

Subjects

Six dogs were recruited in the same way as they were in the previous two studies. These dogs were not matched for size as this did not appear to have any bearing on the results of the previous two studies. Only six dogs were able to be recruited at this time. The dogs were numbered in the same way as they were in the previous two studies.

Apparatus

The same apparatus which was used in the previous two studies was used for Study 3.

Procedure

The setting for this study was the local dog club in Taupo. However, some of the dogs were too distracted to eat or use the Manners Minder in this setting, and so the training was moved to their home environment but still took place outdoors to ensure as natural a setting as possible (this was not a problem as the study was looking at the learning of a response and not the particular setting). In the case of Dogs 3.2 and 3.5, this was on the lawn and patio outside the owner's home, and for Dogs 3.3 and 3.4 it was a public park. See Appendices H and I for details on the training of each of the six dogs.

As with the previous two studies, the videos were run through the same data recording programme to enable the collection of the times at which each reinforcer

was delivered, as well as the time between each reinforcer. This data is depicted in Figures 11, 12 and 13.

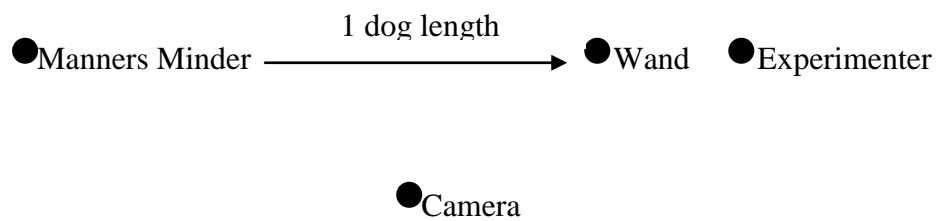


Figure 3. Set-up plan of equipment for Study 3. Except for the distance of one dog length between the wand and the Manners Minder, the distance between all other elements could change depending on the space available.

Results

Figures 10 and 11 were produced in the same way as the figures depicting the results for Studies 1 and 2; the graphs depict the number of reinforcers per 3min bin, cumulative across all sessions for each dog in both the immediate and the delayed groups. Again, the graphs for the dogs in the immediate group show a steeper graph line indicating more reinforcers gained across a shorter period of time (and faster learning) than the graph lines for the delayed group, although this learning speed can be seen in the second part of the delayed graphs where the phase changes from immediate to delayed reinforcement.

Figure 12 depicts the cumulative time (in seconds) that each reinforcer was delivered for each dog in Study 3. As with Figure 9 for Study 2, the graphs depicting the results for those dogs who received the delayed reinforcement (Echo, Sproket and Timber) depict a slower learning curve. This is evidenced by the amount of time taken to gain a number of reinforcers, which is significantly more for the dogs receiving delayed reinforcement.

Four out of the six dogs learned the target response under immediate reinforcement conditions, while none of the dogs learned it when the reinforcement was delayed by 2-s. From the immediate group, Dogs 3.2 and 3.4 learned the target response within the three sessions. Dog 3.1 did not learn the response. From the delayed reinforcement group, none of the three dogs learned the response under the delay condition. However, Dogs 3.3 and 3.5 learned the response when trained under immediate reinforcement conditions. Dog 3.1 did display minor evidence of learning; she would walk towards the experimenter to obtain reinforcement, although she did not appear to notice the wand. Dog 3.6 showed no evidence of learning besides lying beside the experimenter. However, this appeared to be a behaviour that had been

learned previously, this corroborated by the owner. See Appendices H and I for the details of each dog's results.

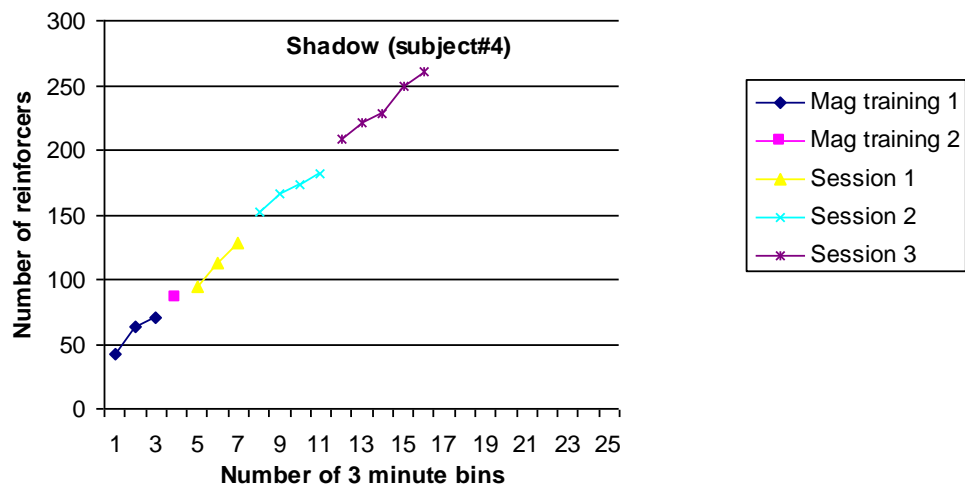
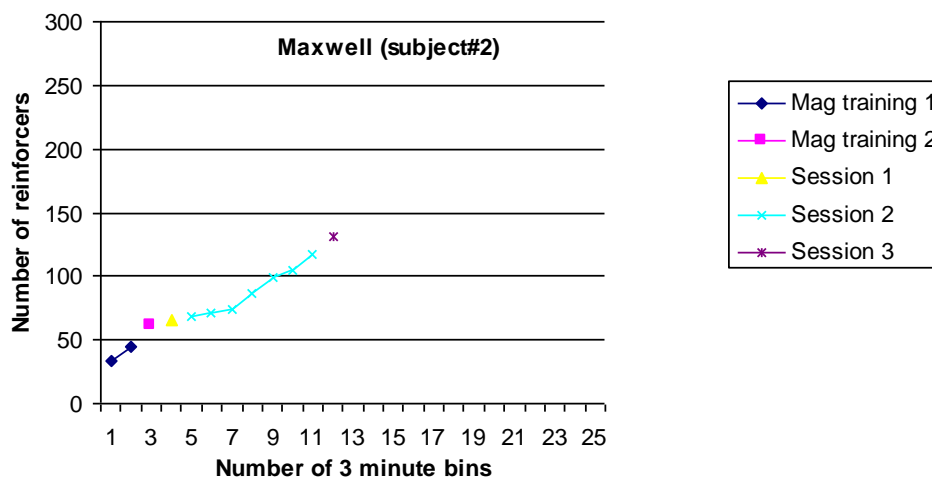
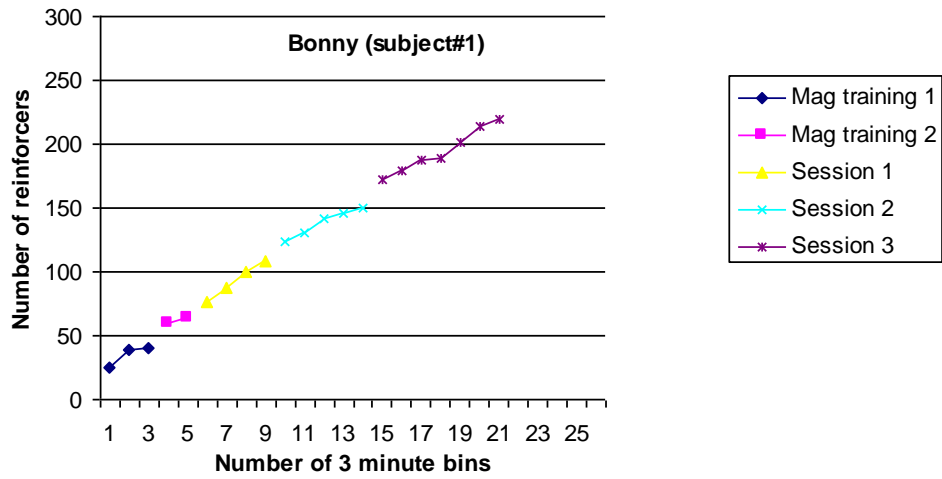


Figure 10. Cumulative number of reinforcers per 3 minute bin for dogs in the immediate group across all sessions.

