

**To investigate Pets As Therapy  
dogs' behavioural responses/interactions  
towards care staff and patients**

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## **DECLARATION**

**This dissertation is a product of my own work and is not the work of any  
collaboration.  
I agree that this dissertation may be available for reference and photocopying  
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**Miss Samantha Bailey**

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## **Abstract**

Human-dog interactions are considered to be beneficial to a patients' quality of life and improves their general health. 'Pets As Therapy' is an organisation that arranges for suitable dogs to visit patients and the elderly in order to provide an activity and company for the patients. The PAT dogs' role is to interact with the patients but the extent to which the dogs' understand their role has not been widely explored. This study is designed to uncover if the dogs behave differently towards patients and care staff in the same environment. Patients and care staff have physical and emotional differences. This study will show if the dogs respond differently to the patient and care staff differences. The dogs' behaviour is recorded for 2.5 minutes interacting with patients and staff members. The patient and staff behaviour is recorded two seconds before the dog behaviour, to correlate human behaviour with the dogs' response. The results are interesting in that there are differences in the amount of physical interaction the dogs receive from patients and staff, yet there was no significant difference in the proportion of time the dogs would spend encouraging interaction or behaving passively (i.e. sitting next to the human). The reasons for which are explored in the discussion. The dogs looked back significantly more towards the owners during patient interaction compared to staff interaction. This is one explanation explored to why the dogs would remain with the patients'; the owners' were encouraging the dogs to remain. The owners' influence is a topic for future study. The main findings are that the dogs spend the same amount of time encouraging interaction with patient and staff members but remain for a longer proportion of time with patients when physical interaction ceases.

## Chapter 1

### Introduction

Animal assisted therapy and animal assisted activities are two separate concepts. Dogs involved in Animal assisted therapy are trained to respond to human gestures and are part of a treatment process with goals to achieve. Animal assisted activity dogs visit with their owners to nursing homes and hospitals without specified training or specific goals in terms of treatment process for the patients (Kruger *et al.* 2004).

Pets As Therapy are a charity that visit hospitals, nursing and residential homes either through a clinical psychologist's referral to take part in a treatment process for a patient, or just as a visitor to the patients. Patients include depressed or phobic people, stroke victims and a variety of patients of different physical and mental ability and ages. The goal is to bring comfort and companionship to the patients.

Animal assisted activity programs were first introduced into mental institutions in the 19<sup>th</sup> century and the interest and value of the subject was recognized in the 1970s by Boris Levinson, working with children and therapy dogs. Boris Levinson found that the dog acted as a medium or facilitator to encourage the children to talk during therapy sessions. The subject of human-dog relationship is becoming more popular and requires an open-minded view to fully understand the relationship (Serpell, 2000a).

Therapy dogs are routinely exposed to certain people in different situations, such as hospital patients and nursing home residents, which require them to act in a friendly and cooperative way. This setting provides an opportunity to observe how a dog instinctively reacts with the people in these situations. Observations will only show if there is a difference in a dog's behaviour towards patients, not the underlying mechanisms that control these behaviours. This study may provide a step in understanding a dog's awareness under these situations by how the dog interacts with different people.

The aim of the study was to investigate whether Pets As Therapy dogs show different behavioural responses towards care staff than towards patients. The two objectives were to record the gestures given by the patients and the care staff during interaction and to record the behaviours of the dogs towards patients and the care staff.

## **Chapter 2**

### **Literature review**

Patients and care staff experience two different situations in the same environment and therefore have different views and react differently in the hospice/hospital environment. The need for attention is different between care staff and patients and in turn the dogs may perceive a difference on this level.

#### **2.1 Therapy dogs**

Animal assisted activities provide a mutually beneficial relationship, both physically and mentally to the patients (Serpell *et al.* 2000). The study of animal-assisted therapy on a patient's physical health has shown that a person's blood pressure drops significantly during and after interaction with a visiting dog (Freidman, 1995). Animal-assisted programmes have also shown to help improve the mental health of a patient. Kovacs *et al.* (2004) studied schizophrenic patients over a nine-month period and found increased participation in leisure and health activities after the introduction of a visitation program.

Animal-assisted therapy also decreases anxiety over a wider range of psychotic disorders than conventional therapy such as therapy group and one on one therapy (Barker & Dawson, 1998). In a study conducted by Velde *et al.* (2005) participant therapists commented that the dog visits provided companionship and improved physical mobility of the patients. The general health and well being of the patient is perceived as better in the presence of a pet, so trained or untrained dogs have the potential to help patients (Serpell, 1991).

The exact role of the dogs during visitation programmes is unclear and there is a lack of research from the dogs' perspective during animal-assisted activities. The majority of research has been on the effects of human-dog relationships on the humans (Odendaal & Lehmann, 2000; Palestrini *et al.*

2005). The most widely accepted theory is that dogs' act as a social-facilitator, providing a presence to encourage social hormone levels of well being to increase (Odendaal, 2000). Dogs provide a focus for attention, providing comfort and reducing loneliness (Wilson, 1991). Animal assisted activities also provide a foundation for social conversation and encouraging occupational activity (Velde *et al.* 2005). It also has a positive influence on the morale and feelings of self-worth in the patients' (Rowen & Beck, 1994).

The human-dog bond is believed to have a mediating power from three views, social lubricant (Social catalyst), animal ambassador (animal basic rights and morals) and animal within (helps people connect with a fundamental part of themselves). The ability to achieve this may depend on the strength of the human-dog relationship (Serpell, 2000b). The dog provides support in several ways including emotional, esteem support and protection (Serpell, 2003). As stated the majority of research is focused on humans, the dogs' awareness of these situations is one area that has not been thoroughly documented.

## **2.2 Care staff and patient differences**

There are high expectations among patients and staff of the Animal assisted activities visits (Moody *et al.* 2002). Elderly patients are unable to compete for attention on an intra-species level, so additional support is welcome from an interspecies level (Serpell, 2003; Odendaal, 2000). There is no significant difference on a patients 'need for attention' based on age or sex (Kugo *et al.* 2006).

A patient's inability to compete for attention maybe on a social or physical level; this is due to patients being partly or completely dependent for simple activities such as feeding themselves, toilet independence, social contact, bathing and safety management. The result of this is that the staff or caregiver has a more stable, less fluctuating 'quality of life' on an emotional and physical level than the patients (Gill *et al.* 2003). The general perception of the 'quality of life' is difficult to obtain for elderly patients as it is based on

self-questionnaires. Many patients require the carers to complete the questionnaires on the patients behalf, so the quality of life measures have limits (Moans *et al.* 2005).

There are gestures such as pointing, gazing and basic cues to direct or gain another's attention that are instinctual in humans despite environmental influences; in order to communicate with other humans as suggested in studies of non signing deaf people (Morford, 1996). It is also therefore possible that there are a collection of gestures, which consciously humans are not aware of, which dogs are able to use too understand a humans temperament and interact with the human accordingly. The basis of this assumption is so the dog will not promote aggression but will elicit attention giving behaviour from the human (Voith, 1985). There maybe body language differences between staff and patients, which dogs maybe able to use, as it is their primary source of information (Buck & Vanlear, 2002). The dogs' ability to respond differently is partly dependent on a dog's motivation to interact with patients or the staff.

### **2.3 Domestic dog motivation and ability to interact with humans**

The ability and motivation of dogs to behave differently towards different people is studied from many different angles such as the origin, attachment behaviour, social cognition and learning abilities. It is an important area of research as dogs are apart of everyday life aside humans. The more that is understood about their needs and awareness the more we are able to communicate and live in harmony with dogs.

#### **2.3.1 Co evolution**

The human-wolf relationship began around 135,000 years ago (Vila *et al.* 1997). Wolves became domesticated 12,000 years ago (Davis & Valla, 1978). The law of the jungle is not the only system in nature, many species co exist to heighten their chances of survival in terms of protection and resources (Odendaal, 2000). Cooperation was the most beneficial

relationship for wolf and man and positive interaction is the basis of this relationship and communication is the basis of maintaining interaction (Bradshaw & Nott, 1995). Basic communication such as identification, behaviour to minimize competition and maintain relationships was already apart of the wolf pack behaviour system. This basic social structure was selected for when breeding the wolves as many dog-dog, wolf-wolf behaviour patterns are seen in human-dog interaction (Simpson, 1997).

The basic interaction would have become more complex and advanced social systems have a greater need for positive interaction at an emotional level. Without the competition on a physical level for resources human and wolf had an environment to interact on an emotional level and positive interaction was the feedback loop. Human and dog became a social symbiotic relationship with an equal, normal need for attention from both species, the pre requisite for positive interaction (Odendaal, 2000). Dogs became dependent on humans for food and shelter as well as the need for attention (Topal *et al.* 2005a). Humans also would have some dependency on dogs for attention (Odendaal, 2000). It is a unique interspecies relationship and exchange of social knowledge (Serpell, 2003).

The mechanism of this interaction is *attentionis egens* (The normal need for attention in a complex social structure). After positive interaction the neurochemicals involved in *attentionis egens* behaviour or attention seeking behaviour increase in both human and dog. Hormones include 3-endorphin, oxytocin, prolactin, phenylacetic acid and dopamine. Although these hormones increased significantly in the blood it is unsure what proportions reach the receptors and produce the feelings that are associated with the hormones. Social behaviour is the product for the need of *attentionis egens* (Odendaal, 2000; Odendaal & Lehmann, 2000).

Fulfilling *attentionis egens* produces the reduced feelings of loneliness and provides comfort. These needs are rooted in human biology and they can be fulfilled by other means dependent on a person's personality such as book reading or taking care of plants (Wilson, 1991). Paxton (2000) proposed that

the human-dog relationship is biologically interdependent and natural on this *attentionis egens* level. The natural co evolution is not the only theory to explain wolf domestication but it may explain a natural loyalty instinct some dogs have towards humans (Berkoff, 2000).

Humanness and communication evolved with both species. Primates unlike wolves do not show loyalty outside kinship and are volatile in the wild. It is a possibility that humans gained part of the communication and team working skills from wolves (Schleidt, 1998). During domestication certain traits in the wolves would have been selected for to assist their integration into human society, intentional or not, responsiveness to certain stimuli and flexibility behaviour was selected (Frank, 1980). Wolves living with humans would have needed to understand and react appropriately to human behaviour for this relationship to have begun and continued (Topal *et al.* 2005a). This trait would have been selected for and therefore is an instinct in dogs (Schleidt, 1998).

Integration into the human social system in some cases has been that the dog has been, intentionally or not, bred to exhibit child like behaviour to elicit attachment or attention-seeking behaviour, to be an outlet for human parental behaviour. There is no evidence to suggest that parent-child relationship is mutual for dogs as seeing humans as the parent or their cub (Serpell, 1989). Dogs do see humans differently to how the wolf sees the human, meaning that this attention trait is a product of co evolution (Topal *et al.* 2005b) or destabilization during domestication (Miklosi *et al.* 2003).

Attachment levels (emotional connections with humans in the dogs life, begins with a bond with the primary caregiver) towards humans compared between dogs and wolves raised in the same environment show that dogs show more attention seeking behaviour on reunion. This behaviour differs from a mother and cub reunion, which supports that dogs do not see human dog relationship as parental (Topal *et al.* 2005b). Attachment bonds towards humans have been linked to the level of care and interaction the dog receives from the human. Attachment definition is not agreed and can differ

on the cause and on how it is expressed. There is a genetic influence that affects the dog-human bond. A bond is described as a mutually beneficial relationship that is influenced by behaviours that are essential to the health and well being of both concerned (types of behaviours are specific to individuals) (Shore *et al.* 2005). Cooperation during evolution would have been the basis for this relationship as cooperation is also a basis of attachment (Csanyi, 2000).

Cooperation between human and dog is instinctual on an action and program level. Dogs and humans are able to cooperate on an action level, meaning starting and avoiding situations and on a program level, a series of behaviours to reach a desired goal. This is very difficult to test and many studies are not statistically strong and the breed and dog history training affects the outcome (Naderi *et al.* 2001). This would mean that the dog would need to have a good understanding of human gestures and how they communicate in order to maintain this relationship. The positive feedback is evolutionary, as shown comparing wolves and dogs; dogs have a better understanding or react more appropriately to more complex human gestures than wolves raised in a similar environment (Miklosi *et al.* 2003).

### **2.3.2 Understanding of human gestures**

Use of cues to make a decision such as pointing, head orientation and eye gazing, when body position was in certain proximity (exact distances are unknown) depends on a dogs ability to use communicative body signals from humans. Reading cues depends on the dogs' cognitive ability, mechanism from domestication boundaries and enculturation with humans. Many studies have been done to assess the dogs' ability to address their attention, based on another individuals behaviour and whether they truly comprehend the nature of the cues to achieve a reward (McKinley & Sambrook, 2000).

Dogs are sensitive to gesture communication of direction to locate a reward, either food or a toy in these experiments. Establishing which cues dogs' can distinguish to achieve a certain goal, such as locating food when olfactory

and visual stimulation is suppressed is tested. Two brown bowls are left overnight containing food so both have the scent, to suppress olfactory advantage. During the experiment the two bowls are in front of the dog, one with food the other without the food. The dog did not see the placing of the food or the bowls. Directional gestures from the human include bowing, pointing, head turning, gazing and nodding and lasted for 2 seconds, then the dog had to make a decision. Novel cues are used to eliminate learning processes. Dogs are able to use these directional cues to locate food (Miklosi *et al.* 1998).

The trials also test the possibility if the dogs' skills at reading directional cues from the owner can be transferred to understanding a stranger, eliminating the possibility of associative process. The dog would not have had time to positively associate the stranger's cues with a positive reward, although dogs do learn quickly and this still remains a possibility. Dogs are sensitive to all body parts connected to the action or motion of the cues. Movement into the pointing position was more important and increased performance than when the dogs' just saw the pointing gesture in the final stage (Soproni *et al.* 2002).

Dogs' visual perception has evolved to recognise many signals in 3d reality. When subjected to 2d (owner on a screen) and 0d (just the owners voice) visual and command cues, the performance decreases respectively. One theory to the lack of performance at 2d was lack of odour and additional visual signals, but the dogs' were still able to complete the task unlike in the 0d situation. Dogs use visual over auditory and olfaction but further research is needed to establish the degree to which visual, olfactory and auditory cues are intermixed. The dog's ability to adapt to 2d was not tested but it is believed dogs can be trained to respond to 2d and 0d commands through associative learning (Pongracz *et al.* 2003a).

Dogs have adapted to interpret or read human social communicative signals. The most common task again is the object choice (two brown bowls) but in this scenario one of the bowls had a marker (Markers are novel physical objects with no association with the reward such as a sponge) on top of the

bowl, which contains the food, to see if the marker addressed the dogs attention to the bowl. The owner gives a single signal to indicate where the reward is located. The dogs' reactions are observed and their performance recorded. Signals include place marker and gaze, gaze only, dogs see marker already on the bowl but not the whole movement of placing, place only and marker only. (Agnetta *et al.* 2000). The dogs' performance increases with human signals such as pointing and the movement of the arm to a certain bowl. Marker only was the poorest performance. Humans needed to be seen placing the marker in majority of situations or seen the human hold the marker and this provided sufficient association. The influence of marker as a communicative tool is uncertain. Marker attracted dog to the cup not to the marker itself. Associating novel objects with reward is not easily explained in evolutionary terms (Reidel *et al.* 2006).

The possibility that the dogs' are able too generalize cues to get the direction/location of the reward is also tested. This is why some cues such as pointing and gazing are combined to see which one the dog will follow as the true cue to the reward. One signal indicates the reward bowl and another signal indicates the empty bowl. The signals are also used together to indicate the food bowl. When the gestures were combined the performance rate of the dogs' increased, but when a false indication is given by the hand and the true indication is given by the eye; the majority of dogs took notice of the gazing cues, but more when the owners were down at their eye level (Agnetta *et al.* 2000). The dog is aware that the human attention state is on the bowl as the dogs could locate the food, using gaze. Therefore the object choice is also a test of the dogs' awareness of attentive versus inattentive states of humans (Miklosi *et al.* 1998).

### **2.3.2.1 Attention states**

Visual attention or being able to read another's attention states is studied by observing a dogs' response to cues, such as head orientation and gazing from a human, to direct the dogs' to a reward. This method has also been successfully documented in chimps and dolphins as well as dogs (Pack &

Hermann, 2001). Gaze allows individuals to take advantage of a visual experience of another (Tomasello *et al.* 1998). The direct transfer of information is such that the owner can see the reward and the dog can use this information to locate the reward (Pack & Herman, 2001). The majority of the dogs are able to use these direct cues to locate the reward. Eye gaze was more easily perceived at the dogs level. Two out of the sixteen dogs could use eye gaze alone to choose the correct direction to the reward (Soproni *et al.* 2001). The dogs are also able to understand attention focus such as gaze and head orientation of their owners' reaction to the demonstrators; this is an indirect transfer of information. The dogs were able to understand the demonstrator commands when the demonstrators were facing the owners and not the dog (Viranyi *et al.* 2004).

The key to social cognition (Bruner, 1995) is the ability to look where somebody else is looking (joint visual attention) (Butterworth, 1995). The problem with these trials is that dogs could use associative learning rather than cognitive processes. Previous reinforcement may have been how the dogs' learn about a stimulus and which cues led to a reward (Viranyi *et al.* 2004). This fact is illustrated that trained dogs were also able to perform quicker as they are exposed to regular training sessions with humans. All dogs have a natural curiosity, which is a motivation and what limits the ethical concerns with these experiments (McKinley & Sambrook, 2000).

Exactly what dogs comprehend from these cues is disputed (Pack & Herman, 2001). Gazing and latency is an important communicative tool, staring can evoke submissive or threatening postures and shorter latency evokes play behaviour. A dogs' understanding of eye gaze could stem from associative learning but it is difficult to study, but in adding in a factor of how dogs use cues to direct owners sheds more light onto the subject (Soproni *et al.* 2001).

### **2.3.2.2 How dogs can use cues to manipulate their owners' behaviour**

Good communication means cooperation from the sender and receiver so both need to be aware of attention states of the other. Human–human interaction will initiate from eye contact or other facial expression or gesture (Miklosi *et al.* 1998). One-way to know if dogs understand human cues, is to establish if they are able to use them to manipulate the owners' behaviour or to communicate external events to people. In this experiment dog food or a favourite toy was hidden in the dogs' sight but the dog could not gain access to the reward. The dog needed to direct the owners' attention to the location of the reward so the owner could retrieve the reward (Miklosi *et al.* 2000). Gazing at the owner and at the baited bowl is one technique the dogs used to direct the owners' attention to the baited bowl. Gaze alternation is getting another individual to do something, which implies understanding of attention state (Povinelli *et al.* 1997) and ability to respond to the mental state of another (Hare *et al.* 2000).

Gazing is not just a method of following the leader (Tomasello *et al.* 1998). Gazing is an important gesture in human communication; dogs may have adapted during domestication to fully incorporate this gesture into their social repertoire (Vas *et al.* 2005). Learnt behaviour is still a possibility in explaining the results as dogs need to cooperate with owners and need them for problem solving ability so will rely on humans to solve problems such as reward retrieval (Hare *et al.* 1998). Miklosi *et al.* (2000) did not adequately prove that dogs' show understanding of attention states but that dogs learn behaviour patterns that get the owners' attention and elicit rewards from the owner.

### **2.3.2.3 Differences in individual performance**

The age of the dog and the ability to adapt to strange surroundings may explain the differences in performance of the dogs. Different levels of performance may be based on genetics. Gundogs are trained to respond to hand signals, and have a more cooperative temperament (friendly nature

towards human interaction) with humans. It is very difficult to distinguish how significant breed is on the difference on performance; there are also individual differences within breeds (enculturation, affects from attachment and experience from exposure to humans) (Scott & Fuller, 1965). Different breeds are evaluated to test the origins of the behaviour to novel and known cues. In general most dogs understood that pointing meant 'this is the direction to go' despite their owners proximity to the object (proximity was not fully explored). Regular training and learning sessions with owners' in other areas such as obedience and agility training was significant to successful completion of tasks. The duration of the cues was important in successful completion of tasks supporting that the dogs might have been able to learn over the experimental period (McKinley & Sambrook, 2000).

Dogs rely on both olfactory and visual cues and their own instincts. The motion of a gesture is more important than the gesture itself in performance success; suggests change in situation provokes investigative behaviour. Dogs prefer to rely on human signals in problem solving tasks, as this is the most successful way of the dog achieving rewards (Topal *et al.* 1997). Motivation is of equal importance to obeying its owner. Experienced social dogs rely more on other methods including their own initiative to find rewards. Less experienced dogs are aware that the best chance of getting the reward is to rely on their owner, maybe due to over training. Relationship and experience are vital factors in how a dog will respond to a gesture cue to reach a desired goal (Szetei *et al.* 2003).

Recognition of gestures could be genetic or learnt from a lifetime of being in close proximity to humans; apes and infants do not have the same performance level as dogs at an earlier age suggesting strong genetic possibilities. Dogs are able to interpret head orientation, gazing and pointing and are able to rapidly learn what these gestures lead too (Soproni *et al.* 2001). Dogs have evolved a way of understanding human behaviour better than chimps, they may also have lost some of their problem solving ability due to there dependence on humans (Povinelli *et al.* 1997).

### **2.3.3 Human influence on dogs' cognitive ability**

Due to domestication dogs require social cues from owners to solve problems and use inferential reasoning by exclusion (can find the toy if they see where the toy was hidden) (Topal *et al.* 2006a). Such cues may include owner touching the reward location or moving towards a handle to realise food. The dogs copied the action and the dogs receive the reward. The motor pattern and motivation of the goal is important. It is still unclear if the behaviour is goal emulation, observational conditioning or imitation behaviour (Kubinyi *et al.* 2003a), the fact remains that dogs are able to use human cues to achieve a reward.

Imitation is a fundamental part of communicating in the absence of language (Morford, 1996). Imitation is a form of social learning, no associative or cognitive theories can yet explain imitation but it is a vital communicative tool and play tool. Reinforcement of the action by the reward or genetic behaviour could explain imitation however, problems in the study is either a loose anthropomorphic approach or too narrow behaviour bands (Miklosi, 1999). Dogs are sensitive to the recurring behaviour of humans, when no goal directive is in place they see it as a game like situation, these help in the formation of social rules, which in survival terms means less conflict, is a mental construction skill via observational learning (Topal *et al.* 2005a).

Problem solving ability is not as dependent on their cognitive abilities but on their relationship with their owner or attachment level to humans. Dogs would of learnt that using humans to problem solve for them is more reliable to get the reward. The latency of the manipulation and the motivation of the reward are what effects a dogs problem solving behaviour. In this study the amount of training, sex or breed made significant difference although the sample size was limited (Topal *et al.* 1997).

### **2.3.4 Social cognitive abilities**

Understanding of cognitive abilities is important, as they are the basis for social learning, communication/interaction and understanding (Dawkins, 2006). Domesticated dogs were selected for their ability to adapt to human social system so therefore a dog's cooperative behaviour and attention seeking behaviour towards humans is significantly different to wolves (Miklosi *et al.* 2004). Social environment presents different challenges than the physical environment and therefore dogs' would need different behaviour mechanisms to cope with these challenges. The more complex the social system the greater the driving force for complex communication (Tomasello & Call, 1997).

Social cognition can be measured in terms of recognition, attachment behaviour, differentiating conspecifics, learning novel social cues, manipulation of others and reading of attention states. A combination of all these is needed to determine cognitive ability as over time dogs are able to learn the skills tested by associative learning and it is difficult to distinguish to what degree dogs understand different situation (Miklosi *et al.* 2004).

Wolves already had a social basis as part of their social pack in the wild and therefore had traits such as social attraction, decreased aggression, sharing of food, cooperation, loyalty and individuality. In order to achieve synchronicity within a group certain cognitive abilities are needed such as empathy, imitation, behaviour and emotion synchronicity, rule following, teaching and discipline (Hare *et al.* 2002). All these traits expressed outside of kin relations as well, for a pack to be successful. Wolves would of used these traits in simple communication such as sex recognition, protection, aggression and identification. This social system had the ability to advance as with human social structure. The extent to which domestic dogs social cognitive ability changed to live within the human social structure is unknown (Csanyi, 2000).

Cognitive testing shows dogs do possess the ability to behave appropriately towards novel situations and are able to adapt their behaviour. A dog's behaviour is very flexible. In ascertaining what the animal is aware of and testing its learning and instinctual responses via what it wants and response tests is a step closer in understanding the level of consciousness, as cognition is the process that leads to decisions.

However as consciousness is a human term and loosely defined it is difficult to draw conclusions from 'what it wants' experiments as they maybe a complex set stimulus response reactions. However these experiments are to ascertain what the animals wants are and their awareness. They are not only important in ascertaining conscious levels but from a welfare point of view to provide best life possible for these animals and how they see humans (Griffen & Speck, 2004).

Social understanding is a complex cognitive process in which the subject is able to integrate social cues and modify its own behaviour to behave accordingly (Pongracz *et al.* 2001). Social learning is tested using v-shaped test. A v-shaped transparent mesh fence one metre high is in front of the dog. A reward is placed inside the v shape and it is a task for the dog to retrieve the reward. (Pongracz *et al.* 2001; Pongracz *et al.* 2003b). There is series of tests such as owner walking the dog around the fence, dog observing owner place or go to the reward, owner directing the dog using hand gestures and familiar verbal signals. There is also an occasion where there is an additional opening to the reward so the dog does not have to detour the fence (Pongracz *et al.* 2003b).

It tests both asocial and social ability. Social ability is tested in novel situations; adaptive behaviour required some experience and in novel situations the dogs cannot draw on experience. Trial and error was the most common way the dogs retrieved the reward with their own merits but it took five or six trials. Observing the owner or demonstrator place or walk to the reward speeded up the performance by decreasing the number of trials the dog took to retrieve the reward (Pongracz *et al.* 2003b; Topal *et al.* 2006b).