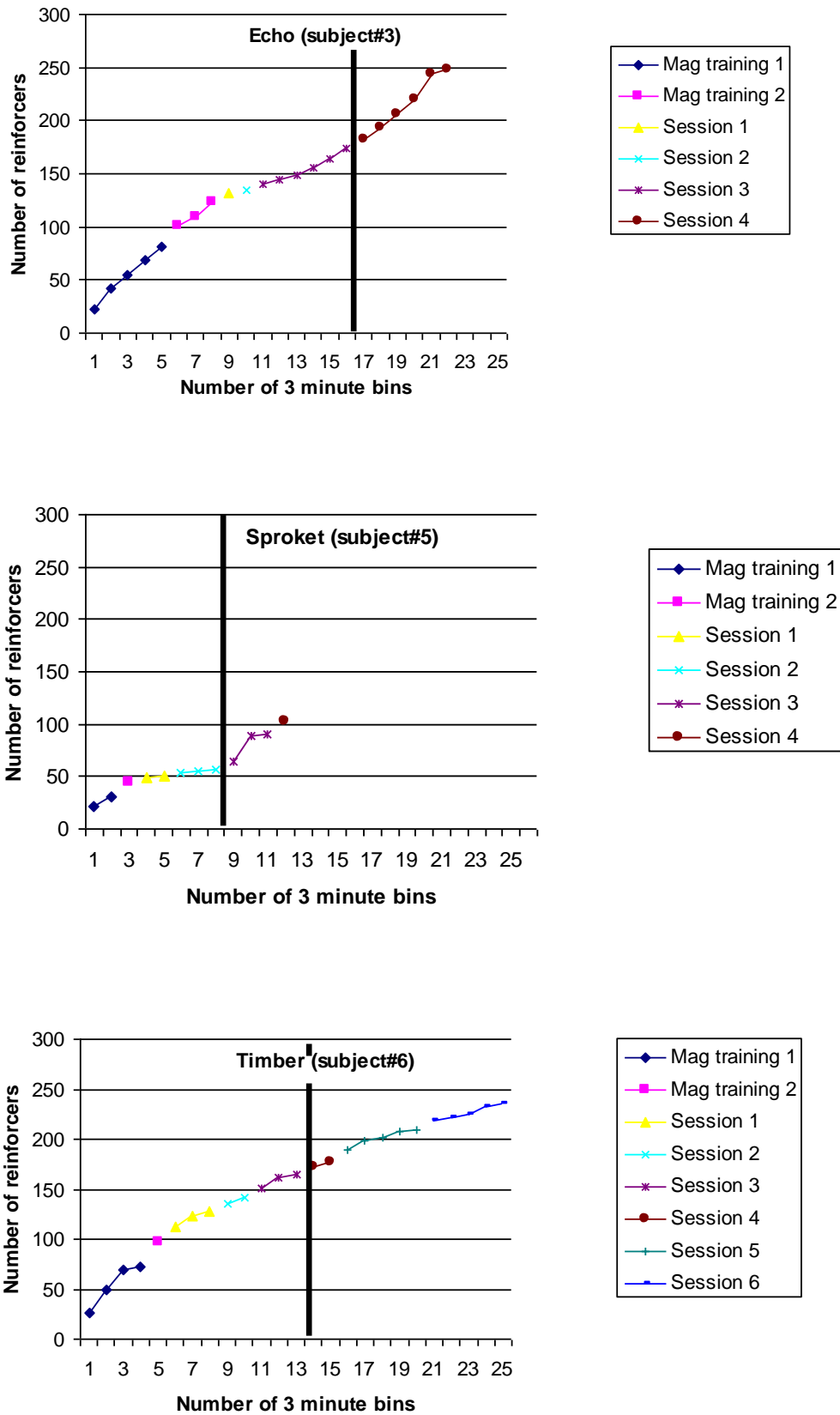


Figure 11. Cumulative number of reinforcers per 3 minute bin for dogs in the delayed group across all sessions.

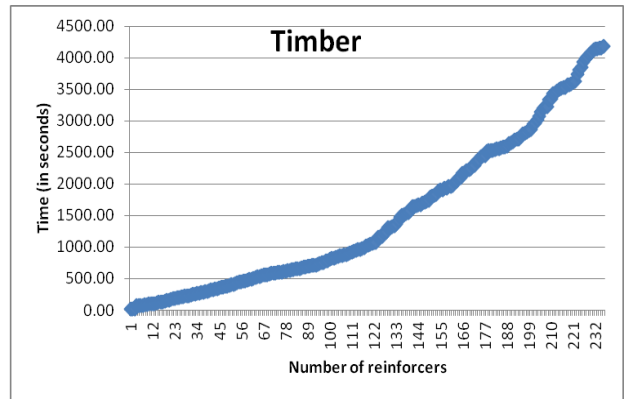
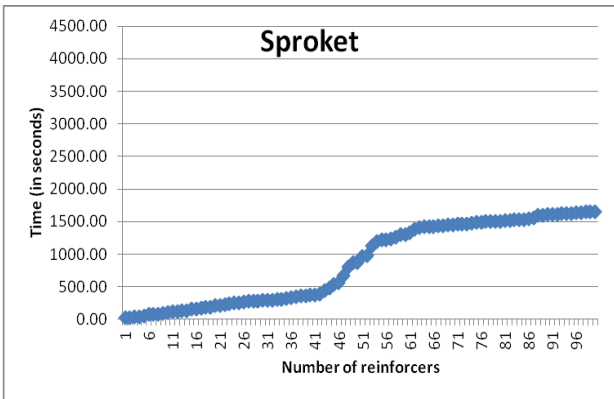
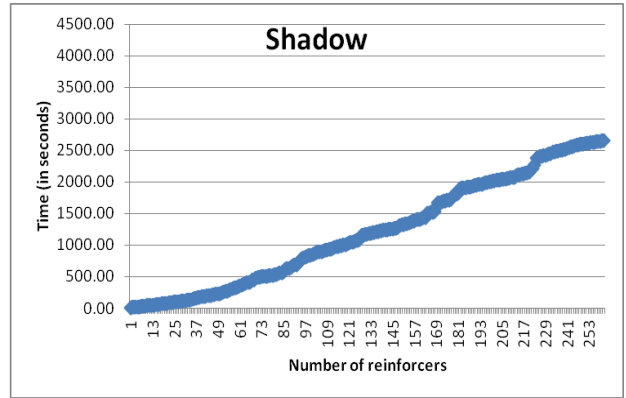
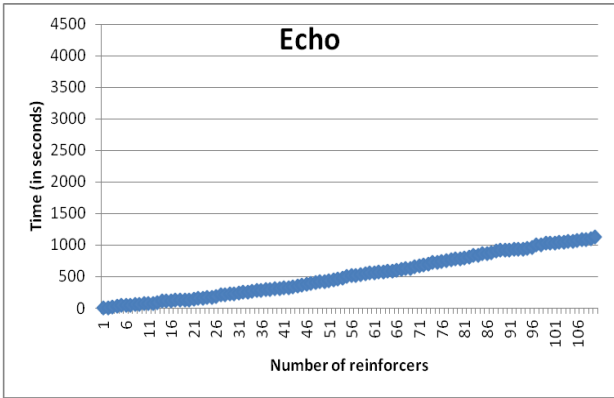
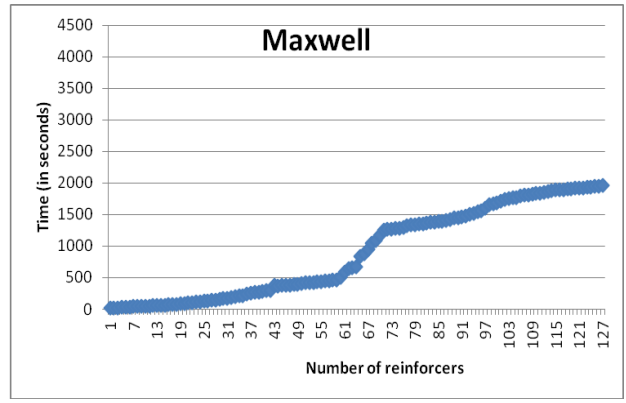
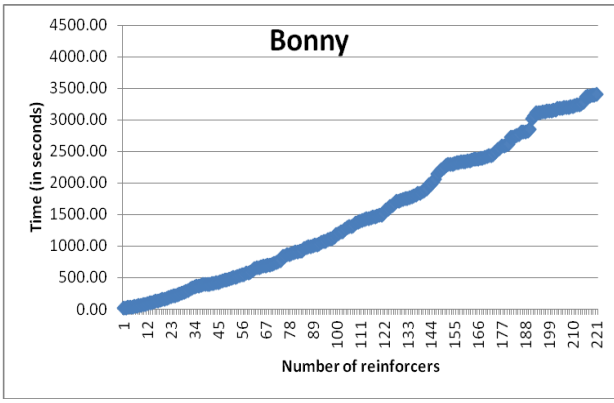


Figure 12. Cumulative time (in seconds) that each reinforcer was delivered for each dog in Study 3.