Suggesting that dogs are able to use human actions to achieve a desired goal.

Owners and strangers were able to direct the dog to the reward so dogs' do have the ability to transfer understanding of cues from one person to another. The dogs do not exactly follow the route given by the demonstrator in all cases but were able to use the information to know the location of the reward. When the dog and the reward switched sides of the fence the dogs' performance decreased unless shown again how to detour the fence, showing limited problem solving ability. Once a successful route was found the dog continued with the same route (Pongracz *et al.* 2001). The dog receives communication from the sender but how it processes and stores this information and how it uses it in future situations is uncertain. Is the dog's behaviours instinct, learnt or a fixed pattern based on response reward actions (Csanyi, 2000).

Dogs have a means and ends relationship understanding as they understand concept of behave and reward. Dogs are able to flex their behaviour via observational learning. This is a combination of instinct and cognitive abilities. These abilities are believed to be separate in the wolf, instinct are needed more for survival (Frank, 1980).

## **2.4 Social behaviour of the dog**

Definition of communication is the sender's signals altering the behaviour of the recipient. The dog uses visual, olfactory and acoustic signals to communicate. Visual signals in the form of behaviour is the mostly used in human-dog interaction as it is more easily adjusted in a short period of time and allows more complex interaction (Simpson, 1997). Understanding the principles and mechanisms of behaviour begin with understanding a dogs cognitive abilities such as memory, conceptualisation and attention and biological mechanisms. These can be tested observing the dogs behaviour and comparing inter and intra species (Wasserman, 1993). There is no framework for comparison to interpret the domestic dogs social behaviour.

The wolf social structure is the closest system in helping to understand the basics of domestic dog behaviour, this is a loose framework as different breeds or in deed individuals may have a different social system dependent on breed or individual purpose (Bradshaw & Nott, 1995). Dogs have lost some of their ability to communicate using ear and body postures through selective breeding however they still have the ability to show submissive signs and to read them from others (Fox & Bekoff, 1975).

Certain stimuli elicit certain behaviour, environmental and social stimuli. Stimuli include mobile, immobile, objects, auditory, visual, odorous and mixed. It is difficult to ascertain which behaviours are caused by which stimuli, as often with complex social system it is a mix of stimuli that determine a response. Hormonal responses along with behaviour are a good determination of the true purpose of behaviour as sometimes as with hormone experiments the results can be ambiguous i.e. excitement and fear, there is no standard test to analyse socialization in dogs so behaviour is a good place to start, although there are expensive and ethical implications with taking blood samples from dogs (Diederich & Giffroy, 2006).

Underlying mechanisms are unclear but behaviour functions are, and therefore the behaviour (as well as hormone and brain imaging) does indicate how an animal perceives a situation and shows what an animal wants and perceives (Dawkins, 2006). Dog behaviour is a socialization tool for caregiver (owner) and receiver (dog) relationship whereas humans see the human-dog relationship more from a parent-child perspective. This is the strongest point of attachment as in chimp species, are ancestors. Breeders would of selected dogs traits that were child like behaviour, such as play in the presence of owners and anxious behaviour on separation. These are apparent in human infants, chimps and dogs. This behaviour makes it easier for attachment bond to be established (Topal *et al.* 1998).

Human-dog relationship is a complex and intense bond (Prato-Previde *et al.* 2005). Pet behaviour is an adaptation of its ancestral behaviour to elicit human parental care, or attachment/attention behaviour from their owners

(Archer, 1997). Basic motor behaviour of the dogs ears, tail and body position are key to help distinguishing how a dog is reacting to specific situations or interactions. There are many behaviours expressed to which the state of mind is uncertain, such as whether a dog is confident or not. Certain behaviours need to be looked at in conjunction with the dogs overall posture to gain understanding of whether the dog is confident, stressed or relaxed. The behaviours are then compared to those expressed by wolves in the wolf pack (Schilder & van der borg, 2004), such as low ears as an indicator of stress (Beerda, 1999). The behaviour may also be dependent on what behaviour has been reinforced in the dogs lifetime, as the appropriately way to react. It is therefore very hard to judge at face value the purpose of behaviour. Hormones are usually the best way to back up behaviour mechanisms (Schilder & van der borg, 2004). Difference in behaviour of the dog is largely due to the recipients' response (Paul & Serpell, 1996) and attachment to that recipient (Serpell, 1996).

Therapy dogs are selected so they do not show dominant behaviour. The levels to, which dogs interact are the effort of the inferior to obtain friendly or harmonic social interaction. Bradshaw & Nott (1995) suggested that on observation in many dog-human interactions the dog behaves in a similar fashion to that of a subordinate or submissive wolf. The two types of submission are active (begging) and passive (low body posture) submission. Submission is not just to avoid fighting but also to maintain relations (Fox & Bekoff, 1975).

Whether the dog is active submissive or passive submissive is dependent on the recipient of the communicative signals. In the wolf pack if the recipient is inquisitive then the sender will be passive submissive. If the recipient is not inquisitive, then the sender will be more active submissive. Active submission includes friendly behaviours such as nuzzle, lick person, pawing (controversial), group ceremony and evidently friendly. Passive submission is clear signs of inferiority such as lying on the back and timid. There are levels in-between or intermediate submissions (Schenkel, 1967). The more dominant the recipient or threatening the more the sender will express

passive submission. Active submission is an ontogeny relationship. Nuzzling and licking are similar to mother-cub relationship when begging for food. Submission such as this only occurs in species that are attached by a bond, the tolerance of submission is learnt from childhood and mainly from females (Schenkel, 1967; Fox & Bekoff, 1975). However as stated before this framework is not set in stone. Dogs have been selected for their natural affectionate temperament and for their loyalty, in most cases a dog will be constantly by the side of the owner despite the owners' behaviour (Hart, 1995). Dogs have a natural ability to behave in a way that is compatible with their human partners behaviour (Kerepesi *et al.* 2005).

Dominance relationship in dogs and humans does not specifically match wolf hierarchy or mother-cub relationship, also evidence that pack structure is not genetic as it is not seen in feral dogs, most likely that from associative reinforcement that dogs have developed the social system (van Kerhore, 2004). Dog pack structure will not be exactly the same as wolf structure as the genetic differences between wolf and dog are significant enough especially when concerned with the hypothalamus, which is a centre that controls the emotions and therefore expression of behaviour (Saetre *et al.* 2004). Dominance relationships are less aggressive however eye contact or gazing lengths are still important in maintaining human-dog relationship. The more glancing at owners especially when on a walk is considered a subordinate act, always looking for leadership, but this is dependent on the sexes of both dog and human (Wormser, 2006). Proximity is also an indicator of a dogs' submissive tendencies or confidence (Sonderegger & Turner, 1996).

#### **2.4.1 Are all dogs the same?**

In some studies there are differences between sexes, males dogs' are more dominant than females, however how independent the dog is, can affect its behaviour. The dog behaviour individual differences are due to the complexity of dog behaviour (Wormser, 2006).

It is unclear if the dog's social behaviour is anything more than stimuli response but there are studies that show that there are more complex mechanisms underlying behaviour such as personality. Svartberg & Ferkmann (2002) found there were four personality areas that had an effect on the dog behaviour choice: Playfulness, curiosity, chase-proneness and sociability. Aggression was one area but did not have an affect on every choice of behaviour (Scott & Fuller, 1965; Svartberg & Ferkmann, 2002). These results were general across all breeds of dog so it is a trait that has survived selection pressures, but as with all personalities there are some differences between individuals. In a human personality model an area studied is extraversion (sociability and activity) that can also be used to study a dog's individual preference on a situation. Other areas include Conscientiousness (competence and self discipline), agreeableness (trust and compliance), openness and naroticism (anxiety). Sociability is one most significant to positive human-dog interaction. As stated earlier it is unclear how complex social behaviour responses are, it comes back to the level of dogs' sentience (level of cognitive and emotional ability) (Svartberg & Ferkmann, 2002).

Dogs act appropriately to different cues from both friendly and threatening humans, familiar and unfamiliar humans and there are instances when sex of the human does or does not matter. Apart from individual personality differences and the response from the recipient there are some breed differences (Hart, 1995). Some breeds are sensitive to gesture communication such as gun dogs, and some dogs are more confident such as retrievers are more consistent than German Shepard dogs in their responses. The unfamiliar person was a women in this experiment, which may of effected the results. Breed specific genetic make-up in retrievers and sled dogs express more cooperative behaviours and show aggression on sudden behavioural changes. Guard dogs such as German Shepard's are more sensitive to sudden behaviour change, how responsive is also dependent on socialization that the dog has received in the early socialization period. Exactly how flexible dog behaviour is needs further investigation (Vas *et al.* 2005).

Experienced dogs are more able to handle new situations and people and are more investigative (Sonderegger & Turner, 1996). Different breeds have different training abilities. German Shepard dogs are more dependent on owner cues than hunting dogs. All breed of dogs show cooperative traits so this has been a result of selection pressures and is generic throughout the species although the way individual dogs express this may be different (Pongracz *et al.* 2005).

Dogs' individual traits are important such as confidence. Puppy development and socialization are key factors in how a dog behaves and how flexible and trainable the dog becomes (Hsu & Serpell, 2003). Owners believe that their dogs understand them and there is no difference between sex and breed but owners judge their dogs on activity and actions, social situation to them just requires that dogs give the appropriate response. Elderly owners claimed more understanding probably due to the dog's experience (Pongracz *et al.* 2001). There are individual differences in ontogenetic ritualization. Owner and dog will have different communicative relationship so it is very difficult to generalize what dogs are able to understand especially with small sample sizes involved (Tomasello *et al.* 1998).

## **2.5 Can dogs tell the difference between people?**

Dogs can behave differently towards different sexes (Prato-previde *et al.* 2005). Studies done by Wormser (2006) showed that male owners were treated as if they were more dominant than the dog, than female owners. Dogs are able to distinguish between men and women (Lore & Eisenberg, 1986), children and plastic human shaped dummies (Millot, 1994). Behaviour has not been the only indicator that dogs perceive a difference between people, hormonal changes are one but they do have limits such as that the procedures may of induced hormonal changes and it is unknown if the same hormones effect in humans is replicated in dogs. Traces of phenylaictic acid and catabolite of beta-phenyl ethylamine increase after interaction with patients, these hormones are linked with feelings of euphoria and attention

fulfilment in humans, and are assumed to be similar in dogs, as they are needed to strengthen the bond between individuals and are linked with basic positive interaction. Blood pressure was also measured and it decreased in both human and dogs during interactions (Odendaal & Lehman, 2000) linked with decreased stress (Beerda, 1999).

As behaviour indicated could be excitable behaviour, it stresses the importance of using both internal and external cues to judge the dogs or any animal actions. But they were not compared with other humans in the same environment. Behaviour and physiological bridges are important to build in understanding a dog's reaction to certain situations, although difficult in implementation, as ethical considerations of dog need to be considered. Heart rate and stress behaviour have been linked and display more stressful responses between friendly and threatening strangers (Beerda, 1999). Behaviours vary on response between dynamic and static behaviours which could indicator stress or uncomfortable. Recording heart rate, on its own, could be excitement or fear, the more variables that are observed the more accurate the diagnosis of the dogs reaction to a situation (Palestrini *et al.*2005).

Cortisol levels were lower in the dog when being petted by a women than a man (Hennessy *et al.* 1998). The ontogeny mother cub relationship maybe one explanation for this but it is not conclusive or the fact that women may see dogs as equals more than men but this is very subjective (Miura *et al.* 2000). Oxytocin is higher in dogs when they are interacting with their owners than strangers (Odendaal, 2000), so they have a higher attachment so they are able to distinguish owners from strangers (Palestrini *et al.* 2005). They also react to separation from who they are attached, hormonally similar to infants and chimps (Prato-Previde *et al.* 2003). Dogs also have an excellent sense of smell and are able to discriminate between human individuals scent samples (Schoon, 1996). Dogs use visual signals more primarily than scent so the possibility they can distinguish by other means is possible.

## **Chapter 3**

### **Methodology**

This study is designed to establish if there is a significant difference in a dog's behaviour towards care staff and patients. Data was collected on routine visits with 'Pets As Therapy' dogs to establishments that care for elderly patients.

**Aim:** To investigate whether Pets As Therapy dogs show different behavioural responses towards care staff than towards patients

**Objectives:**

1. Record the gestures given by the patients and the care staff.
2. Record behaviours of the dogs towards patients and the care staff.

The data shows if there is a difference in the dogs' behaviour when interacting with patients and staff. The data does not reveal the mechanisms to which any behaviour has arisen. The observations were passive to get an accurate account of the dogs' normal behaviour during human-dog interaction in these situations.

### **3.1 Pilot study and methodology alterations**

The pilot study was conducted with a single dog at the first establishment with dog number 1. Originally the observer was to record each individual interaction for five minutes, but on average the minimum amount of time that a 'PAT' dog would spend interacting with a patient was 2.5 minutes, before the owner or other event encouraged the dog to move. The sample points therefore had to decrease from 30 to 16 sample points. Consent forms (Appendices 1-3) were confusing and certain areas needed to be highlighted on the form to make the staff more comfortable about the study that was being conducted. This was the main ethical consideration of the study. Ethical committee did not have to sit, however each individual establishment requested an ethical form and discussed the implications before the researcher could enter each establishment.

The recording sheets (Appendix 4) needed to be more accurately labelled and numbered so they could be correlated with the consent forms. It also became apparent from the pilot study that the ethogram was incomplete and behaviours such as paw person, whimper, licking nose and aside needed to be included. Several behaviours from the dog ethogram were removed such as eyes closed and tail high. Sitting was removed from the human ethogram, as this was a constant for patients. The type of recording sheet was also decided. The pace was very quick, it was more efficient to tick the relevant behaviours as well as keeping time with the stopwatch. Glancing at an ethogram and abbreviating as well as keeping track of time was difficult. After an additional visit with dog number 2 these changes were effective, however at this stage two volunteers from the original ten could not take part. In order to make up the number of the dogs, two dogs from the same owner and establishment have been included in the study.

### **3.2 Final Hypothesis and methodology**

- 'PAT' dog behaviour will differ when interacting with patients compared to staff
- Difference in patient and staff behaviour will be reflected in the dogs' behaviour
- The percentage of the active and passive dog behaviour that can be accounted for by the patients-dog interaction will differ compared to the staff-dog interaction

This study is a passive observational study of nine 'PAT' dogs on a routine visit to establishments that care for the elderly. Elderly patients were chosen as permission to enter these establishments was quicker to arrange and consent were more straightforward than with dealing with younger patients. The behaviour of nine dogs was recorded for 2.5 minutes. If the dog moved to another participant before the final sample point was reached then the data had to be discarded. The 'Pets As Therapy' volunteer spent extra time to allow the researcher to observe interactions with the staff (as not to interrupt the normal visit routine with the patients).

Three patients and three members of staff were observed interacting with each dog on one visit, at eight different establishments (one dog for each different establishment (Apart from dogs 7 and 8)). The behaviour was recorded (one researcher doing recording at all establishments, so inter-observer reliability would not be an issue) using instantaneous sampling with a check sheet (Appendix 4) and an original ethogram for dogs (Table 1) and humans (Table 2). The sample points were 10 seconds apart (close together so it is similar to continuous recording) (Engel, 1996). The recording of the participant behaviour ran simultaneously with the dog recording but began two seconds before, so data could be collected of the dogs' reaction to human gestures.

Instantaneous sampling was the most effective sampling method because it required simple recording equipment. Using a video camera brought in privacy and cost issues (Video recording is the only way to do effective continuous recording in this situation. Video recording would have been more useful especially in observing the owners influence on the dogs, however obtaining consent to use a camera was not possible in the 3 months that was allocated to collect the data). One-zero sampling was not selected as this method overestimates behaviour (Martin & Bateson, 1993). The only equipment required was a check sheet, pencil, stopwatch, clipboard and eraser.

Selection of staff members to record was done on a first come first serve basis, this did increase the risk of bias, but there were few staff members that had the time to interact with the dog. 'Pets As Therapy' volunteers made their regular visit and the observer selected which patients to record, to limit bias from the volunteer. The recording began after the dog had settled (sat down or had remained stationary for ten seconds next to the participant). The observer maintained a discrete distance away from the dog so as not to affect the dogs' interaction with the participant. Observer distance was not a constant due to space constriction or other activities happening at the establishment.

Table 1 Dog ethogram

| Dog Behaviour              | Explanation  |
|----------------------------|--|
| Ears forward               | Ears are upright and open end is facing in the same direction as the nose and muzzle               |
| Ears side                  | Ears are upright and open end is facing perpendicular to the direction of the muzzle               |
| Ears slightly back         | Ears are down, open end is not visible, and facing towards the back of the dog                     |
| Ears side v shape          | Ears are down, open end not visible and facing perpendicular to the muzzle                         |
| GAZING                     | Dogs eyes are looking directly at the person, muzzle facing directly towards the person            |
| GAZE averted               | Dogs eyes are looking away from the person and not obviously observing anything else               |
| Head up towards            | Nose and muzzle are elevated towards the person  |
| Head down towards          | Nose and muzzle are facing towards the ground  |
| Head level towards         | Nose and muzzle are facing forwards  |
| Look around                | Head moves from side to side or up and down when not obviously distracted                          |
| Sit Towards                | Hind legs and rear end are in contact with the floor with the front legs straight and vertical     |
| Stand towards              | All four legs are straight and paws are flat on the floor  |
| Walk around                | Legs and paws are moving from one position to another  |
| Lying down                 | Only the stomach and legs are in contact with the ground   |
| Aside (Active/neutral)     | Dog is positioned perpendicular to a person, 'active aside' the head is in contact with the person |
| Tail above                 | Tail is above the line of the spinal cord  |
| Tail level                 | Tail is in line with the dogs spinal cord  |
| Tail hanging               | Tail hanging loose below the spinal cord not between legs  |
| Tail between legs          | Tail is between legs   |
| Tail wagging               | Tail moving from side to side, tail moving in circles  |
| Licking lips               | Tongue moves around the lips below the nose  |
| Licking nose               | Tongue moves over the nose   |
| Grooming self              | Tongue moving back and forth along a part of the dogs body   |
| Lick person                | Tongue licks a person  |
| Eating from ground         | Dogs mouth is in touch with the ground   |
| Eating from hand           | Dogs mouth is in touch with food in the hand   |
| Sniffing ground            | Dogs nose is just off the ground   |
| Sniffing person            | Dogs nose is in close proximity to an object or person   |
| Sniffing surroundings      | Nose is in the air with no apparent object or person in close proximity to the nose                |
| Paw person                 | Paw is raised and placed on a person   |
| Whimper                    | Short high pitched vocal sound   |
| Roll over (Neutral/Active) | One side is in contact with the ground, active is moving from one side to the other                |
| Nuzzle                     | Nose and muzzle touches as the head nudges the person  |
| Bark                       | Barking sound  |
| Woof                       | Woof sound   |

Table 2 Human ethogram

| Human behaviour |   |
|-----------------|---|
| Stroking        | All of the persons palm is always touching the dog and is in constant motion                            |
| Petting         | Finger tips or bottom of the hand are touching the dog on and off, either scratching or 'touch and off' |
| Talking         | Head and eyes are facing towards the dog or person while talking  |
| Standing        | Person is upright with both feet on the floor   |
| Crouched down   | Knees are bent with bottom towards the floor and back straight  |
| Leaning over    | The legs are straight and the back is bent forward towards the floor                                    |
| Feeding         | Hand is out with food facing towards the dog  |
| Hand out        | Hand is out with NO food facing towards the dog   |

The project was explained to the patients and the care staff before observations began to answer any questions and confirm consent. The small sample size and amount of data that could be recorded meant that it would be necessary that each dog was observed on two different days in order to record the dog interacting with a larger range of people. Since there was no guarantee that the same staff would be there the following week no participant was recorded twice. The two recording days were consecutive to how often the Pets As Therapy volunteer would visit the establishment.

The only costs were travelling and the donation to 'Pets As Therapy' for their assistance. Permission to proceed was required by Alison Reynolds ('Pets As Therapy' Research and training manager). Consent forms needed to be signed by carers on behalf of patients (Appendix 1), the 'Pets As Therapy' volunteers (Appendix 2) and the carers observed (appendix 3) before recording data. The history of all the dogs (age, time as a PAT dog, time been visiting establishment, breed and training background) was taken for comparison. PAT dogs were suitable since they all had similar temperaments towards people and all had some experience in animal assisted activities. The dogs were already well established in all the hospitals and hospices.

### 3.3 Data Analysis

Non-parametric tests were used, as the data was difficult to transform; arc sign transformation was attempted. The transformed and the original data was tested with the Kolmogorov-Smirnov test to test the similarity to normal distribution, to which both were unsuccessful. Only a total of four hours of data was collected with eight out of nine dogs being female. Distribution free tests allowed more flexibility for analysing this data (Dytham, 1999).

Wilcoxin's signed rank test was used to test the differences in the dogs' behaviour towards patients and staff, as the data was paired. Behaviours that were analysed were active interaction (dog encouraging interaction by pawing, nuzzle and gazing), passive interaction (gaze averted, lying next to the participant, looking back at owner and not encouraging interaction), away from participant and all the individual behaviours that made up active and passive interaction.

The proportion of time the dogs' spent performing active behaviour, passive behaviour and 'away from participant' behaviours were placed in a pie chart; comparing the overall amount of time spent performing certain behaviours towards the staff and patients during interaction.

The Mann Whitney U test was used to compare the differences in staff and patient behaviour towards the dog, as the data was unpaired. The Mann Whitney U test was also used to compare the experience of seven of the nine dogs (Three of the seven dogs had 24 days of experience and the other four dogs of the seven had 72 days experience).

The Spearman's rank test was used to correlate participants and the dogs' behaviour with active and passive interaction i.e. to test the significance that when the participant does not interact, the dog will be active and when the participants are interactive the dog will be passive.

Dogs 9,4 and 6 (in ascending order of experience) were analysed separately as these were all the same breed, so overall outcome could be compared to results where breed was not a variable (but only on a descriptive basis). Measures were a median of the dogs' behaviour of the proportion of time the dogs spent performing the behaviour in a recording period. The proportion was how many sample points out of sixteen sample points; dogs were performing certain behaviours.

## Chapter 4

### Results

The main aim was to test the difference between the dogs' behaviour when interacting with patients and the staff on a routine 'Pets As Therapy' visit. The secondary objective was to record the dogs' responses to the patient and staff behaviour. The amount of time the dog spent towards the patient and the staff is shown in figures 1a and 1b. There was no significant difference between active interaction (Wilcoxin's signed rank  $p=0.766$ , 95% confidence level), passive interaction (Wilcoxin's signed rank  $p=0.953$ ) and no interaction (Wilcoxin's signed rank  $p=0.495$ ). There is a slight descriptive difference in active interaction that will be explored in experience differences between the 'PAT' dogs.

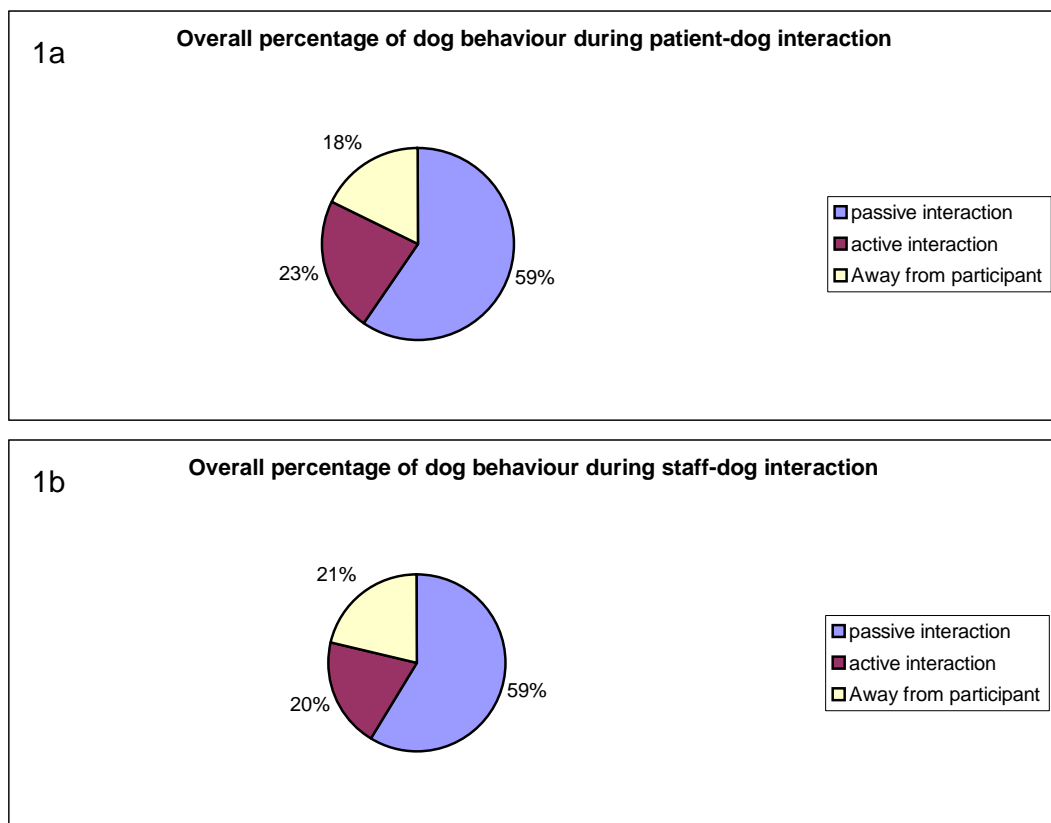


Figure 1a: The percentage of passive, active and non-interactive behaviour the dogs expressed during patient-dog interaction. Figure 1b: The percentage of passive, active and non-interactive behaviour the dogs expressed during staff-dog interaction.