Discussion

The results of this study again demonstrate that dogs can learn with a short delay to reinforcement, although again the target response was only mastered by the dogs which were in the immediate reinforcement group.

This study looked at the same effect of delay as the previous two studies but in a more natural setting. As some dogs were too distracted to eat or respond at the chosen setting (the local dog club), training continued at the owner's home in an outdoor setting. (See Appendices H and I for more detail).

General Discussion

The three studies conducted and discussed above investigated the effect of a 2-s delay to reinforcement on dogs' learning. Across these studies it was found that in general, dogs' learning is slowed considerably when a 2-s delay to reinforcement is in place, or learning does not take place at all. Some of the dogs in these studies demonstrated learning with the delay to reinforcement in place (for example 'circling' behaviour – see Appendices C and F), although they did not learn the required target response, except in the case of Dog 1.8, who learned the response during the delayed sessions. These results are in line with the results of the previously mentioned studies conducted in controlled settings with other animals, which showed that learning can occur with delay to reinforcement, but learning is faster without a delay.

There may have been a number of confounding factors present across the three studies; the experimenter's skill in using the Manners Minder; the experimenter was new to using this machine at the start of the experiment but improved as they became more familiar with both the machine and the shaping procedure. Setting is also a major factor; for example some homes would have been more or less distracting, and in the third study not all the dogs would work for food at the local dog club, so some had to be trained at home (although this was done outdoors, in as natural a setting as possible). Age and breed of the dog may have been a factor as well; for example younger dogs tend to be more easily distracted and have a shorter attention span (this appeared to be so in my study), and Labradors are known for being more food-motivated than any other breed, although in these studies, the Labradors did not in fact learn the target response faster as a breed.

As the experimenter hand-fed the dogs, they may have associated the experimenter with food; in the case of Dog 3.6, she moved towards the experimenter

in order to be rewarded. This may have looked like she was moving towards the wand, and so in these cases she would have been rewarded, even though she was moving towards the experimenter rather than the wand.

As with the studies by Andrzejewski, Terry-Cain and Bersh (2004), Weatherly, Stout, Rue and Melville (2000), and Schlinger and Blakely (1994), the current studies showed that responding is faster with no delay to reinforcement and rate of acquisition is also faster. Dog 1.8, who learned the target response *with* the two second delay, seemed to respond to the 'click' sound when the remote button was pressed immediately following a response, which may have acted as a 'signal' that reinforcement was on the way, similar to the signal or cue discussed in the study by Schlinger and Blakely (1994), where a response-produced signal occurred immediately after the response, essentially increasing response and acquisition rates. This theory of course would need to be tested with more dogs. An experiment of this kind may again involve training two groups of dogs, one using immediate reinforcement, the other delayed. A 'click' immediately following the response of the dogs in the delayed group could occur, essentially bridging the delay between the response and the reinforcer so the dog is focussed on the 'click', rather than any other behaviour. The 'click' would signal to the dog that a reinforcer will soon be available. The point of this would be to find out if learning would still occur for the dogs with the delay in place, when the 'click' is acting as a signal for reinforcement. A future study may also involve slowly increasing the time between the dog's response and the reinforcer if the dogs demonstrate learning with the signal during the delay. In yet another study, this signal could be a sound which lasts the duration of the delay.

The above theory may also be compared to the concept of clicker training, where the 'click' essentially acts as a reinforcer. This outcome is achieved through classical conditioning; the 'click' is paired with a tangible reinforcer (usually an edible treat in the case of dogs), until the 'click' becomes the secondary reinforcer. This is also another possibility in the case of Dog 1.8, who may have been clicker trained previously.

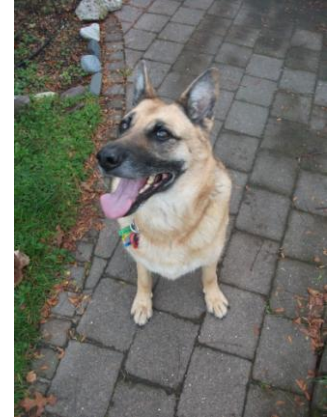
Appendix A – Photo gallery for Study 1



- Dog 1.1
- 'Sassi'
- Jack Russell



- Dog 1.2
- 'Lady'
- Cavalier
King Charles
Spaniel



- Dog 1.3
- 'Zoe'
- German
Shepherd



- Dog 1.4
- 'Roxy'
- Rotweiler



- Dog 1.5
- 'Beau'
- Huntaway x
German
Shepherd



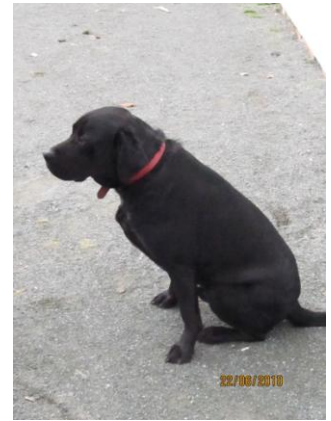
- Dog 1.6
- 'Mika'
- Bijon x
Shitzu



- Dog 1.7
- 'Jake'
- Fox Terrier



- Dog 1.8
- 'Orca'
- Border Collie



- Dog 1.9
- 'Diesel'
- Black Labrador



- Dog 1.10
- 'Kara'
- Black Labrador

Appendix B – First set of notes taken for each dog in Study 1; details of procedure.

Dog 1.1 was not reinforced for looking in the direction of the wand as she was actually looking at her owner and she was moving in that direction anyway.

Narrowing criteria was difficult as she barked a lot whenever this was attempted. After the last session was scheduled to end, she sporadically started touching the wand, so this session went on for a few extra minutes.

Dog 1.2 was initially scared of the noise the Manners Minder made, although this did not prove to be a problem during the responding stage. The camera angle makes it look as though she is not walking towards the wand even when she is. Even though owners were not supposed to be present at all, Dog 1.2's owner needed to be present at some stages otherwise she would be distracted or keep leaving the room. She also seemed to value attention more than food at times.

For Dog 1.3, a room change was necessary for Session 3 due to space issues. Reinforcing her was difficult as she did not respond much at all, especially when criteria were narrowed.

The Manners Minder broke down near the end of the magazine training for Dog 1.4 but she learned the association anyway.

Dog 1.5 was trained in the owner's garage as he is generally not allowed indoors so this would have presented more of a distraction. According to the owner, he is generally not very motivated for food but he did work for it consistently during the study.

Dog 1.6 tended to become distracted from the task quite easily, so the experimenter played with her a bit during magazine training to get her attention focused back on the task.

Dog 1.7 was very distracted in general during all stages of the experiment.

Dog 1.8 was also trained in the owner's garage due to the same reasons in existence for Dog 1.5. She ran out of the garage the first few times she was reinforced, unsure if she was scared of the Manners Minder. She looked at the experimenter when they pressed the remote control button (the 'click' was quite audible). The wand was lowered as she kept touching the base rather than the top.

The experiment for Dog 1.9 was conducted on the owner's driveway as he is not allowed in the house. The second magazine training was cut short due to rain. He required three magazine training sessions – according to his owner he gets “bored” easily.

It was difficult to reinforce Dog 1.10 for particular responses as she was very motivated for food, and so she moved extremely quickly; sometimes it was necessary to make her sit briefly to calm her down. She seemed to be responding to the noise of the food coming out of the Manners Minder rather than the “beep” sound.

Appendix C – Second set of notes taken for each dog in Study 1. Notes taken from record sheets

Dog 1.1 – Sassi - Delayed

Dog 1.1 did not learn the target response by the definition and criteria for ‘learning’ for this study. She took one session to magazine train (6.5mins). She spent a substantial amount of Session 2 barking and sitting beside the experimenter, and there was no consistent responding of any kind. She would back away from the Manners Minder when no food came out. During Session 3, she was still hardly responding and when she did respond it was never consistent. She walked past the wand to see her owner a couple of times, so this was reinforced. She was briefly distracted by a visitor arriving (left the room, barking). Session 5 was the first immediate reinforcement session; she was beginning to circle in the wand direction for reinforcement but barked a lot whenever the experimenter tried to narrow the criteria for reinforcement. During Session 6, Dog 1.1 was circling more consistently but without getting any closer to the wand, but as in Session 5, she barked and stopped responding when the experimenter tried to narrow the criteria (e.g., get her closer to the wand). She narrowed the criteria herself at one point by walking up to the wand but this was not continued. The camera battery died so Session 6 was ended, although she was not making much progress anyway. At the start of Session 7, she immediately walked in small circles towards the wand. Again, she went to her owner, walking past the wand and so this proximity to the wand was reinforced. Her responding was still not consistent and she was not getting any closer to the wand – half her attention seemed to be on other household activities. After the session was suppose to end, she started to sporadically touch the wand so the session was allowed

to run for an extra few minutes, but although she touched the wand a few times, it was inconsistent and she spent long periods in between responses doing nothing.