The difference between the amounts of physical interaction that the participants display with the dog is significantly different (Mann Whitney  $U=584$ ,  $p<0.05$ , 95% confidence level) in that staff members are more physically interactive in the sense that they stroked the dog more than the patients stroked the dog (Figure 2).

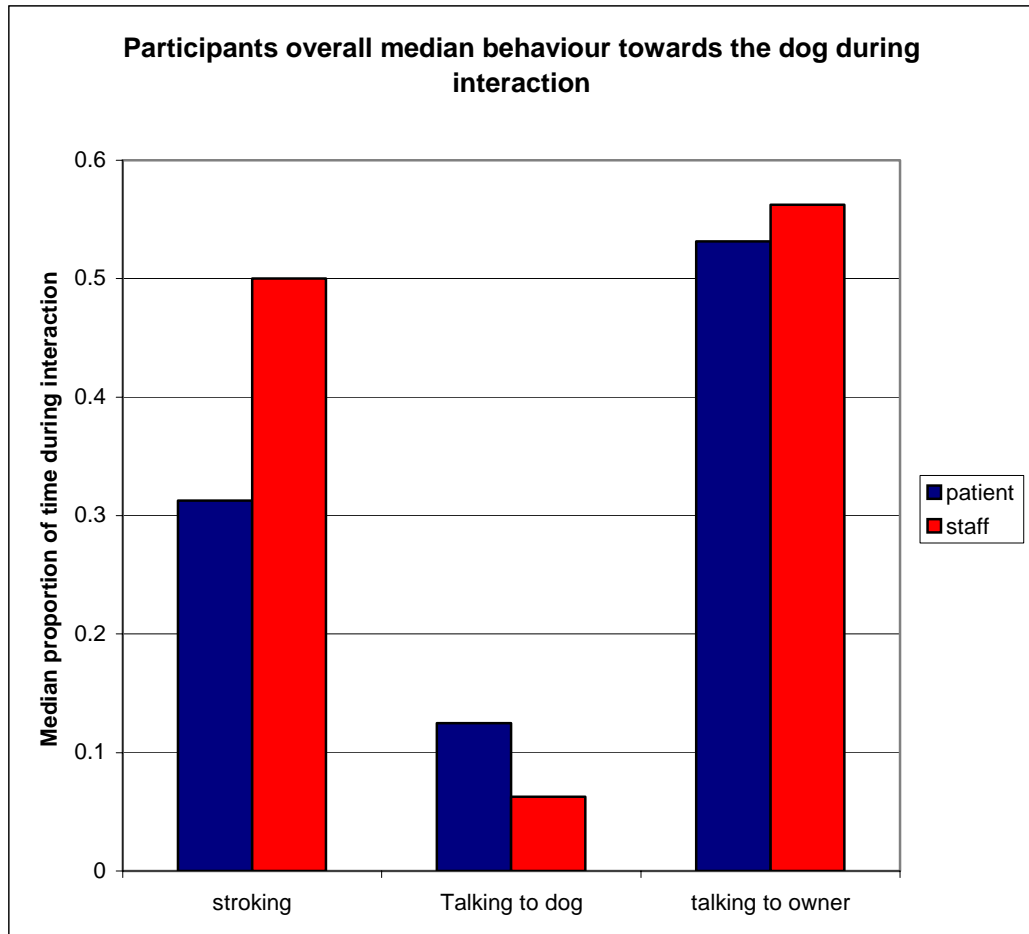


Figure 2: The overall median proportion of time the participants spent interacting with the dogs.

Physical interaction differed from patient and staff towards the dog. Figure 3 displays that there is no significant difference (Wilcoxin's signed rank  $p=0.833$ ) between the percentage of the behaviour that was responsible for active interaction between patients and the staff. There is a large section unaccounted for to what caused the other active interactions. Descriptively there is a slightly higher incidence of active behaviour towards patients.

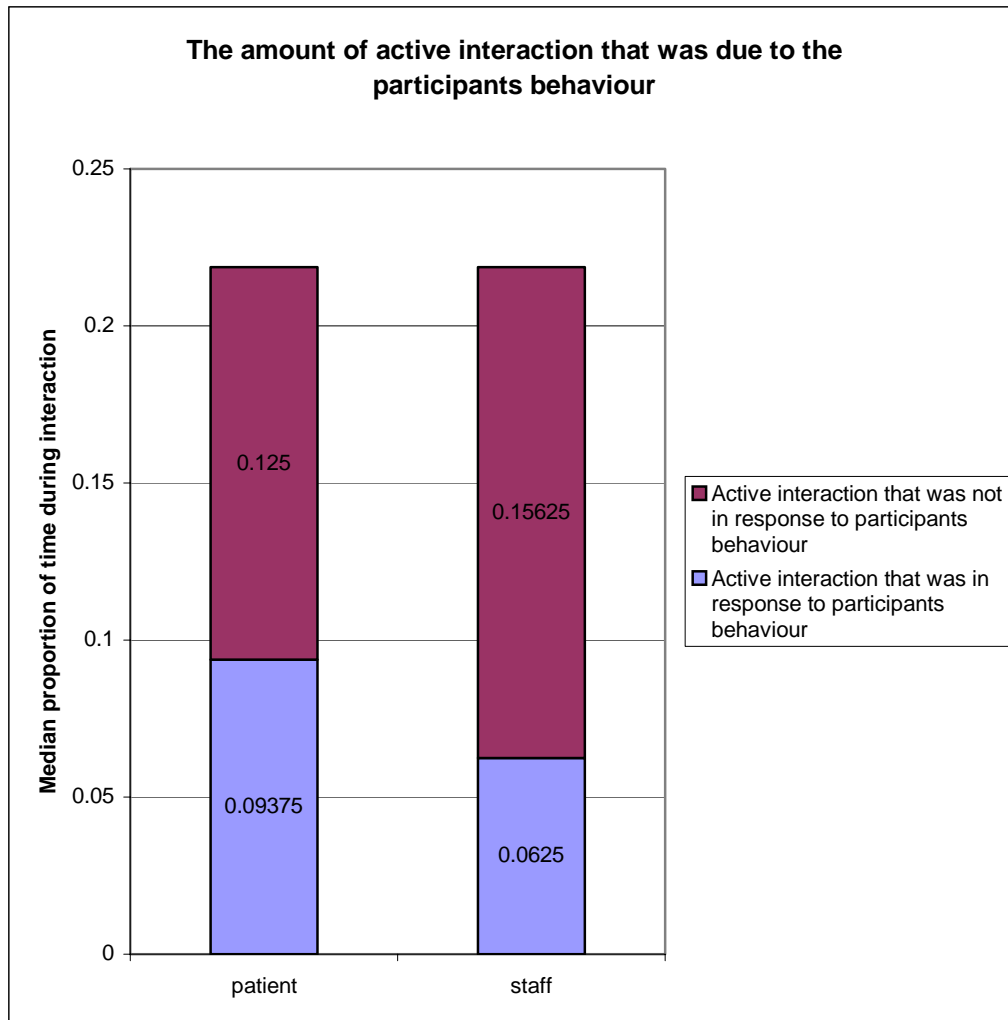


Figure 3: Proportion of active interaction or encouraging interactive behaviour from the dogs that was due to the participants' behaviour.

The correlation between participant not interacting with the dogs and the dogs encouraging interaction is strong and positive in staff-dog interaction (Spearman's rank  $r=0.748$ ,  $p<0.01$  (99% confidence level)) (figure 4a) and patients-dog interaction (Spearman's rank  $r=0.799$ ,  $p<0.01$ ) (Figure 4b). The greater the proportion of time the participants were not interacting with dog, the greater the proportion of time the dog would spend encouraging interaction.

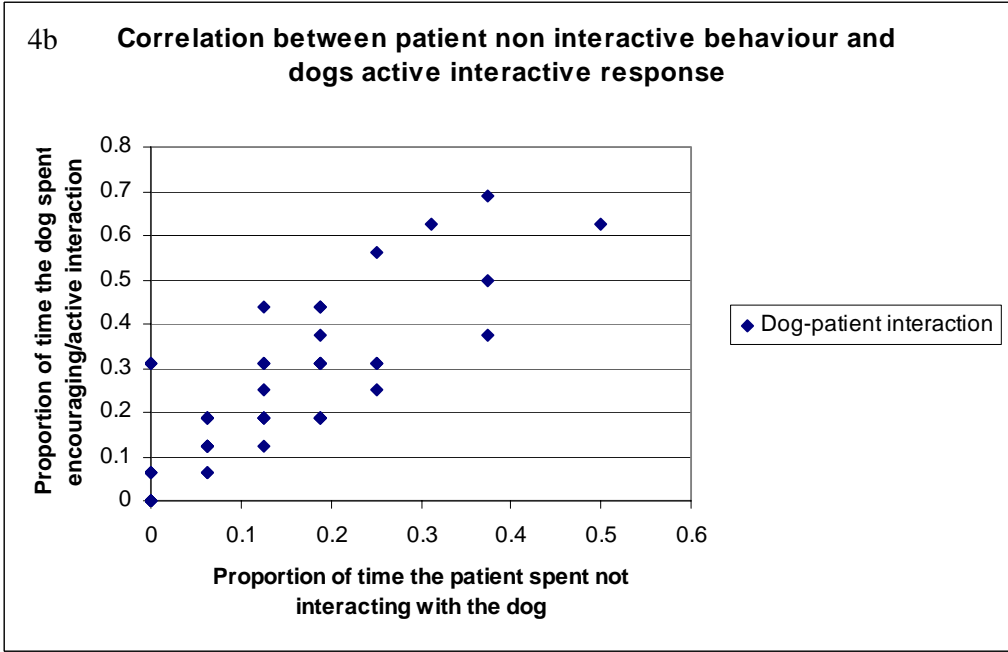
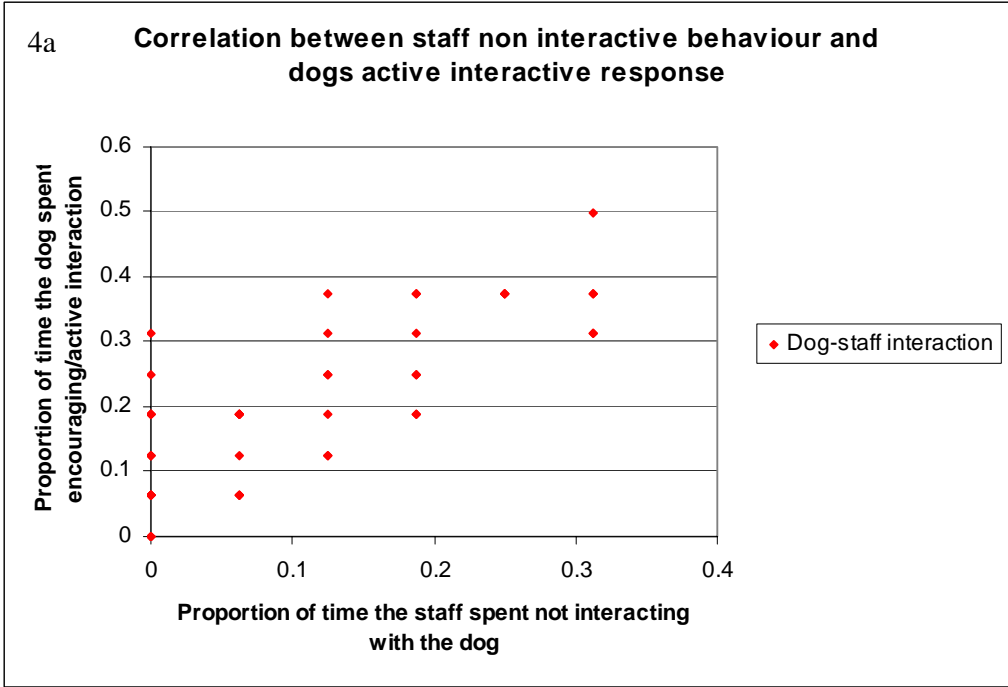


Figure 4a and 4b: Correlation between staff and patients not physically interacting with the dog and the dog trying to encourage interaction.

There is a significant difference however in the percentage of passive interaction from the dogs that can be accounted for by the participants' behaviour. More of the passive interaction directed towards the staff can be

accounted for by the staff behaviour than with the patients' behaviour (Wilcoxin's signed rank  $p=0.015$  95% Confidence level) (Figure 5).

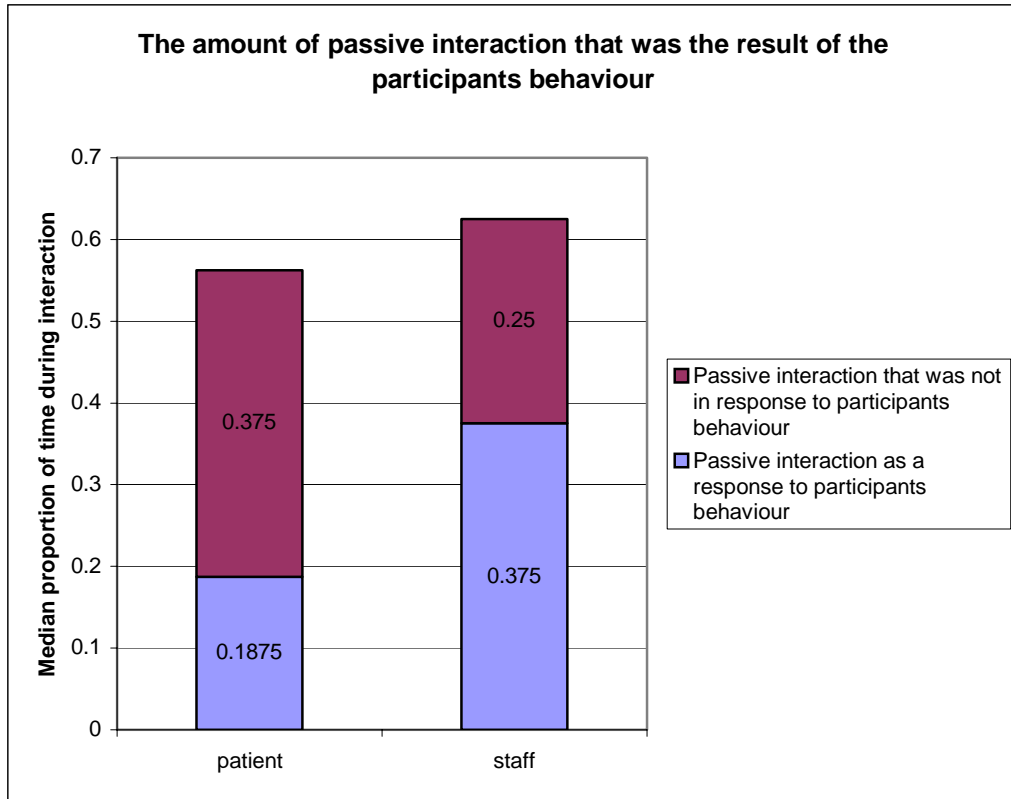


Figure 5: Proportion of the dogs' passive behaviour that could be accounted for by the participants' behaviour.

The correlation of staff physically interacting with the dog and the dog in passive interaction is positively correlated (Spearman's rank  $r=0.593$ ,  $p<0.01$ , 99% confidence level) (Figure 6a). The greater proportion of time staff members were interacting with the dog, the greater the proportion of time the dog engaged in passive interaction. However the patient-dog passive interaction has no correlation or significance (Figure 6b).

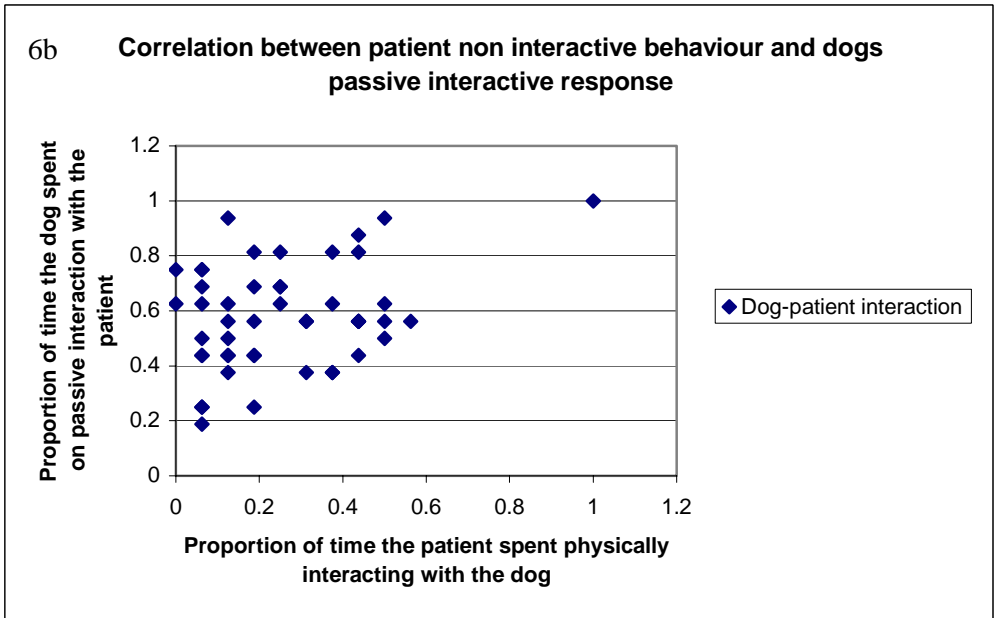
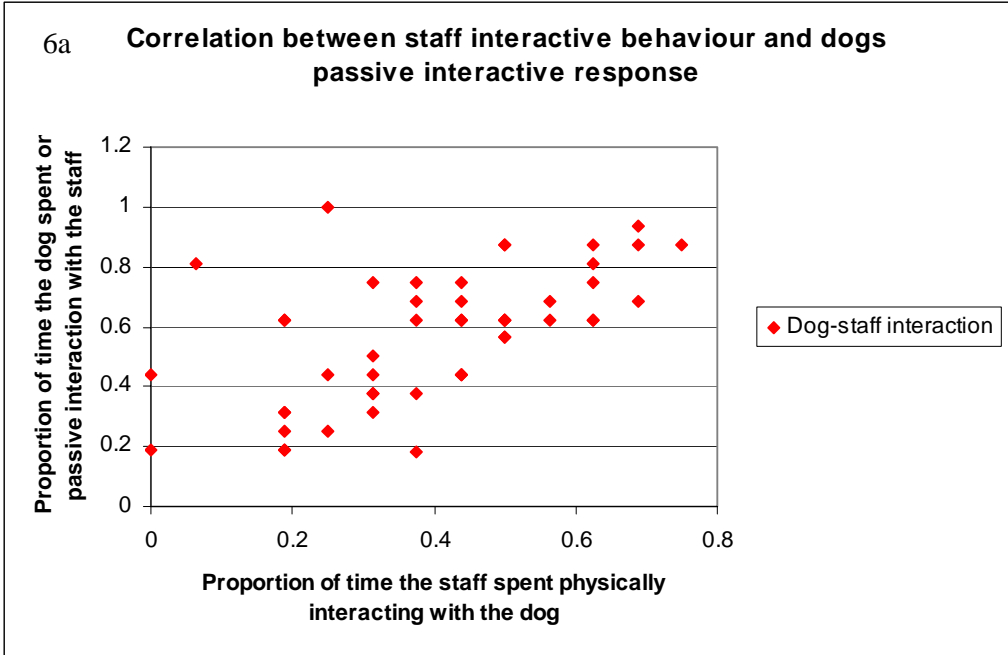


Figure 6a and 6b Correlation between participants' physically interactive behaviour and the dogs passive behavioural response.

One behaviour that was considered to be passive interactive from the dogs' behaviour was looking back at the owner. Figure 7 illustrates that there is a significant difference (Wilcoxin's signed rank  $p=0.021$ , 95% confidence level) in that the dog would look back at the owners more during interactions with patients than with staff.

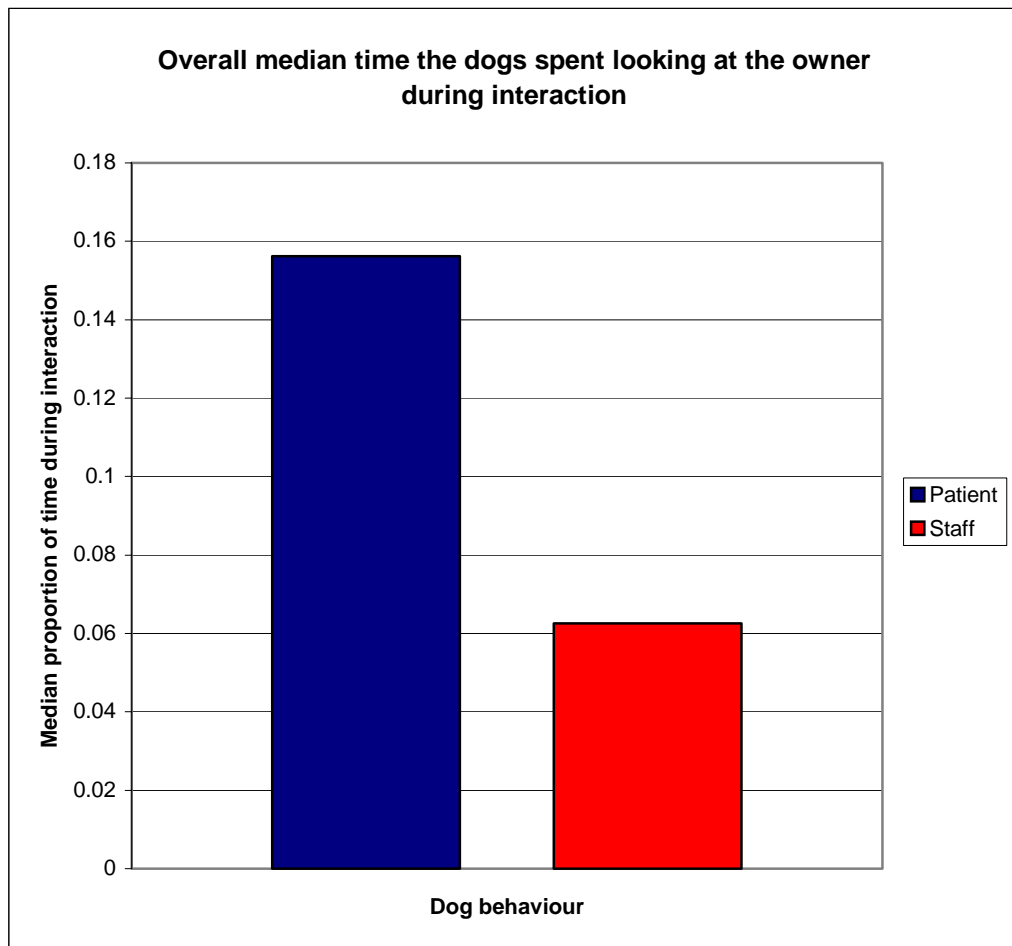


Figure 7: The median proportion of time a dog would spend looking back towards the owner during interaction.

On a descriptive basis only the dogs appear to spend more time away from the staff than the patient during the recording period (Figure 8).

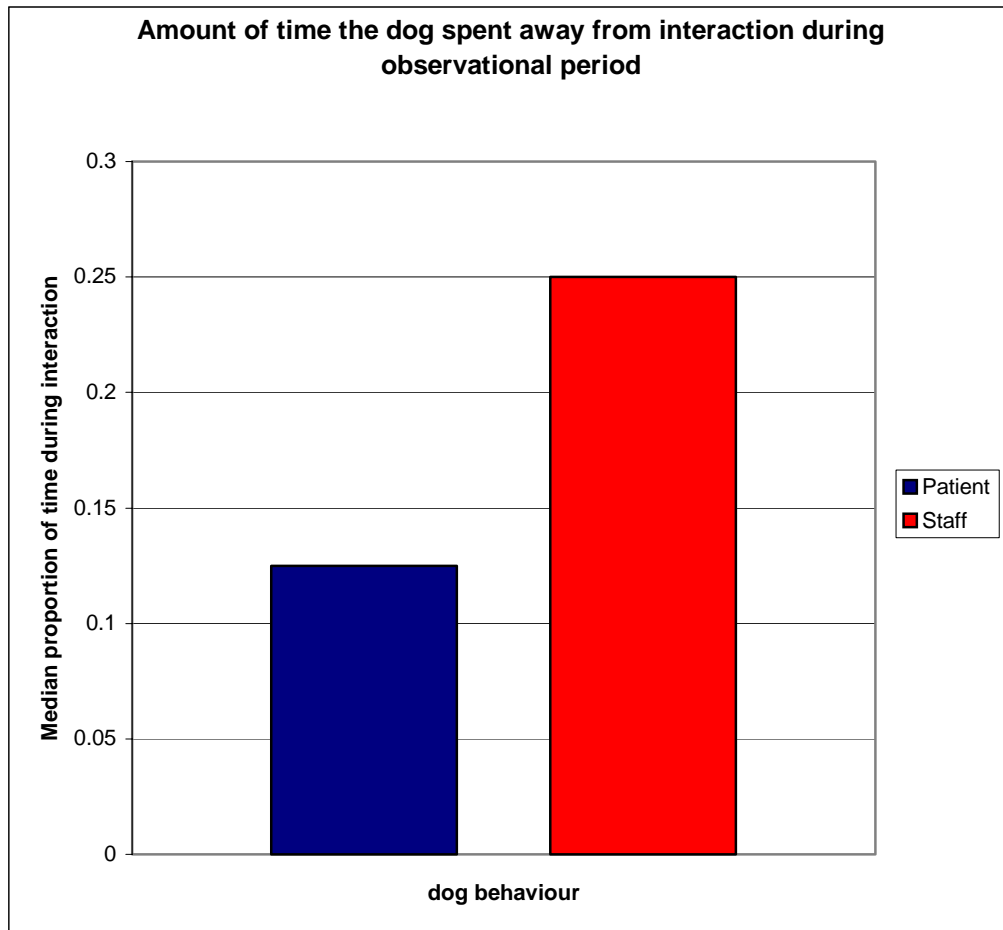


Figure 8: Proportion of time dogs spent away from interaction during the recording period.