- **Session 1** (Mag. training) – 30r, 6.5mins
- **Session 2** – 24r, 17mins
- **Session 3** – 14r, 11mins
- **Session 4** – 17r, 16.5mins
- **Session 5** – 32r, 11mins
- **Session 6** – 47r, 22mins
- **Session 7** – 50r, 25mins

Dog 1.2 – Lady – Immediate

Dog 1.2 did not learn the target response, although she did learn to circle towards the wand. She took one session to magazine train (8.5 mins). She was scared of the Manners Minder at first, but it did not take long to get her eating from it. The experimenter could increase the distance she had to move to get food after approximately 2.5mins. She was very focused on the experimenter at first, so she was given a treat from the Manners Minder to get her attention away from them. It was necessary to break twice due to Dog 1.2 becoming distracted and leaving the room. She appeared to be walking towards the wand consistently for reinforcement. During Sessions 3 and 4, she did not do anything *consistently* in order to get reinforcement. She circled the wand for reinforcement during Session 5 (extra session). Cats were present during all sessions but did not seem to be a distraction. The owner came in a couple of times, and Dog 1.2 became distracted. The owner had to stay during Sessions 3 and 5, as she kept leaving the room to look for her. There was one extra session for this dog by accident.

- **Session 1** (Mag. training) – 45r, 8.5mins
- **Session 2** – 56r, 18mins, 1 break
- **Session 3** – 50r, 17mins, 1 break
- **Session 4** – 24r, 7.5mins, 2 breaks
- **Session 5** – 95r, 26mins, 2 breaks

(Although the criteria is three “no responding” breaks, Dog 1.2 was very distracted and kept leaving the room, so Sessions 2 and 3 were ended early).

Dog 1.3 – Zoe – Immediate

Dog 1.3 did not learn the target response or demonstrate any other consistent behaviour for reinforcement. She took one session to magazine train (5mins) and learned the tone/treat association very quickly (she was very food-motivated). She was totally focused on the experimenter, so one treat was delivered to take attention away from them. She spent a lot of time lying down and looking at the experimenter. During Session 3, she was consistently looking at the wand for reinforcement and then consistently circling towards the wand for reinforcement. The experiment was moved to a larger space for Session 4, and moved back a step to reinforcing her for looking towards the wand. Most of Dog 1.3’s time was spent lying or sitting down, looking at the experimenter and sniffing the Manners Minder, so not many reinforcers were delivered during most sessions.

- **Session 1** (Mag. training) – 30r, 5mins
- **Session 2** – 3r, 2mins
- **Session 3** – 84r, 22.5mins – 2 breaks
- **Session 4** – 15r, 8mins – 2 breaks

(Session 2 should have continued for longer but Dog 1.3 was hardly responding).

Dog 1.4 – Roxy – Immediate

Dog 1.4 learned the target response very quickly. She was magazine trained in one session (7mins) and was very food-motivated. During magazine training, the Manners Minder broke down after approximately 2mins and only occasionally delivered food. Between 6 and 9mins into the first session, the Manners Minder did not stop delivering food so the session was ended early, although Dog 1.4 learned the tone/treat association, despite the delays and the intermittent schedule. Session 2 was a second magazine training session to check that she had in fact learned the association, which she had. She was touching the wand base more than the top. She learned the target response in one session but an extra session was conducted as a consistency check.

- **Session 1** (mag. training) – 41r, 7mins
- **Session 2** (mag. training) – 25r, 2mins
- **Session 3** – 111r, 31.5mins, 2 breaks
- **Session 4** – 43r, 8mins

Dog 1.5 – Beau – Delayed

Dog 1.5 did not learn the target response during the delayed reinforcement phase, although he learned it quickly when he was moved to immediate reinforcement. He was magazine trained in one session (12mins). He seemed to respond to the sound of the food coming out of the Manners Minder rather than the tone. At the start of magazine training, it was necessary to point out the food and he

kept sitting down, although he was successfully magazine trained. During Session 2, he was reinforced for looking at the wand, but he touched the wand during the 2-s delay. Dog 1.5 spent a lot of time sitting or lying down and moved around quite slowly. He started to circle towards the wand consistently during Session 3 between the 6th and 9th minute – because of the delay, he was being reinforced for walking in a full circle rather than walking to the wand. He learned the target response during Session 5, as he was put onto immediate reinforcement, although he was touching the base of the wand first.

- **Session 1** (Mag. training) – 84r, 12mins
- **Session 2** – 12r, 13mins, 2 breaks
- **Session 3** – 33r, 15.5mins, 2 breaks
- **Session 4** – 47r, 16.5mins, 2 breaks
- **Session 5** – 63r, 22mins, 3 breaks

(Session 5 included an extra break the third time Dog 1.5 stopped responding as he had basically learned the response and this only needed to be checked – he seemed to become ‘bored’ easily).

Dog 1.6 – Mika – Immediate

Dog 1.6 learned the target response very quickly. It took two sessions to magazine train her as she was very scared of the Manners Minder at first, even with no volume, and was distracted, although she learned the basic tone/treat association. It was possible to turn on the volume after approximately 2mins. She was distracted by the sound of her owner’s voice and other sounds during the first two sessions. The experimenter had to start magazine training from the beginning during Session 2 (feeding by hand), but during the first three minutes of this session, she went readily

to the Manners Minder when the tone sounded. The experimenter had to point out the food a couple of times during Session 2, but only when Dog 1.6 was distracted by something. Although she had been fed her breakfast, she still learned the target response in one session (Session 3). Session 4 was just a consistency check and to get criteria met.

- **Session 1** (Mag. training) – 25r, 6mins
- **Session 2** (Mag. training) – 61r, 10.5mins
- **Session 3** – 37r, 9.5mins
- **Session 4** – 11r, 1.5mins

Dog 1.7 – Jake – Delayed

Dog 1.7 did not learn the response during either the immediate or the delayed conditions. He was magazine trained in one session (5.25mins). He associated the food with the tone almost immediately – he was very food-motivated. He looked at the experimenter a lot of the time, who needed to point out the food a couple of times, and although the Manners Minder stuck twice, this did not seem to effect his responding. He moved quite quickly in general, so he made a number of different responses during the 2-s delay, such as walking away from the wand, sniffing around and sitting down. He stopped eating from the Manners Minder or the experimenter's hand near the end of Session 2 (the delay already seemed to be having an effect). Dog 1.7 was still being reinforced for looking at the wand during Session 4 but this had to move on to immediate reinforcement at Session 5. During Session 5, he was being reinforced for both looking at, and walking towards, the wand. He touched the wand base once spontaneously during the 12th and 15th minute, but by this time he was hardly responding to the tone at all, and he kept leaving the room. During the 6th

session, the owners were out of the house at work, seeing if he would be less distracted, but he was still not responding to the tone, although he responded very briefly during the 6th and 9th minute. By the last session, Dog 1.7 was hardly responding at all, spending a lot of time sitting behind the camera, although he responded once to the tone near the end of the session, after which there was no responding for one minute. His attention was mostly on the experimenter, and he spent a lot of time whining and backing out of the room, distracted by any small noise or smell. He was definitely hungry as he ate from his bowl as soon as it was put down once the session was over.

- **Session 1** (Mag. training) – 32r, 5.25mins
- **Session 2** – 7r, 6mins, 1 break
- **Session 3** – 24r, 15mins, 1 break
- **Session 4** – 9r, 8mins, 2 breaks
- **Session 5** – 34r, 14mins, 2 breaks
- **Session 6** – 28r, 13mins, 2 breaks
- **Session 7** – 20r, 9mins, 2 breaks

(Session 2 only had one “no response” break rather than two as the first break was when the wand was introduced – the point was to see if Dog 1.7 was still responding to the tone after the last session. Session 3 was ended after only one “no response” break as responding was so minimal and he was very distracted).

Dog 1.8 – Orca – Delayed

Dog 1.8 did learn the target response, even with the delay, although she may have been responding to the ‘click’ sound when the experimenter pressed the remote control button (she stopped and looked at the experimenter as soon as she heard the

‘click’ and did not move until the food was delivered). If this is the case, then it is almost as though she were in the immediate reinforcement condition (Schaal & Branch, 1988). She was magazine trained in one session (6mins), and was very quick to respond to the Manners Minder tone, although at first she left the room every time the tone sounded. She did not do this if the experimenter left their hand there, so this was done until she became used to the sound (after approximately 3mins). She was very food-motivated. The first three recorded minutes of Dog 1.8’s magazine training was lost as the tape ran out . During the first session, she did not look at the wand, instead spent a lot of her time pawing and nudging the Manners Minder with her nose, although after 6mins she walked towards the Manners Minder for reinforcement and started to circle towards the wand, and then consistently right around the wand for reinforcement. After 18mins into the third session, she was deliberately touching the wand base for reinforcement and by the end of the session she was doing this consistently. During the first 3mins of Session 4, the experimenter stopped reinforcing her for nose-touching the base, and reinforced only for almost touching the top of the wand. She started to perform a sequence for reinforcement; touching the base and then the top of the wand, and this got faster. By approximately the 13th minute of Session 4 (after a break), she was touching only the top consistently and met the criteria for learning.

- **Session 1** (Mag. training) – 41r, 6mins
- **Session 2** – 44r, 17.5mins, 2 breaks
- **Session 3** – 87r, 30mins
- **Session 4** – 71r, 17mins, 1 break

(The break during Session 4 was only to give Dog 1.8 a break from constant responding).

Dog 1.9 – Diesel – Delayed

Dog 1.9 did not learn the target response during either the delayed or the immediate conditions. It took three sessions to magazine train him as he was quite easily distracted by noises and smells, and although he seemed food-motivated, he did have constant access to food during the day. He had to be trained outside on the driveway as there was nowhere suitable indoors to do this. The first and second magazine training sessions had to be ended early as it started to rain, and there was nowhere undercover to keep training. He was consistently responding to the tone when standing beside the Manners Minder, but not when he was two steps away (the food had to be pointed out to him). During Session 3, Dog 1.9 responded immediately to the tone, even from a distance. When training started, he was hardly responding at all, just sniffing around the experimenter and the Manners Minder. This continued for Sessions 4, 5 and 6. Session 7 was the start of training under the immediate reinforcement condition, and he progressed to walking towards the wand for reinforcement. The experimenter went back to reinforcing him for looking at the wand at the start of Session 8, as responding during the last session was not consistent. This was then progressed to moving one or two steps in the direction of the wand. During this session, he froze and did not move for a considerable amount of time so the experimenter reinforced him for the next step towards the wand. He was not responding much during the 9th session – he seemed to be walking in the wand's direction for reinforcement but this was not consistent enough to constitute 'learning' using the criteria of this study. The owner walked in a couple of times; this was a distraction during some sessions. Dog 1.9 seemed quite distracted and 'bored' in general.

- **Session 1** (Mag. training) – 16r, 2mins
- **Session 2** (Mag. training) – 45r, 6.5mins
- **Session 3** (Mag. training) – 33r, 5mins
- **Session 4** – 6r, 6.5mins, 2 breaks
- **Session 5** – 4r, 5mins, 2 breaks
- **Session 6** – 4r, 4mins, 2 breaks
- **Session 7** – 17r, 10mins, 2 breaks
- **Session 8** – 32r, 16mins, 2 breaks
- **Session 9** – 28r, 13.5mins, 2 breaks

Dog 1.10 – Kara – Immediate

Dog 1.10 learned the target response very quickly. She was magazine trained in one session (11mins) and was extremely food-motivated. She was very fast so there were lots of reinforcers delivered, even for just looking at the wand. It was necessary to make her sit before reinforcing at times as she was very fast and pushy about getting to the food. Like Dog 1.5, it was unclear whether she was responding to the actual tone or to the sound of the food being delivered. Approximately 4mins into the second session, the camera battery died and so this session was ended early, although Dog 1.10 was already moving towards the wand for reinforcement and she nose-touched the wand once spontaneously. During Session 3, she left the room and would not come back so a break was held, although she touched the base of the wand for reinforcement a few times. She then started touching the top most of the time (three out of four). Session 4 was a consistency check and to make sure she met the ‘learned’ criteria.

- **Session 1** (Mag. training) – 114r, 11mins

- **Session 2** – 17r, 4mins
- **Session 3** – 106r, 22mins, 1 break
- **Session 4** – 12r, 1.5mins

Appendix D – Photo gallery for Study 2



- Dog 2.1
- 'Phoenix'
- Huntaway x



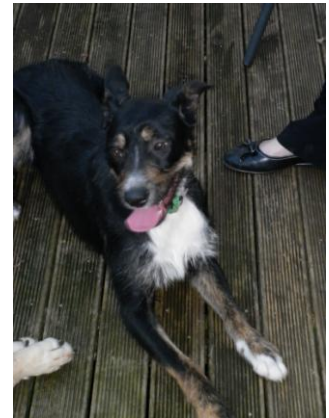
- Dog 2.2
- 'Cara'
- German Shepherd



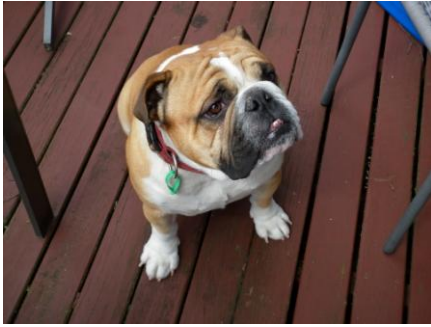
- Dog 2.3
- 'Jack'
- Huntaway x
Border Collie



- Dog 2.4
- 'Narla'
- Neopolitan Mastiff



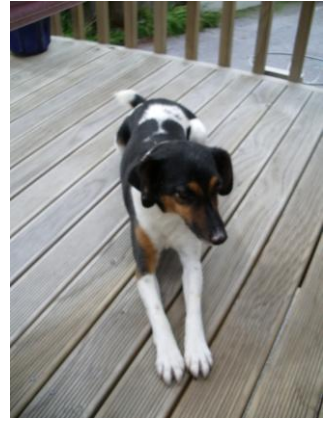
- Dog 2.5
- 'Topsy'
- Bitsa



- Dog 2.6
- 'Stanley'
- British Bulldog



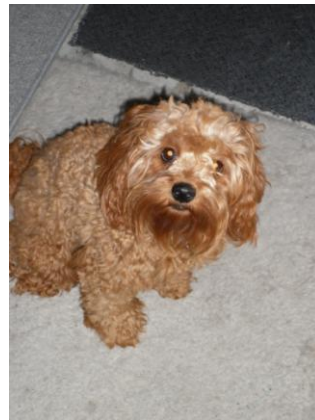
- Dog 2.7
- 'Max'
- Border Collie



- Dog 2.8
- 'Wagg'
- Fox Terrier



- Dog 2.9
- 'Sophie'
- Chihuahua x



- Dog 2.10
- 'Clover'
- Labradoodle

Appendix E – First set of notes taken for each dog in Study 2; details of procedure

The experimenter had to point out the food in the Manners Minder dish during the first magazine training session for Dog 2.1. During Session 2, she became very distracted, so she was given a longer break.

From the experimenter's knowledge of Dog 2.2, (information from her owner), and from observing her behaviour, it was decided not to reinforce her for looking at the wand as she would not get up, as she could earn food from lying beside the machine. In addition, the experimenter did not always wait the full minute of no responding for Dog 2.2 to have a break, as once she lay down it was highly unlikely she would get up again.

Dog 2.3 was nervous of the Manners Minder noise at first. The first session was ended early as it was getting late and dark. He was trained in the owner's garage as he is not generally allowed in the house. He became distracted again during Session 2, so the third break was an unusually long one.

Like Dog 2.2, Dog 2.4 lay down often beside the Manners Minder. It was hard to reinforce her as she did not even look in the direction of the wand initially. Also, she seemed to value attention and praise more than food. Session 4 had to be ended as she became too distracted to respond.

It was hard to reinforce Dog 2.5 for particular responses as she moved incredibly quickly. Session 2 was ended early as it was getting late.

Opposite to Dog 2.5 was Dog 2.6, who had very slow movements. It was necessary to point out the food to him initially during magazine training. The owner added treats to the dry food as he responded a lot better with this mix. The owner described him as "stubborn", and this was evidenced when he often lay down and stopped responding during the sessions.

Dog 2.7 stopped responding when the experimenter tried to narrow the criteria. He did not seem to notice the wand at all, even when knocking it accidentally.

For Dog 2.8, a quick 30-s check was conducted to see if he remembered the noise/treat association at the beginning of Session 1 (which he did).

Dog 2.9 was nervous and distracted, and would not eat unless her owner was very close by. Session 1 was conducted on the bed as shee would only eat up there, as according the owner, she likes to be high up.

Appendix F - Second set of notes taken for each dog in Study 2; details of procedure.

Notes taken from record sheets

Dog 2.1 – Phoenix – Immediate

Dog 2.1 learned the target response during Session 4 (although technically this was Session 2 as one session was conducted to check the consistency of his responding to the Manners Minder, as the time period between the magazine training and the response shaping was unusually long). He took one session to magazine train. He may have learned the response during the first response shaping session, but the video tape ran out so the session was ended. He started to circle consistently during the first response shaping session. The Manners Minder was starting to break down at this point, but this did not seem to affect his learning. Dog 2.1 was given an unusually long break (approximately 10mins) during Session 4 as he was getting distracted by other dogs outside; the experimenter wanted him to start fresh in order to meet the criteria for learning (ten responses in a row without hesitation).

- **Session 1** (Mag. training) – 44r, 5mins
- **Session 2** (consistency check) – 18r, 2.5mins
- **Session 3** – 57r, 23mins
- **Session 4** – 52r, 11mins

(The experimenter was sitting in the wrong place according to the room plan as in this particular house there was a space issue).

Dog 2.2 – Cara – Delayed

Dog 2.2 did not learn the target response during either the delayed or the immediate conditions. She did not appear to learn any consistent behaviour. She mastered the noise/treat association well but had to be called away from the Manners

Minder. She did not respond much during any of the sessions (immediate or delayed), although when she did respond she did so quickly. She spent most of her time sitting or lying beside the Manners Minder so it was difficult to give reinforcement. During Session 5, it was possible to see the beginnings of a consistent response; she began to take one or two steps away from the Manners Minders in the direction of the wand. This became more consistent during Session 6, so the criteria was narrowed so she had to move further away from Manners Minder, although as soon as a reinforcer was 'missed' (through narrowing the criteria), she lay down and stopped responding. Session 7 showed slightly less responding than Session 6, and no further progress made so training was terminated for Dog 2.2.

- **Session 1** (Mag. training) – 23r, 3mins
- **Session 2** – 11r, 6.5mins
- **Session 3** – 13r, 7mins
- **Session 4** – 10r, 6mins
- **Session 5** – 21r, 9mins
- **Session 6** – 22r, 8.5mins
- **Session 7** – 14r, 8mins

(Dog 2.2 seemed to “give up” easily – she may have known she was going to be fed after the session regardless of her responding).

Dog 2.3 – Jack – Immediate

Dog 2.3 did learn the target response during the fourth session, although this included touching the base as well as the top of the wand. He immediately met the criteria during Session 5. He was nervous of the noise of the Manners Minder at first. During Session 2, he was easily distracted by any noise and the owner's movements.

This session was ended early as it was getting late at night. He starting doing consistent circles for reinforcement, which was narrowed to circling around the wand itself (he did not seem to notice it). He accidentally knocked the wand at one point and so he nose-touched it once. He became very distracted and responded much less after this so a break was taken. After the break, he consistently touched the wand (top and base). At the beginning of Session 4, he began to touch the wand consistently and met the criteria easily. The owner's other dog was present throughout training, as were the cats, but these were not a distraction for Dog 2.3.

- **Session 1** (Mag. training) – 34r, 4.5mins
- **Session 2** - 56r, 14mins
- **Session 3** – 49r, 12.5mins
- **Session 4** (2nd part of session 3) – 34r, 9.5mins
- **Session 5** – 16r, 1.5mins

Dog 2.4 – Narla - Delayed

Dog 2.4 did not learn the target response under either the delayed or the immediate conditions. She took two sessions to magazine train, although these were counted as one session as time was running short, so only about 6mins of the first session was used; this still fit the criteria for inclusion in the study. She constantly had to be lured away from the Manners Minder, as she lay down beside it to eat the food, although when she did get up she responded consistently. She seemed to be motivated by attention as well – she kept rolling on the experimenter, not paying attention to the Manners Minder. She hardly responded during Sessions 3, 4, 5 and 6 (6 being the first response shaping session under immediate reinforcement conditions) – she spent most of the session lying beside the Manners Minder or on the

experimenter. There were not many opportunities to reinforce her either, as she did not even look in the wand direction, mostly lying with her back to it. During Session 7, she was reinforced for even slight eye movement in any direction. More opportunities to reinforce were taken, so there was a lot more responding than in previous sessions. She was also reinforced for movement towards the experimenter, just to get her away from the Manners Minder. She spontaneously touched the wand once but this was not repeated. Dog 2.4 began to move in the general wand direction but this was not consistent. She became very distracted towards the end of the session, not showing interest in the experimenter or the food, so the session was ended. She seemed distracted and became “bored” easily (e.g., moving out of the room and house, and not coming back when called or when hearing the Manners Minder noise to indicate food). She was not close to learning the target response so training was terminated.

- **Session 1** (Mag. training) – 24r, 5.5mins
- **Session 2** (consistency check) – 19r, 4.5mins
- **Session 3** – 7r, 7mins
- **Session 4** – 4r, 6mins
- **Session 5** – 5r, 5mins
- **Session 6** – 6r, 5mins
- **Session 7** – 48r, 17.5mins
- **Session 8** – 19r, 8mins

(Although Dog 2.4 learned the noise/treat association fairly quickly, she seemed at times to be more motivated by attention).

Dog 2.5 – Tipsy – Immediate

Dog 2.5 learned the target response during Session 4. She moved very quickly and was very food-motivated. As with Dog 2.1, Session 2 was used to conduct a consistency check, as the last session was a number of days before. She spent the first part of Session 3 near the experimenter and the Manners Minder. She started to consistently circle close to the wand for reinforcement during the second part, although her circles sometimes became smaller (these were not reinforced). This session was ended early as again, time was running short for the third dog (these three dogs were in one household and an hour and a half drive away). Dog 2.5 started off Session 4 by circling as before, but moved fairly quickly into consistently touching the wand (by about the 4th min). She was given a short break before trying to get the ten responses in a row so she did not become distracted.

- **Session 1** (Mag. training) – 39r, 4mins
- **Session 2** (consistency check) – 16r, 1.5mins
- **Session 3** – 63r, 18mins
- **Session 4** – 51r, 8mins

(As with Dog 1.1, the experimenter was sitting in the wrong place according to the room plan as in this particular house there was a space issue).

Dog 2.6 – Stanley – Delayed

Dog 2.6 did not learn the target response during the delayed reinforcement phase, although he learned it quickly when he was moved to immediate reinforcement. During Session 1, he was slow to move and respond to the noise of the Manners Minder, and became distracted easily. He responded only about 50% of the time to the noise without the experimenter having to point out the food to him, so

Session 2 was a consistency check (with more treats mixed in with the food) and it appeared he was gradually learning the association. During this session, he showed consistency in his responses to the Manners Minder noise. During Session 3, he continued to react immediately to the noise, and began consistently circling towards the wand for reinforcement, although he lay down often (the owner reported he is “stubborn”). During Session 4, he was easily distracted and very playful, not concentrating on the task, and sniffing and licking the experimenter’s hand which was holding the button for the Manners Minder. During Session 5, the Manners Minder began to break down – it was not responding when the button was pressed to reinforce Dog 2.6, so a couple of reinforcers were missed. After the first break in the session, he lay down and stopped responding.

When he started to respond again, he did a sequence of responses; moving first towards the camera, then towards the experimenter, then towards the wand, although after a while he skipped out the experimenter. Although the Manners Minder continued to respond inconsistently, this did not appear to affect his responding. Near the end of Session 5, he was consistently moving in the direction of the wand for reinforcement, but after a number of responses he lay down. Session 6 was the last session, using immediate reinforcement, where he started circling close to the wand for reinforcement. He touched the wand once (which was reinforced immediately). He touched it consistently after that and met the criteria for having learned the response.

- **Session 1** (Mag. training) – 75r, 18mins
- **Session 2** (consistency check) – 11r, 2.5mins
- **Session 3** – 17r, 9.5mins
- **Session 4** – 15r, 12mins

- **Session 5** – 48r, 24.5mins
- **Session 6** – 45r, 13.5mins

(During Session 5, the camera had moved and so it is not possible some of the time to see the wand or Dog 2.6's responses near the wand).

Dog 2.7 – Max – Immediate

Dog 2.7 did not learn the target response. He seemed to stop responding (he lay down or walked out of the room) every time the experimenter attempted to narrow the criteria for reinforcement, although he learned the noise/treat association quickly during the first session. He consistently circled a few times towards the wand but these were never in the same place. He sat or lay down (stopped responding) often during Session 3, although he did walk straight past the wand a few times, even knocking it, although this did not initiate any wand-related responding. He started to move more consistently towards the wand during Session 4, and he knocked it once accidentally so he touched it with his nose. This was not repeated. The Manners Minder stopped responding again, so six reinforcers were missed, although this would not have made a difference to Dog 2.7's training overall. After a break in Session 5, the experimenter had to sit beside the Manners Minder in case it broke again and Dog 2.7 sat beside the experimenter, who attempted to narrow the criteria further, but he stopped responding ("gave up" easily). The cats were present for most of the training, but were generally not a distraction, except when one of them came up to the Manners Minder and Dog 2.7 would not get his treat from it until the cat left (according to the owner he is scared of this particular cat), so this was possibly delayed reinforcement. The other dog was also present some of the time but Dog 2.7 only went over once, and after that he was not a distraction.

- **Session 1** (Mag. training) – 21r, 3.5mins
- **Session 2** – 56r, 12.5mins
- **Session 3** – 44r, 11.5mins
- **Session 4** – 50r, 16mins

(It was not specified where the owner needed to be during training, so during Sessions 2 and 3, the owner was sitting beyond the wand so unsure whether Dog 2.7 was walking to the owner or moving in that direction due to being reinforced previously by the owner for doing so).

Dog 2.8 – Wagg – Delayed

Dog 2.8 did not learn the target response during the delayed reinforcement phase, although he learned it when he was moved to immediate reinforcement. He mastered the noise/treat association quickly. There was no consistent responding during Session 2. There were a few unexpected distractions, such as someone arriving at the house, the other dog coming into the training area and the children saying his name. Despite these distractions, and although he was not responding consistently, Dog 2.8 still responded immediately to the noise of the Manners Minder (although he had emitted other behaviours during the 2-s delay). During Session 3, he started responding more consistently; at first he was being reinforced for moving towards the experimenter as he was staying beside the Manners Minder. Sometimes there were gaps between responses of around 20-s or more. During Session 4, he was consistently moving in the direction of the experimenter, which changed to the wand direction (he was turning back to the Manners Minder straight after responding, “expecting” food). Session 5 was the first immediate reinforcement session; he responded quickly, getting closer to the wand. During Session 6, he was reinforced

for moving even closer to the wand than in Session 5, and the criteria was narrowed quicker (he does not get many biscuits for tea). The Manners Minder got stuck once and he became distracted; he was given a break. After the break, Dog 2.8 began to consistently touch the base of the wand, but the allocated food ran out so the session was ended. During Session 7, the experimenter tried to narrow the criteria to get him to touch the top of the wand only, but this did not happen. He met the criteria – he definitely learned a variation of the target response (touching the base of the wand rather than the top) but most of the dogs seem to go for the base first.

- **Session 1** (Mag. training) – 27r, 3.5mins
- **Session 2** – 38r, 16mins
- **Session 3** – 27r, 10mins
- **Session 4** – 51r, 20.5mins
- **Session 5** – 45r, 8.5mins
- **Session 6** – 53r, 14.5mins
- **Session 7** – 24r, 2.5mins

(A quick 30-s consistency check was conducted at the very start of Session 2. Session 2 had to be terminated early due to lots of distractions and the tape ran out).

Dog 2.9 – Sophie – Immediate

Dog 2.9 did not learn the target response. She mastered the noise/treat association during Session 1, but Session 2 was used to do a consistency check (also because she does not get many biscuits for her meal). At the start of Session 3, she would not eat but kept jumping onto the bed, so the set-up was moved onto the bed but she still hardly responded throughout the session. There was not much more responding during Session 4; she was reluctant to eat anything at all at the beginning.

She was distracted during the session and kept walking to the door which was closed, so she lay down. The experimenter had to point out her last treat. During Session 5, even slight movement was reinforced; Dog 2.9 was responding a lot more, but she was also more food-motivated this session. She touched the wand once, but this was not repeated. She was very distracted by other movement and noises, and was not making any progress, so training was discontinued.

- **Session 1** (Mag. training) – 20r, 3.5mins
- **Session 2** (consistency check) – 18r, 5mins
- **Session 3** – 6r, 6.5mins
- **Session 4** – 11r, 8mins
- **Session 5** – 11r, 11mins

(Session 3 was ended after one break instead of two, as Dog 2.9 was hardly responding, and further responding seemed highly unlikely).

Dog 2.10 – Clover – Delayed

Dog 2.10 did not learn the target response during the delayed reinforcement phase, although she learned it when she was moved to immediate reinforcement conditions. She was very food-motivated and mastered the noise/treat association quickly. There were no consistent or deliberate responses during Session 2, although she moved around the training area a lot. During Session 3, she sat beside the experimenter often, but not for long periods. She stopped eating her food, although she still walked over to the Manners Minder when she heard the noise, so she was hand fed a couple of pieces of food to get her responding again. The tape ran out after the second break but there were no consistent movements anyway, although she did touch the wand once while the equipment was being packed up. During Session 4,

she did some circling towards the wand but this did not seem deliberate, more just sniffing around the area (which she did a lot). This circling seemed more deliberate near the end of the session, when she started to move towards the wand more often. Session 5 was the start of Dog 2.10's training with immediate reinforcement; her responding was spaced out but still deliberate. The Manners Minder stopped working, so three reinforcers were slightly delayed (as these were given by hand). She touched the base of the wand a number of times but there were long gaps between responses. This response became consistent. Session 6 was to get her to meet the 'learned' criteria, and she touched the wand consistently within the first 2mins.

- **Session 1** (Mag. training) – 24r, 4mins
- **Session 2** – 34r, 17mins
- **Session 3** – 13r, 12mins
- **Session 4** – 26r, 14.5mins
- **Session 5** – 51r, 22mins
- **Session 6** – 24r, 5mins

Appendix G – Photo gallery for Study 3



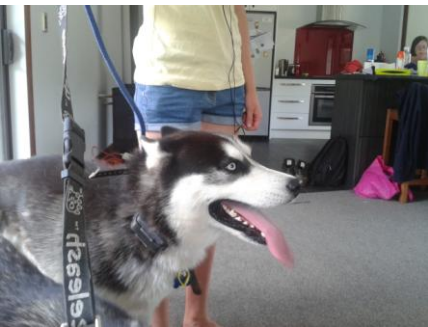
- Dog 3.1
- 'Bonny'
- Chocolate Labrador



- Dog 3.2
- 'Maxwell'
- Chocolate Labrador



- Dog 3.3
- 'Echo'
- Husky



- Dog 3.4
- 'Shadow'
- Husky



- Dog 3.5
- 'Sproket'
- Fox Terrier x



- Dog 3.6
- 'Timber'
- Black Labrador

Appendix H – First set of notes taken for each dog in Study 3; details of procedure

For Dog 3.1, the third part of Session 1 was cut short as the owner had to leave. She tended to rush off if she saw a dog in the vicinity, so it was necessary to attach a lead to her collar just for Session 1. She seemed unaware of the wand even when touching it accidentally.

For Dog 3.2, the food had to be pointed out in the Manners Minder at first. During Session 1 at the dog club, he was so distracted that he was not responding, so the remaining sessions were conducted at the owner's home on the front lawn.

Dog 3.3 was hesitant at first to eat from the Manners Minder dish during the first magazine training session. She was too distracted to work at the dog club, so Session 2 and subsequent sessions were conducted opposite the owner's home in a public park.

Dog 3.4's movements were quick, so there were a lot of reinforcers during the magazine training sessions. Session 1 was cut short as it began to rain. Sessions 2 and 3 were conducted in the same park as the one used for Dog 3.3, as the owner (owner of both Dogs 3.3 and 3.4) lived a considerable distance from the dog club, and so it made sense to train both dogs in the same place on the same day. In addition to this, Dog 3.4 was also quite distracted at the dog club. Session 2 was ended early as according to the owner, he was no longer hungry (he had left the training area).

Dog 3.5 was also scared of the Manners Minder noise at first. The experimenter attempted to magazine train him at the dog club, but this session was not recorded as he was so distracted he ran around whining; subsequent sessions were conducted at the owner's home in the yard.

Dog 3.6 appeared to be very food-motivated. As with Dog 3.4, she moved very quickly, so during magazine training a lot of reinforcers were delivered. It was

necessary to point out the food at the start of training. She lay down often, wagging her tail; according to her owner she was trying to be well-behaved, as this is what she had been reinforced for in the past.

Appendix I – Second set of notes taken for each dog in Study 3. Notes taken from record sheets

Dog 3.1 – Bonny – Immediate

Dog 3.1 did not learn the target response during either the delayed or the immediate sessions, although she did learn a response; moving towards the experimenter or the wand for reinforcement, sometimes sitting beside it. She knocked the wand with her feet and nose constantly, but did not appear to notice it at all (not looking at it or sniffing it, etc). She learned the noise/treat association quickly, and continued to respond (although she was slightly distracted) at the dog club. During the first shaping session, she knocked the wand accidentally with her paw often but seemed completely unaware of it. Although she continued to respond continuously throughout the remaining sessions, she remained unaware of the wand. During the last shaping session, she was reinforced only for any touching of the wand but she still did not take notice of it. She was no closer to learning the target response; she sat or lay down often and had to be encouraged to get up again.

- **Session 1** (Mag training at home) – 40r, 6mins
- **Session 2** (Mag training at dog club) – 24r, 4mins
- **Session 3** – 45r, 12.5mins
- **Session 4** – 41r, 15mins
- **Session 5** – 69r, 20.5mins

(Session 3 was ended early as the owner had to leave. During Session 1, the camera was moving and unsteady as the experimenter did not yet have a stand for it so the owner was holding it).

Dog 3.2 – Maxwell – Immediate

Dog 3.2 learned the target response during Session 4 (the second shaping session). The fifth session was just to get the criteria met, which he did. He took a little while to get the noise/treat association, but was reliably moving to the Manners Minder when it sounded, from a distance and both sides. At the dog club he was still responding to the Manners Minder but was very distracted by sticks. The first shaping session was unsuccessful as he was still very distracted by everything, especially sticks. Although he knocked the wand three times by accident, he did not take notice of it. This session was ended early as no responding was happening. The second shaping session took place at the owner's home (outdoors with distractions present) as Dog 3.2 was too distracted to respond or eat at the dog club. During this session, he was distracted at first and so took a while to start responding consistently. He learned the response in this session. Session 5 (the third shaping session) was to make sure the criteria was met.

- **Session 1** (Mag training at home) – 44r, 5mins
- **Session 2** (Mag training at dog club) – 18r, 2.5mins
- **Session 3** – 3r, 3mins
- **Session 4** – 52r, 20.5mins
- **Session 5** – 14r, 1.5mins

(As with Dog 3.1, the camera was unsteady during the first session as the experimenter did not yet have a stand and the owner was holding it).

Dog 3.3 – Echo – Delayed

Dog 3.3 did not learn the target response during the delayed sessions, but learned it quickly during the first immediate session. During Session 1, she was

hesitant to eat at first, but she did eat eventually. Distance was increased successfully, although it was still necessary to occasionally point out the food if the Manners Minder was too far away or if she was distracted (which happened easily). By the end of this session, she was still hesitating at times but basically knew the association. At the dog club she was very distracted, but still responded to the Manners Minder noise from a short distance. During the first shaping session, Dog 3.3 was very distracted and kept leaving the training area and not responding. The session had to be cut short due to sudden heavy rain. The second shaping session was conducted opposite the owner's home on an empty field with distractions, as shaping had been unsuccessful at the dog club. Here Dog 3.3 was still not responding as she was too distracted. She responded more during Session 5, although there were long periods of no responding (standing still). When she did respond, she seemed to be deliberately lowering her head towards the wand and then stopping still (she would look at the experimenter, lower her head and then look at the experimenter again). The experimenter started shaping with immediate reinforcement at Session 6, when she was much more focussed and responding faster. She started to touch the wand consistently when the experimenter narrowed the criteria for reinforcement to actually touching the wand, after which she met the 'learned' criteria.

- **Session 1** (Mag training at home) – 81r, 15mins
- **Session 2** (Mag training at dog club) – 43r, 9mins
- **Session 3** – 8r, 3.5mins
- **Session 4** – 3r, 4.5mins
- **Session 5** – 39r, 18.5mins
- **Session 6** – 74r, 15.5mins

(As with Dogs 3.1 and 3.2, the camera was unsteady as the owner was holding it during Session 1. Also during this session, a small break took place after 4.5mins, as the Manners Minder kept sticking (the wheel size was too small) so it had to be changed to the bigger size).

Dog 3.4 – Shadow – Immediate

Dog 3.4 learned the target response during the third shaping session. He learned the tone/treat association well, and continued to respond at the dog club. During the first shaping session at the dog club, he was very distracted and kept leaving the training area, and was not always responding to the Manners Minder noise. This session was ended early as it began to rain heavily. The second and third shaping sessions were conducted at the field opposite the owner's home as he was too distracted to eat or respond at the dog club. He responded really well during the second shaping session, moving consistently towards the wand (or the experimenter), often knocking it accidentally without noticing it. The criteria for obtaining reinforcement were narrowed to touching the wand with any body part. This session was also ended early as Dog 3.4 started leaving the area regularly, and according to the owner was no longer hungry. During the last session, he started putting his face closer to the wand, eventually touching the wand. The response was learned and the criteria met.

- **Session 1** (Mag training at home) – 71r, 8mins
- **Session 2** (Mag training at dog club) – 15r, 1.5mins
- **Session 3** – 42r, 9.5mins
- **Session 4** – 53r, 12mins
- **Session 5** – 79r, 13mins

(As with Dogs, 3.1, 3.2 and 3.3, the camera was unsteady as the owner was holding it during Session 1).

Dog 3.5 – Sproket – Delayed

Dog 3.5 did not learn the target response during the delayed reinforcement phase but did learn it quickly when moved to the immediate reinforcement phase. He was scared of the Manners Minder noise at first, but once he got used to it he responded immediately, from both sides and increased distances. The magazine training session at the dog club was not filmed; he was so distracted he would not eat anything, and was constantly running around trying to get to other dogs. Once moved home to train (outdoors with distractions), he responded well. During the first and second delayed shaping sessions, he did not respond much. Although he touched the wand a couple of times in each of these sessions, the reinforcement was delayed and so he did not appear to make the association. He left the training area a number of times. During the first immediate session, he was distracted at first but once he had touched the wand once he made the association immediately, and began consistently touching it after that. The response was learned. Dog 3.5 became satiated quickly, and stopped eating the biscuits but continued to touch the wand and return to the Manners Minder when it sounded. One more session was conducted to make sure he had met the ‘learned’ criteria.

- **Session 1** (Mag training at home) – 31r, 4.5mins
- **Session 2** (Mag training at home – outdoors) – 13r, 2mins
- **Session 3** – 6r, 6mins
- **Session 4** – 6r, 7.5mins
- **Session 5** – 34r, 6.5mins

- **Session 6** – 13r, 1.5mins

Dog 3.6 – Timber – Delayed

Dog 3.6 did not learn the target response during either the delayed or the immediate reinforcement conditions. Timber was very food-motivated and her movements were very quick, so there were a lot of reinforcers delivered in quick succession. It was necessary to point out the food during the first part of the first session but the association was learned, and she continued to respond immediately at the dog club too. She was not distracted by other dogs, smells or noises. During the first shaping session with the delay to reinforcement, she touched the wand a couple of times, mostly by accident. She mostly went to sit beside the experimenter; she seemed to be associating them with getting reinforcement. During Sessions 4 and 5, Dog 3.6 continued to behave in much the same way as in Session 3, although the criteria for obtaining reinforcement had been narrowed to moving directly towards the wand during Session 4, and during Session 5 for getting closer to it. The third part of this session did not happen as the camera battery died. During Session 6, she often lay right beside the wand. At first she was reinforced as she lay down (as at the same time her nose was getting close to the wand). During Session 7, she lay or sat down often, especially beside the experimenter. She knocked the wand often (by accident, as she ran past or over it) and touched it a couple of times, but this did not appear to be deliberate or consistent. She was possibly lying down for reinforcement at this point because, as mentioned above, her nose almost touched the wand as she lay down so this was reinforced. She was a lot more distracted during Session 8, the last session. She seemed to want attention from the experimenter more than food, possibly associating them with the food. She had learned to come towards the wand

(and possibly the experimenter) to obtain reinforcement, but this stopped whenever the criteria was narrowed. Session 8 had to be ended early as the camera battery died, although this was not a problem as no progress was being made.

- **Session 1** (Mag training at home) – 73r, 9.5mins
- **Session 2** (Mag training at dog club) – 24r, 2.5mins
- **Session 3** – 31r, 9mins
- **Session 4** – 13r, 5.5mins
- **Session 5** – 24r, 9mins
- **Session 6** – 12r, 6mins
- **Session 7** – 32r, 15mins
- **Session 8** – 26r, 13.5mins

(Session 6 was supposed to be the first immediate session, but accidentally was another delayed session. Reinforcing Dog 3.6 as she lay down may not have been a good idea as she may have associated lying down with receiving reinforcement, and so increased this behaviour. She often lay or sat down quietly – according to the owner, she was probably trying to be good, as this is what she has been reinforced for in the past).

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