There was a range of experience (Number visits per month multiplied by number of months have been visiting) from the dogs. Dogs 7,8 and 9 had 24 days of experience; dogs 1, 2, 4 and 5 had 72 days experience, dog 6 had 90 days experience and dog 3 had 360 days experience. When 24 days and 72 day experienced dogs were compared with each other, a difference was found in the amount of active behaviour and gazing behaviour towards the patients. The more experienced dogs displayed a greater proportion of active and gazing behaviour during patient-dog interaction (Mann Whitney  $U=5.815$ ,  $p=0.057$ ) ( $p=0.057$  is close to the 95% significance that it requires further investigation).

The breed of dog may have been a contributing factor however dogs 9, 4 and 6 (in ascending order of experience) were all the same breed, which allowed some investigation into behaviour without breed as a variable. No significant differences were found however descriptively figure 9 supports the fact that proportion of passive interaction towards patients is similar despite experience. Figure 10 supports that the dogs spend a greater proportion of time engaged in active behaviour with patients with greater experience.

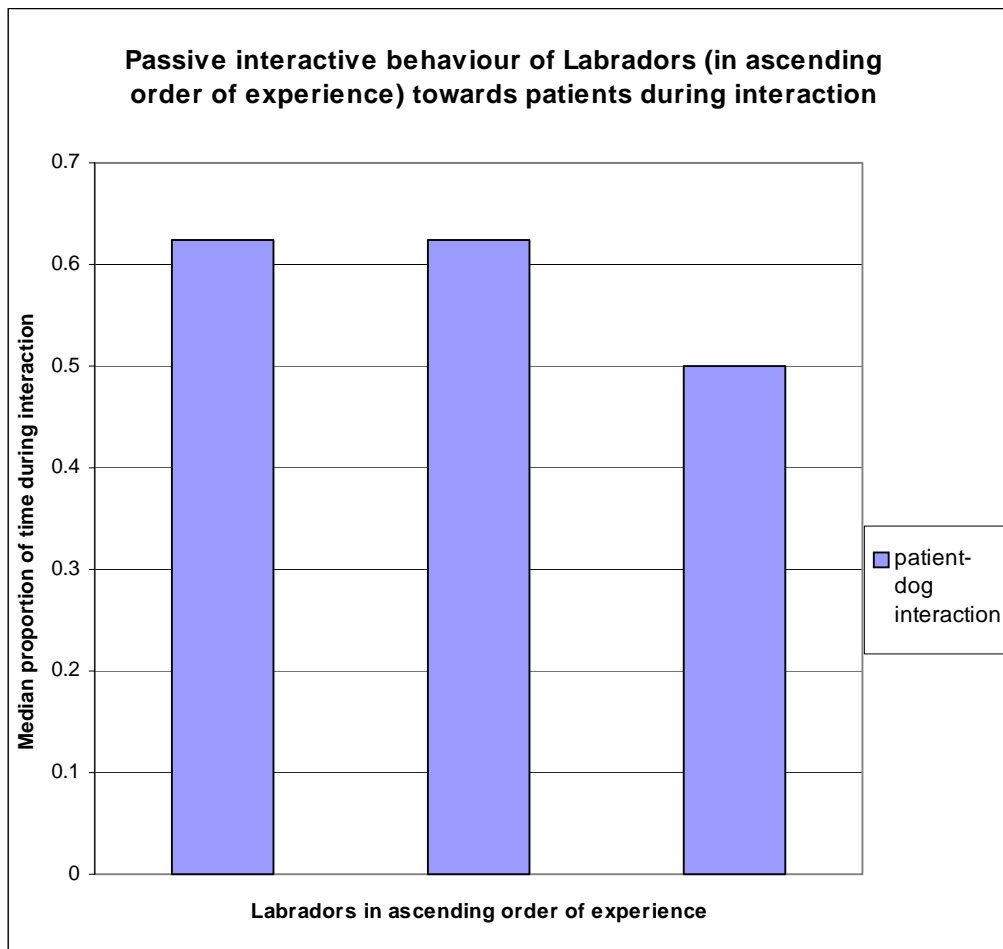


Figure 9: Passive interactive behaviour of Labradors (in ascending order of experience) towards patients during interaction

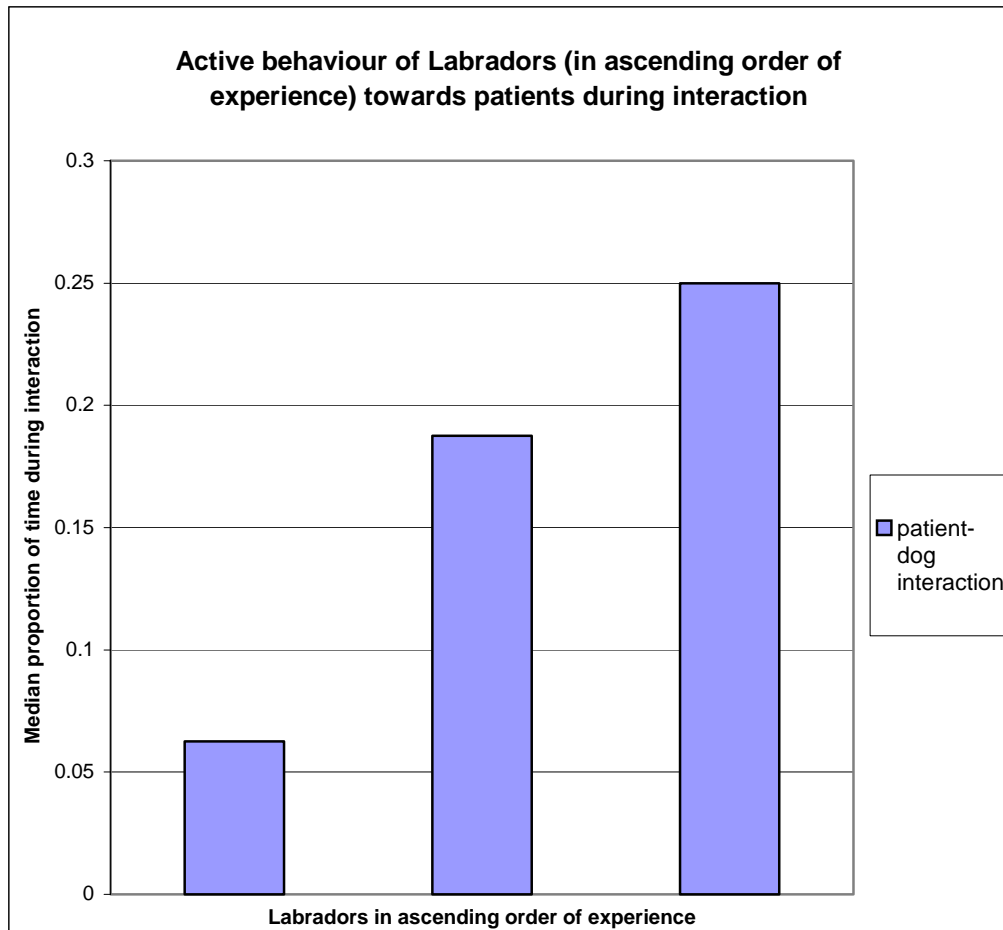


Figure 10: Active behaviour of Labradors (in ascending order of experience) towards patients during interaction.

In summary there were differences in the amount of physical interaction that occurred between patient-dog and staff-dog interactions, yet there was no significant difference in the proportion of active or passive behaviour towards patients and staff during interaction. An interesting finding was that the dogs looked back at the owners for a greater proportion of time during patient-dog interaction than staff-dog interaction.

## **Chapter 5**

### **Discussion**

The main hypothesis was a 'PAT' dogs behaviour differs when interacting with patients compared to staff. The results of this study accept the null hypothesis, which is that there is no difference in a dogs' behaviour when interacting with patients and staff. There was no difference between the proportion of time dogs spent on active behaviour, passive behaviour and away from the participant between patient-dog and the staff-dog interactions. This is an interesting result as there is a difference in the way the staff and patients interact with the dog as discussed below.

The second hypothesis was that the difference in patient and staff behaviour would be reflected in the dogs' behaviour. The results for physical interaction towards the dog support the null hypothesis that the dogs' behaviour is independent of the participants' behaviour. There is a difference in the amount of physical interaction during patient-dog and staff-dog interactions. A theory of human-dog interactions is that the dogs' behaviour is similar to that of submissive wolves. Active behaviour is expressed when the recipient is not attentive. Active behaviours include licking the muzzle or nuzzling. Passive behaviour is expressed when the recipient is investigative such as averted eye contact and tail between the legs (Bradshaw & Nott, 1995). It would be expected that the more physical interaction the dogs' receive the more passive behaviour the dogs will display during interaction (Schenkel, 1967).

The dogs' should of been more passive with staff than with patients, as the staff members were more physically interactive with the dog, but as shown there is no difference in the amount of passive behaviour between patient and staff interactions. Non-physical interaction from the patients and staff, the null hypothesis that the dogs' behaviour is independent of the participants' behaviour is rejected. There was no difference overall in the proportion of time the dog was not physical touched and that was reflected in that there

was no difference in the amount of active behaviour displayed to encourage interaction.

Passive and active behaviour is based on passive and active submission in the wolf pack. In order to avoid promoting aggression when being investigated the recipient will be passive. However dog-dog and wolf pack social rules may not be the same as the dog-human social rules (Agnetta *et al.* 2000). Dogs have been selected for their friendly behaviour traits and their close proximity behaviour towards humans. The more attached to a person the more the dog will remain next to this persons side despite the amount of physical interaction expressed by the human (Hart, 1995)

The third hypothesis was that there would be a difference in the percentage of the active and passive dog behaviour that could be accounted for by the patients and the staff during interaction. The null hypothesis, which was that the percentages would not differ, is accepted for the amount of active behaviour that could be accounted for by the participants not interacting with the dog. The amount of active interaction that can be related to participant behaviour is similar towards patients and staff. The dogs will spend the same amount of time encouraging interaction with patients and staff when they are not physically interacting with the dog.

Motivation for physical interaction is the same in the dog towards patients and staff, perhaps due to the friendly temperament of the dogs, which all PAT dogs must have certified before they are allowed to take part in animal assisted activities. Patient-dog and staff-dog interactions both show a high proportion of active behaviour that occurred while participants were physically interacting with the dog, this also maybe due to the friendly temperament of the dog. Good-tempered dogs show just as much active behaviour towards friendly strangers as well as their handlers (Bradshaw & Nott, 1995, Gasci *et al.* 2001), again linking to the submissive wolf active behaviour theory. Gasci *et al.* (2001) study was in a different situation, the dogs were more socially deprived and may have had a greater motivation to interact. The higher proportion of friendly behaviour could be accounted for

by the fact that after feeding, the dogs may have been more willing to interact, this was not picked up by the study design.

The behaviours of the participants were also limited to simple gestures such as stand, lean over and stroke, so something to encourage interaction may have been missed. Humans exhibit non-intentional or spontaneous gestures as well as symbolic of intentional gestures/communication, (Buck & Vanlear, 2002). Dogs respond to the motion of moving into a gesture and are sensitive to all visual cues from participants as well as other factors such as scent and auditory communication (Goodwin *et al.* 1997). These factors could not be recorded in this study, which may have encouraged active interaction.

Passive interactive results conclude that, the null hypothesis, which was that the percentages would not differ, can be rejected. The amount of passive interaction that could be accounted for by the participants' behaviour was significantly less with patients. The dogs spent the same amount of time trying to encourage interaction but when the patient did not respond they would remain passive near the patients, whereas with staff the dogs would move away in the majority of cases. This may tie in with the dogs' temperament in that the dog will not force interaction from a person which may be essential when working with people with phobias of dogs.

A study done on therapy dolphins showed that one female dolphin spent more time in the proximity of the sick patients rather than control/healthy humans. This could indicate that animals can distinguish a difference between humans in the same environment, however the patients had different medical conditions to the patients in this study (Brensing *et al.* 2003). In this study patients were elderly participants and the type of interaction by dolphin and dog towards humans is different. Dolphins are not domesticated animals.

Passive interaction and staff physically interactive behaviour can be positively correlated so dogs were more passive with increased physical interactive behaviour from the staff but there is no correlation between

passive behaviour and patient behaviour. Possible explanations are that the dogs are not used to the care staff and are just responding to behaviour as stimulus and response, the submissive wolf theory. Possible evidence that the dogs were more used to interacting with patients is that some dogs had specific behaviour patterns toward patients.

Dog nine's (24 days experience) behaviour pattern consisted of sniff feet or nuzzle- lick hand- tail wags-walk around- sits next to owner and patient. Dog seven's (24 days experience) behaviour pattern consisted of sniff patients-patient begins stroking-immediately sits aside the patients gaze averted-stays until stopped being stroked-walk around. Dog five's (72 days experience) behaviour pattern consisted of nuzzle or sniff-Stand towards and gaze at patient-Averts gaze-sits/stands aside the patients-lies down. Dog six's (90 days experience) behaviour pattern consisted of nuzzle-sniff-sit aside the patient while being stroked-when stopped being stroked gazed at patient-sniffed surroundings-lie down. There were no clear behaviour patterns observed towards the staff.

Dogs use approach to assess the temperament of a person (Call *et al.* 2003) and are able to predict their social tendencies (Cooper *et al.* 2003). The PAT dogs' had less opportunity to do so with the staff, which maybe one explanation too why the dogs had more of an instinctual approach towards the staff (the submissive wolf theory). Dogs have the ability to synchronize their behaviour with humans, which means that they have the ability to anticipate human behaviour and the dogs can change their behaviour to get the response they want (Kubinyi *et al.* 2003b). It may of just been a more simple process such as trial and error, which the dogs were able to associate a more passive approach to patients as more rewarding than towards the staff (Agnetta *et al.* 2000).

The dogs' maybe more attached to patients with consistent interactions, creating and maintaining relationships (Bokkers, 2006). Attachment is usually associated with dogs in an early sensitive period but it can occur over all ages, it is also a given that attachment takes frequent interaction to occur

(Gasci *et al.* 2001). The least experienced dogs ranged from ages of one to ten years and the 72 days experienced dogs had a similar range, indicating that dog can learn how to interact with the patients or could become attached from any age. The exact timeline for attachment bond to form requires further study.

It has been suggested that short interactive period compared to long have a higher cortisol level in the dogs linking to either stress or over excitement, but nothing conclusive to suggest that attachment can occur in short interactive periods (Haubenhofer & Kirchengust, 2006). Attachment hormones have been known to increase after interaction (Odendaal, 2000), but attachment level for each individual was not known, as hormone samples or history of the dogs personal interaction with the patients was not investigated.

On testing attachment it is usually done by testing a dogs reaction after separation from the handler and in general more attention seeking behaviour occurs towards the handler than a control person, suggesting the more physical handling the greater the attachment. Dogs will show active interactive behaviour towards the control person but more preference towards their handler (Gasci *et al.* 2001). However these experiments occurred in a relative short period of time on shelter dogs. PAT dogs have a greater frequency of short interaction and even though they did not get as much physical interaction from the patient they maybe getting other reward such as more communication from the owner. The dogs' have been able to adapt their behaviour; so the idea of more handling equals more attachment/attention-seeking behaviour may not be as set in stone in the Animal assisted activity situation as the tested situation of shelter dogs.

If more physical interaction the more attention seeking behaviour was the case then the dogs should of shown more of a preference towards the staff. It is possible therefore that the dogs get the basic fulfilment of *attengionis egens* from the staff and have no need to adapt their behaviour. These experiments also illustrate that a dog can tell the difference between control

person and handler, the question is can dogs generalize this knowledge and use it for other interactions/situations.

The dogs may have learnt to behave more passively through experience. Dogs have the ability to adapt their behaviour through observational learning (Adler & Adler, 1977) and with frequent interaction, the animals' behaviour does change in the fundamental form such as fear or anxiety around humans fades away (Bokkers, 2006). It has been suggested that this process is more than an associative one as the dogs calling on past experience have to apply it to a different situation, suggesting a higher cognitive process is involved in dogs' interactions towards people (Call *et al.* 2003; Cooper *et al.* 2003).

It is possible that owner behaviour encouraged dogs to remain with patients and this was a simple reward process that the dogs remain with the patient. Dogs' are sensitive to the attention state of people especially through gaze and they learn to associate these cues with a greater reward from the owner (Call *et al.* 2003). The dogs looked back at owners' during dog-patient interaction more than dog-staff interaction. The owners' behaviour could not be recorded due to recording method so it is unsure how much of an influence the owners were on the dogs' behaviour. Several studies of problem solving in dogs has suggested that dogs rely on cues from the owner when they are unsure of a situation as they know from experience that they will get the desired result from the owner (Topal *et al.* 2006a). Dogs learn from an early age and have a communication repertoire with their owner (Agnetta *et al.* 2000) so it would be difficult to know exactly what cues the dogs receive from the owner.

Evidence to further investigate the role of owners is that the dogs were looking back more to the owner during patient dog interaction. This maybe that the owner was giving off signals so that the dog would stay, or even that the dog is unsure of the patient because they are not responding to their active cues and is looking for a cue. The question to address would be if the staff behaved in a similar fashion to patients with the dog after the dog tried to encourage interaction, do the dogs' still look for visual cues from the

owner. The observer would need to record if the owners' signals encourage the dog to stay, or do the dogs look back as much to the owner with the staff if they behaved differently or would they move away from interaction. The owners' behaviour toward patients and staff is therefore possibly a contributing factor to how the dog conducts itself during patient and staff interactions. This would therefore possibly have an impact on the benefits the patients can receive from interacting with the PAT dog.

The dogs did spend more time away from staff than patients but it is unsure if this is because the owner would not encourage the dog to stay or do the dogs not have the motivation to interact with the staff. The dogs' motivation to interact with each person is possibly a key factor in the success of animal assisted activities. It is also possible that the dog may expect more physical interaction from the patients so consistency of the participants behaviour would need to be studied, this was difficult in this study as the staff and patients changed from one visit to the other. It is unclear what shapes a dogs behaviour it can be a combination of instinct, owner influence and learnt behaviour.

The possibility that the behaviour towards patients is learnt cannot be correlated from this study ,as the range of experience in dogs ranged from 24-360 visits and there was no significant difference in the amount of passive interaction the dog displayed. The breed and age are not believed to be a factor, as in other dog behaviour studies (Agnetta *et al.* 2000). The passive behaviour towards patients remains the same despite experience. An explanation could be that the dogs learn a certain behaviour pattern in the first few visits, this could be shaped by owners or by the dogs instinct and this is reinforced by the dogs getting treats each time the dog goes into the establishment. The first visits for a PAT dog could therefore be crucial for continuing future visits.

One difference that came up from difference in experience is that dogs' do become more interactive towards patients. Gazing at the patient especially improves with experience, gazing is a fundamental communicative cue to

begin interaction (Call *et al.* 2003). There was no correlation between the way the dogs behaved with staff and the dogs' experience. This could be because the dogs were not used to interacting with the staff, but experience tests show that they do not shape their behaviour dramatically overtime. It is possible that the dogs become more attached to the patient than the staff, which may explain why the dogs remain near the patient when the patient is not interacting.

Different breeds may be a significant variable, which may explain some of the experiences differences towards staff and patients. Future research should focus to confirm the hypothesis that dogs develop a behaviour pattern. Research method should be designed to follow a PAT dog from day one and see how many visits the dog takes to settle into a pattern. A suggestion to further investigate if the PAT dogs are able to distinguish the differences between staff and patients would be to arrange for the staff to behave in a similar fashion towards the dog as the patients and record the dogs' responses. The observations too note would be the influence of the owners' body language and if the dogs looked back at the owner more frequently, or would the dogs leave the interaction as in this study.

## **Chapter 6**

### **Conclusion**

In general the dogs do not behave differently towards patients and staff, however the dog responses to the patients' behaviour is different to how the dog responds to the staff behaviour. When a patient stops physically interacting the dog, the dog will spend the same amount of time trying to encourage interaction with the patient as much as they would encourage interaction with the staff. When the staff do not respond to the dogs active behaviour the dog would move away from interaction more quickly than the dogs would do with the patients. The dogs would remain in passive interaction with the patients or remain next to the patient. The reason for this is unclear from this study; the owner body language is one promising explanation for the difference in behaviour. Another explanation maybe that dogs become more attached to the patients than the staff.

To test attachment levels versus response to behaviour one possible method would be to arrange for the staff to behave in a similar fashion to the patients to test the response of the dog. Looking for behaviour cues from the owner more often or if they would just leave the interaction would be observed. The amount of time the dogs would look for behaviour cues from the owner when the participant does not respond would show the motivation the dog has for continuing interaction with the participant.

It is also possible that this pattern of passive behaviour is learnt in the first few visits and is reinforced by food and affection; that the dog remains in this pattern. This behaviour is not learnt over a longer time period, as there was no difference in experience, so future research should focus on when the dogs' behaviour becomes a pattern. In conclusion, the reason for which is unclear, however dogs behave differently when participants are not physically interactive after the dogs' attempt to encourage interaction. The dogs' will remain longer with the patient than the staff.

## Chapter 7

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## Appendix A: Resident Consent Form

**Project Title:** To investigate whether Pets As Therapy dogs show different behavioural responses towards care staff than towards patients

**Explanatory:** The 'PAT' dogs and the participant will be observed and recorded interacting for five minutes. The observation will take place on a normal, routine visit.

**I agree to take part in this study. The study has been explained to me and I have read the explanatory, which I may keep for my records. I understand that I have the right to discuss the project and ask any questions before giving my consent. I understand that in agreeing to participate that I am willing to:**

- Be observed while interacting with the 'PAT' dog
- To have my behaviour recorded by pencil and paper by the observer
- To have my sex and general description noted
- The data maybe reused for other projects with permission of Alison Reynolds (Research and training manager for 'Pets As Therapy')

### Data Protection

I understand that **any information I/the resident provides is confidential**, and that no information that could lead to my/their identification will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. I understand that I have the right to view a transcript of the data collected about me before it is published.

### Withdrawal from the project

I understand that **my/their participation is voluntary**, that I can choose not to participate in part or all of the project, and that **I/they can withdraw at any stage** of the project during or after observation without being penalised or disadvantaged in any way. The data collected will be handed over to me.

### Resident or carer of resident

Signature.....Date:.....

Participant has copy of consent form Y/N

Data sheet number-

## Appendix B: Pets As Therapy volunteer Consent Form

**Project Title:** To investigate whether Pets As Therapy dogs show different behavioural responses towards care staff than towards patients.

**Explanatory:** The 'PAT' dogs and the participant will be observed and recorded interacting for five minutes. The observation will take place on a normal, routine visit.

**I agree to take part in this study. The study has been explained to me and I have read the explanatory, which I may keep for my records. I understand that I have the right to discuss the project and ask any questions before giving my consent. I understand that in agreeing to participate that I am willing for my dog to:**

- Be observed while interacting with the patients and staff
- Have my dog's behaviour recorded by pencil and paper by the observer
- Have my dogs description and background noted
- The data maybe reused for other projects with permission of Alison Reynolds (Research and training manager for 'Pets As Therapy')

### Data Protection

I understand that any information I provide is confidential, and that no information that could lead to my identification will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. I understand that I have the right to view a transcript of the data collected about my dog or myself before it is published.

### Withdrawal from the project

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project during or after observation without being penalised or disadvantaged in any way. The data collected will be handed over to me.

Name: .....(please print)  
Signature: ..... Date: .....

Participant has copy of consent form Y/N

## Appendix C: Staff Personal Consent Form

**Project Title:** To investigate whether Pets As Therapy dogs show different behavioural responses towards care staff than towards patients

**Explanatory:** The 'PAT' dogs and the participant will be observed and recorded interacting for five minutes. The observation will take place on a normal, routine visit.

**I agree to take part in this study. The study has been explained to me and I have read the explanatory, which I may keep for my records. I understand that I have the right to discuss the project and ask any questions before giving my consent. I understand that in agreeing to participate that I am willing to:**

- Be observed while interacting with the 'PAT' dog
- To have my behaviour recorded by pencil and paper by the observer
- To have my sex and general description noted
- The data maybe reused for other projects with permission of Alison Reynolds (Research and training manager for 'Pets As Therapy')

### Data Protection

I understand that **any information I provide is confidential**, and that no information that could lead to my identification will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. I understand that I have the right to view a transcript of the data collected about me before it is published.

### Withdrawal from the project

I understand that **my participation is voluntary**, that I can choose not to participate in part or all of the project, and that **I can withdraw at any stage** of the project during or after observation without being penalised or disadvantaged in any way. The data collected will be handed over to me.

Name: .....(please print)  
Signature: .....Date: .....

Participant has copy of consent form Y/N

Data sheet number

## Appendix D: Recording Sheet

|                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| <b>Human Behaviour</b>    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Stroking                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| petting                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Talking                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Standing                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Crouched down             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Leaning over              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Feeding                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Hand out                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Dog Behaviour</b>      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Ears forward              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ears side                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ears slightly back        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ears side v shape         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>GAZING</b>             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| GAZE averted              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Head up towards</b>    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| head down towards         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| head level towards        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Look around               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Sit towards</b>        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Stand towards             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Walk around               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| lying down                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Aside Ac/N</b>         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Tail above</b>         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| tail level                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| tail hanging              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| tail between legs         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| tail wagging              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Licking lips</b>       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| licking nose              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Grooming self</b>      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| lick person               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Eating from ground</b> |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Eating from hand          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>Sniffing ground</b>    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| sniffing person           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| sniffing surroundings     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| <b>paw person</b>         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Whimper                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Roll over Ac/N            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Nuzzle                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Bark                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Woof                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |

