WHO ARE THE VETERINARY STUDENTS OF NEW ZEALAND? & DO THE DEMOGRAPHIC CHARACTERISTICS AND ATTITUDES OF VETERINARY STUDENTS INFLUENCE THE BEHAVIOUR OF DOGS?

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ABSTRACT

Internationally the veterinary profession has been enduring a period of change. There has been an increase in women, an increase in small animal practices and a diversification of skills required to be a successful veterinary professional.

This research attempts to answer several key questions raised by these changes: What is the demography, attitude, and experience of New Zealand veterinary students? Will any of these characteristics influence the behaviour of their canine patients?

The research was divided into two studies. Study one investigated the veterinary students attending Massey University in 1999. The questionnaire administered to 261 veterinary students found 66% of students were female, 75% had owned a dog, 86% are from New Zealand, 67% lived in suburban or urban areas and 31% had attended tertiary education prior to commencing the veterinary degree. Students in the later years of the degree were less likely to have had prior tertiary education. These figures demonstrate a clear shift in demographics of veterinary students that reflects international trends. In addition, the Pet Attitude Scale was modified to specifically measure veterinary students' attitudes to dogs. The average attitude towards dogs was positive, the range and distribution were normal. Females and dog owners had significantly more positive attitudes to dogs. No other variable had significant differences in attitudes towards dogs.

Study two looked at the influence of the demographic characteristics and attitudes of the veterinary students on the behaviour of dogs. The study consisted of a questionnaire and observation of a practical exercise. A golden retriever and a German shepherd were used for the practical exercise, all participants completed manoeuvres with both dogs. Aspects of the dogs' behaviour were used to calculate a submission result. The German shepherd had a significantly lower submission result than the golden retriever. The study found no significant differences in gender, attitude towards dogs, the participants' confidence in handling dogs, fear of unknown dogs, previous medical treatment for a dog bite, experience working with dogs or dog ownership when compared with the submission result. However, females did take significantly longer to complete the practical exercise.

There are implications to the veterinary profession given the greater percentage of females entering veterinary science in New Zealand. Females were found to have significantly more positive attitudes to dogs than males, but there were no significant differences in the dogs' behaviour either by gender or by attitude.

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I would like to acknowledge and personally thank the perseverance of my supervisor, Professor Kevin Stafford, for challenging my thinking, starting some interesting debates and for not losing sight of me.

To my parents, who have always encouraged me, who have read many a late night draft during my varsity years, and who ignited the flame of both my eagerness to learn and my love of the animal world inside of me – thank you.
Thank you also for giving me the genetic boost of stubbornness and the unwavering inability to quit anything before it's finished.

Mike: You came into my life at its darkest hour, a time when I was neither healthy nor capable of completing this. Thank you for giving me strength, for helping me see that no one has the power to control my life except for me. Without your support I could never have got remotivated after the traumatic events that occurred.

To all my family, two and four legged, and my friends, thank you for your support. I acknowledge with heart-felt thanks, that it is only through the support of many people that I have taken the hard road and returned to finish this piece of work.

DON'T QUIT WHEN THE TIDE IS LOWEST,
FOR IT'S JUST ABOUT TO TURN;
DON'T QUIT OVER DOUBTS AND QUESTIONS,
FOR THERE'S SOMETHING YOU MAY LEARN.

DON'T QUIT WHEN THE NIGHT IS DARKEST,
FOR IT'S JUST A WHILE 'TILL DAWN;
DON'T QUIT WHEN YOU'VE RUN THE FURTHEST,
FOR THE RACE IS ALMOST WON.

DON'T QUIT WHEN THE HILL IS STEEPEST,
FOR YOUR GOAL IS ALMOST NIGH;
DON'T QUIT, FOR YOU'RE NOT A FAILURE,
UNTIL YOU FAIL TO TRY.
JILL WOLF

DEDICATION

I dedicate this work

To Lacey,

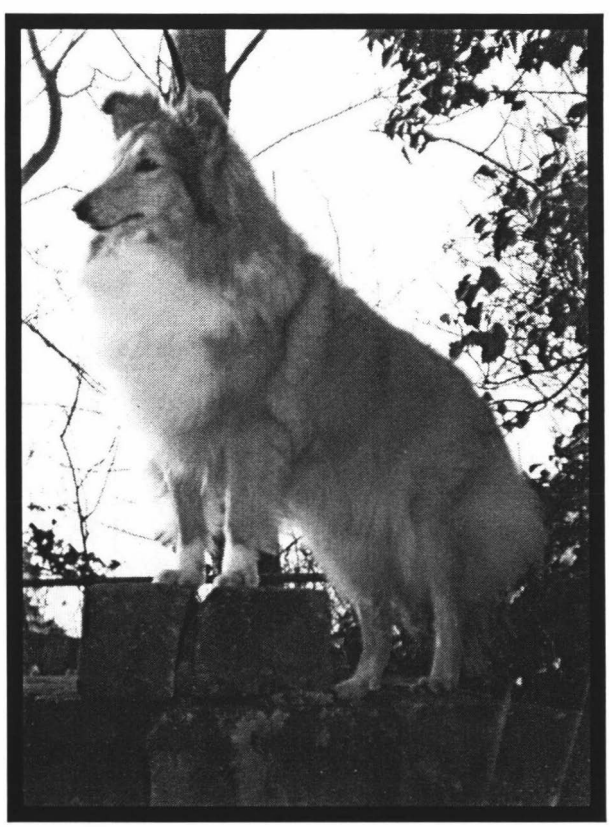
A much loved and missed friend,

And a symbol

Of all those that love and support me

And who remind me

What is important in this life.



The Power Of The Dog
by Rudyard Kipling

There is sorrow enough in the natural way
From men and women to fill our day;
And when we are certain of sorrow in store,
Why do we always arrange for more?
Brothers and Sisters, I bid you beware
Of giving your heart to a dog to tear.

Buy a pup and your money will buy
Love unflinching that cannot lie-
Perfect passion and worship fed
By a kick in the ribs or a pat on the head.
Nevertheless it is hardly fair
To risk your heart for a dog to tear.

When the fourteen years which Nature permits
Are closing in asthma, or tumour, or fits,
And the vet's unspoken prescription runs
To lethal chambers or loaded guns,
Then you will find-it's your own affair-
But...you've given your heart for a dog to tear.

When the body that lived at your single will,
With its whimper of welcome, is stilled (how still!);
When the spirit that answered your every mood
Is gone-wherever it goes-for good,
You will discover how much you care,
And will give your heart for the dog to tear.

We've sorrow enough in the natural way,
When it comes to burying Christian clay.
Our loves are not given, but only lent,
At compound interest of cent per cent.
Though it is not always the case, I believe,
That the longer we've kept 'em, the more do we grieve:
For, when debts are payable, right or wrong,
A short-time loan is as bad as a long-
So why in Heaven (before we are there)
Should we give our hearts to a dog to tear?

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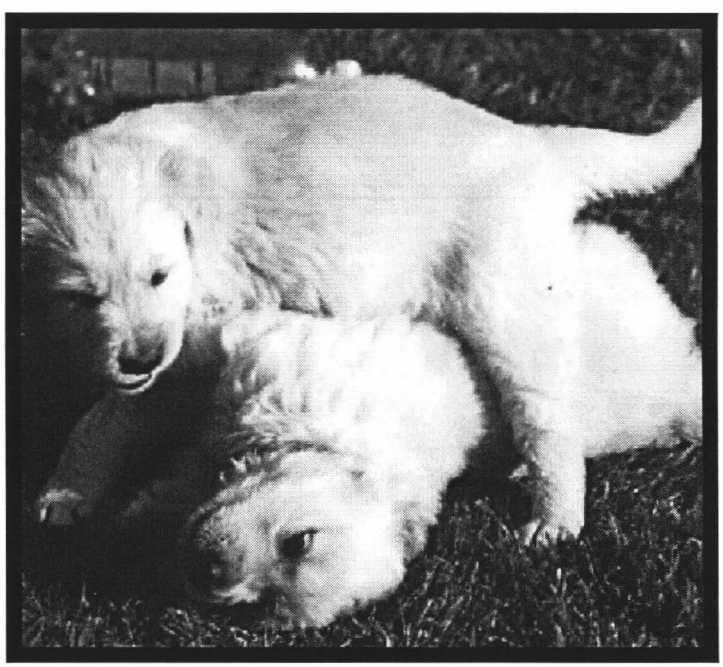


ALL THINGS BRIGHT AND BEAUTIFUL
ALL CREATURES GREAT AND SMALL
ALL THINGS WISE AND WONDERFUL:
THE LORD GOD MADE THEM ALL.
CECIL ALEXANDER

1.1. Veterinary students and the veterinary profession

The veterinary profession has been seen as a male-dominated profession in the past. It has carried prestige and community respect similar to medical doctors and other professionals. Over the past two decades, there have been great changes in the demographic makeup of all professions. In New Zealand, females have entered the professional occupations in great numbers, to the point that there are now as many women as there are men (Statistics New Zealand, 2001a; 2001b).

There have been many reasons postulated for the great increase of women in the veterinary profession, apart from the general influx of woman into tertiary education. The most compelling is that veterinary practice has moved away from large animal and production animals. There are greater numbers of small animal practices and companion animal medicine may appeal to the female "nurturing" nature more. In the eyes of the city person, this has allowed the profession to be seen as more "caring". This explanation is somewhat controversial, as there have been women doing this job for decades, and doing it well. Nevertheless, it is now seen as a profession for younger women whose backgrounds may formerly have precluded consideration of veterinary science as a career.

In the 1980s there was an increase in the number of small animal practices (Jones, 2002; Kelly, 1983). A study conducted in 1989 by Boland and Morris found that at that time, 38% of veterinarians worked in large animal practices, 31% were in mixed practices and 31% in small animal practices. Across all three types of veterinarians, cats and dogs took the largest number of hours per person - 1092 hours per year. Dairy cattle were second with 438 hours, and horses were third with 302 hours. They found that female veterinarians spent a greater proportion of their time working with cats and dogs, and males spent more time with horses. This study notes the changing demographic makeup of the profession, and the forms of veterinary work being carried out in New Zealand. Using data from the annual applications for practising certificates in 1985, Boland and Morris (1988) showed that 18% of registered veterinarians were female. The mean age was 38 years but the mean age of males was 42 years and of females, 32

years. Clinical practice accounted for 70%, government 22%, university 5% and industry 3% of veterinarians in practice.

Some of the interesting research conducted across the Tasman, in Australia, may give an indication and base for the profession in New Zealand. Heath (2002) discussed the findings of a longitudinal study of veterinarians from entry to a veterinary course to ten years after graduation. We must bear in mind that New Zealand only began teaching veterinary students in 1964, prior to that New Zealand veterinarians often trained in Australia (Jones, 2002). Heath found that of those who started in 1985, only 54% of the participants would definitely go back and "do it over again". Heath also found that 42% of these veterinarians were working less than half time. A number of reasons were given for this, including child rearing, long hours, negative attitudes of clients and bosses, low remuneration and some concern about ethical practices by others in the profession.

Heath (2002) found that 80% of graduates were working in a veterinary practice after ten years of the longitudinal study. The majority were spread across small animal practice 40% and 18% in mixed practices. There were greater numbers of women in both areas. Further findings by Heath included the prediction by students at the time of entering study, of their future career paths. The research showed that although students' predictions were somewhat accurate for the first year after graduating, there was little significance at the five-year mark.

Heath (2001) looked at the background of students. If they had grown up on farms for a minimum of two years where animals were used for production, they showed a greater chance of working in mixed practice after five years, compared with students who had not - 83% to 55%. This was lost at the ten-year mark when only 38% of the veterinarians who were working in mixed practices had grown up on farms with animals.

Heath (2002) looked at the proportion of time spent by the participants with different species. Of those who were working as veterinarians, 75% worked with dogs. For more than 50% of the participants, dogs made up more than 90% of their work. No other species is seen by so many working veterinarians in Australia. Some veterinarians

would prefer not to do as much work with dogs, and would prefer to do more with other species.

In research done by Heath in 1997, it was seen that when comparing first-year veterinary students from 1985 and 1986 to 1995 and 1996, there were some changes. There was a marked decrease in males, from 50% to 38% in 1996. In 1985, 76% were under 18 years. In 1996, this was only 55%. Similarly, those who had previously studied for another degree increased from 23% to 60% in 1996. There were a similar number of students from farms or farming towns, but fewer males, 34% had gone down to 27% of males from farms or farming towns.

The study also looked at the country of birth of the students' parents. The majority were Australian born in both 1985 and 1995 when more than 75% of all mothers and fathers were Australian. In 1985, the second significant country of birth for parents was the UK, when 12% of fathers and 15% of mothers were UK born. This was still the case in 1995 but to a much lesser degree - 8% fathers and 4% mothers. There was a marked increase in the number of students with parents born in Asia, up from 1% of fathers and mothers in 1985 to 3% of fathers and 5% mothers in 1995.

Miller (1998) analysing the increase in women in the veterinary profession in America found there had been an increase from 9.5% female veterinarians in 1980, to 28.7% in 1994, and an expectation that by 2004 the percentage would be 50%. The number of women graduating in veterinary medicine in 1992 was 59% and in 1993 it was 61%. Miller also noted the disparity in pay between men and women - a difference of 4.43%. It was noted that, despite veterinarians' salary being low for the qualifications needed, it had not increased as much as medical salaries, a finding confirmed by Ilgen et al. (2003).

Jackson et al. (2004) found that in New Zealand, males were also better paid than females. In veterinary practices there were twice as many males as females working. Harris (1980) noted that remuneration was not rated as highly as interest in the job and personal freedom.

Miller (1998) offered a number of possible reasons for the feminisation of the profession. These included the lack of salary increases putting males off, the stereotyped selection of women for a more empathic role, especially with grieving clients, and that practices would hire women over men due to their lower salary (Miller, 1998; Kogan, 2004). Furthermore there is the issue of gender distribution and that male and female students may require different standards to succeed (Kogan, 2004). The veterinary profession, like many professions, requires a large number of skills, but these can be divided into a number of categories. These categories are technical and professional skills. Technical skills are those requiring specialised knowledge such as surgery and diagnosis. Professional skills are those such as time management and client support.

There are differences in expectations across veterinary students, these effect what each student considers to be career successes (Kogan, 2004). Female students from all years had greater expectations of what a successful veterinary student was and what made a successful veterinary professional than males (Kogan, 2004). Women have a high expectation for success, and what would make them successful. This may be based on the notion that women feel they have to prove themselves and do better than male counterparts to be recognised at the same level (Kogan, 2004).

These expectations possibly explain the much greater risk female veterinarians have of psychological distress and physical illness. Just as in the medical profession, there is a need to prevent unrealistic expectations arising so as to prevent some of the emotional impairment experienced by the trainees (Coombs et al., 1990). The medical profession exhibits high rates of depression, alcohol and drug abuse and suicide. In the veterinary profession, females have been found to have greater levels of psychological distress (Kogan, 2001; 2004). A possible reason for this is the high expectations placed on themselves. Gender differences are also seen when looking at the reasons why students enter the field veterinary. Ilgen et al. (2003) looked at the reasons why students chose veterinary medicine. Females were found to be influenced by having owned a pet or horse, and men were more influenced by the status of the career and the educational toughness. When students who did not enter into the veterinary programme were asked why they didn't, responses included the hours being too long, the low pay, extended

length of tertiary education, a wish to work in an area that gives greater benefit to humans and within which they could gain more prestige (Ilgen et al., 2003).

In New Zealand, job satisfaction was seen to depend on the individual's ability to satisfy their needs either through their job or external factors such as family, leisure and non-job-related activities. Certain areas of veterinary work such as working at MAF's meat division were seen to have low job satisfaction (Shouksmith and Hesketh, 1986).

The study of veterinary medicine requires some hardened attitudes and the ability to distance oneself from the animals that one is working with or on (Shurtleff, 1983). A study conducted in the USA showed veterinary students did not exhibit the expected increases in moral development through their years of study when compared to other post-graduate students (veterinary medicine is a post-graduate course in America) (Self et al., 1991). The attitude of students has also been seen to harden in regard to animal welfare. Paul and Podberscek (2000) split the idea into an empathy for animals and a cognitive understanding of sentience – the ability to "feel" pain - and asked about dogs, cats, cows and pigs. There was a significant change in the sentience students attributed to all the animals except pigs. They attributed less in the later years of the veterinary course. The empathy to the animals was not seen to change, but there was a significant difference between the men and women, with the women showing more empathy with all the animals.

Veterinarians are also expected to see the animal-human bond in others, and deal effectively with the consequences of this when they are treating animals. Owners are often strongly attached to their animals, and the veterinarians need not only show empathy to the patient but to the client as well. Adams et al. (2004) explained the need stated by students and veterinary professionals that they needed more training in the human-animal bond, and 99% of students across all the years of study were concerned about their ability to use human relationship skills when they became veterinary professionals.

In the companion animal practice, there is a great need to understand the human-animal bond. Often the specific components relate more to the veterinarian dealing with the owner of the pet, rather than their relationship with the animal. The study by Shaw et

al. (2004) showed that within a general appointment at a veterinary practice the veterinarian contributed to 62% of the conversation time and the client contributed 38%. Of the veterinarian's contributions 54% of it was interacting with the owner and 8% with the pet. Forty-eight percent of the time spent talking to the owner was the veterinarian educating and counselling the owner and 30% was purely relationship building. The success of the veterinarian is reflected in their abilities with these non-technical areas of their profession.

The KPMG study of "the current and future market for veterinarians and veterinary medical services in the United States" (Brown and Silverman, 1999) and the Brekkee Management and Behavioural (Cron et al., 2000) study looked at where the profession is going and what the profession needs to look at to ensure students have the attributes required to succeed.

Lewis and Klausner (2003) discuss the non-technical competences that underlie a successful veterinary professional. These include business ability, ability to change with the times, managing people, monitoring their work-life balance and satisfying clients. Many veterinarians in this study saw changing client expectations as a major challenge. Satisfaction of clients was raised by those in the private practice environment, and also by veterinarians working in government, academia and industry. Lewis and Klausner go as far as to suggest testing the personality of applicants to veterinary schools to aid in the selection of students who have the ability to deal with the non-technical aspects. These aspects are more difficult to learn and often include the human relationship side of the profession. Lloyd and King (2004) looked at veterinary schools and colleges to see if there had been any changes in the curriculum since the numerous studies that looked at non-technical components to the veterinary profession. It was seen that there were changes occurring to include set courses given in tandem to the technical skill courses. These were aimed to teach the business and interpersonal attributes required by veterinary students in the work place.

Greenfield et al. (2004) asked small animal practices what was important for the veterinary curriculum. They asked what was expected of the new graduate in the veterinary practice. They also found that the skills required by the practices taking on new graduates could be grouped into knowledge (technical) and skills (non-technical).

Concern was expressed about the students' lack of exposure to the general small animal practice requirements, the non-technical skills.

Veterinary students have been studied for their abilities to succeed in their profession. Veterinary professionals not only have to work with the animals they have been trained to give medical assistance to, but they also have to work with the owners of these animals and general society.

In New Zealand, Fay and Bell (1988) found that veterinarians viewed their clients as becoming more demanding and less loyal, compared to the very high level of loyalty expressed in the past. There was an agreed need for increased business acumen requiring a stricter financial focus but 60% of the vets looked to their colleagues in a collegial manner rather than as competitors. Variations in fees, time spent with the client and fee collection methods are seen by the clients as signs of the increased aggressive business behaviours of veterinarians, and can lead to unhappy clients that may then move to other veterinary practices (Fay and Bell, 1988).

1.2. The human – dog dynamic

1.2.1. Domestication and the use of dogs

The wolf, *Canis lupus,* was domesticated and became the domestic dog, *Canis familaris.* Human attitudes to wolves, wild dogs, feral dogs and owned dogs have changed over time. The dog has played many roles in human society; as friend, as worker, as foe and attitudes have changed with this. Dogs have worked as guard dogs, waste removers and the pups have been companions, used for entertainment, or as objects to nurture. In addition, they have been used as gun dogs, working dogs, service dogs, family pets, companions, therapy dog, fighting dogs, racing dogs, symbols of authority and as ornaments of beauty (Serpell, 1995; Fox, 1978).

With every owner-dog relationship, there are specific roles occupied by the dog and the owner. These roles are associated with attitudes based on the owner's evaluation of the dog and/or his or her feelings towards the dog. The behaviours of the dog, its use and associated value influence humans' attitude formation.

Humans have selected the domesticated dog for different roles and functions. These include the small and aesthetically pleasing look of a lapdog, the highly intelligent and energetic sheep dog, and the large, menacing and territorial guard dog. For each function, different breeds have been produced with the physical form and behaviour that enable them to carry out their roles in the best possible way. In different countries breeds have been developed to undertake similar functions, but with differences in physical characteristics due to the environment in which they have been bred. For example, the Lhasa Apso was a guard dog of the Tibetan monasteries. These dogs had to survive at high altitudes. They evolved through selected breeding and survival to have large rib cages with large lungs, but also to be of small size.

In wealthy societies the dogs' role has changed greatly over the last century. Two hundred years ago, few dogs were allowed into houses. Today the primary function of many dogs is to be a family pet and companion, and their roles of guarding or retrieving game are secondary. Today we support dogs that are not necessary for our survival and the dog's major benefit to humans is seen as increasing our general wellbeing (Corson

and Corson, 1981; Serpell, 1991). This major change in the role of the dog within our society has influenced and changed our attitudes towards dogs. Once humans saw the dog as something to be kept at a distance, but now it is welcomed into our homes.

It has been postulated that five groups of dogs cover the phylogenetic sequence of domestication.

- The first group comprises village dogs and scavengers that adapt to village life. The dog's behaviour benefits humans by cleaning up our mess.
- The second group includes dogs that guard livestock and the dogs that hunt. These dogs have acquired specific behaviours that help humans to survive.
- Thirdly, sled dogs have unique morphology and behaviours that enable them to work in environments and conditions where humans are not able to easily. Their reward is food and shelter from humans.
- Herding and gun dogs have sets of innate motor patterns that have been selected over generations to aid humans. Different to sled dogs, as these activities could be achieved by humans, unlike sled pulling.
- The last group comprises household dogs selected for pet or companion qualities (Coppinger and Coppinger, 1998).

From each group to the next there is more willingness of the dog to accept the human social environment rather than the canine. With each step, there is more reliance by the dog on the human for survival and the human has selected more specific behavioural and physical traits.

A difficulty with this idea is that in today's society most dogs fit more than one group, and even in the past, a sled dog would also guard and scavenge. It is an appropriate set of groupings if you look at them as a continuum that the dog has progressed along. In the past, the animal that scavenged was seen as lowly and "dirty", and not befitting human affection, and possibly a threat to human health. Now the dog is seen more for its ability to help and add to our lives. Despite a person's general positive attitude to dogs, a small number of dogs may induce caution or fear contrary to the human's attitude due to physical or behavioural traits. This is often seen when the role of the dog is threatening to humans, such as a guard dog.

Humans have put dogs to work in many different ways. These functions have changed over the years since they were domesticated, but some functions still resemble those of the first domestic dogs. There have been many influences on the breeding of dogs, from science to society, all of which have left an impression on the physical and behavioural form and expected function of the dogs we see today.

The phenotype or "form" is the physical appearance or behavioural expression of the dog. Form encompasses morphological, physiological and behavioural characteristics. Form is what the dog is and does. Form can be changed by human and environmental influences on the selection of specific genes.

In contrast, the function of the dog involves the abstract, the purpose or role of the dog. On the basic level, the function of any animal is to live and reproduce. The ancestral dog was a scavenger around the early human tribe. Its function was to remove waste. The dog developed into a guard dog. Its purpose was to guard the tribe, for which it may have been rewarded by left-over food. The dog came into the tribe as a companion, perhaps by way of a young pup to a child or a childless mother. Its role was to be a substitute for the nurturing behaviours of humans. Its function was to be a companion (Clutton-Brock 1995).

The domestic dog has many shapes and sizes and exhibits many different behaviours. Each breed fulfils a function, and these require different physical and behavioural forms. These forms have been selected for over generations by humans and by natural selection.

The golden retriever was bred over time to work as a retrieving gun dog; the British bulldog as a fighting dog; the Border collie as a working dog; the Pekingese as a lapdog. In different countries, different breeds were bred by the selection for traits that provided the form that could best produce the desired function. Dogs became specialised to particular roles in human society. The domestic dog no longer had its own social environment, but was included in the social environment of humans (Fox, 1992). Today, new breeds are rarely produced, but the functions of the existing breeds do change.

Many dog breeds are found all over the world. New Zealand has imported many breeds, but there is also the New Zealand Huntaway that has been bred specifically to work in the New Zealand high country. The national kennel clubs of each country hold sets of breed standards for each breed. These breed standards are based on what the dog was originally bred to do. Breeds have been bred to cope, survive and serve in the environment of the country in which they were bred. A dog may not have the same function in a new country. For example, in a new country a gundog may have different game to carry and may hunt in a different habitat.

Humans will select new behaviours within a breed to prepare it for a new role. An example of this is the golden retrievers now selected and trained as a search-and-rescue dogs looking for humans. Another example is the Labrador retriever, bred to retrieve and work closely with humans, these dogs are now selected and bred for dependable guide dogs for the blind (Fox, 1992).

1.2.2. Communication

The dog is a social animal. This has an effect on the interactions within the species and between it and other species. There is benefit to the dog in recognising emotional states of other pack members to keep social relationships stable. These states are exhibited in extensive and elaborate displays, and also by subtle signs (Serpell, 1983; O'Farrell, 1989).

Dogs use their sense of smell to communicate (Fogle, 1990). Dogs have an extremely capable sense of smell and the olfactory membranes in their nose is 14 times larger than that of a human and a much larger area of the brain is used to process olfactory information. Dogs use olfactory signals 'pheromones' when a bitch is coming into season and when marking territory (Scott, 1967; Fogle, 1990). Olfactory signals, left for other dogs to pick up later, are a very effective form of communicating territory, and the position where the scent is left also affects the message that is communicated to future visitors to the area (Fox, 1971). These communications may also communicate emotional stress or fear of danger to con-specifics (Fox and Cohen, 1977). Communication takes place over a number of different sensory perceptions simultaneously (Levinson, 1983).

Dogs have better peripheral vision but less binocular vision than humans (Fogle, 1990). Sight plays a lesser role in dog communication than scent but some important messages are shown by body language (Scott, 1967). Dominant and submissive behaviours are used to demonstrate hierarchical order within a pack (Kleiman, 1967). Expressions of dominance include behaviours such as the raising of hackles, growling and elevated position in comparison to another (Fogle, 1990; Creel et al., 1997). Submission behaviours include licking of another's mouth, rolling over and exposing the stomach and throat and generally lowered posture in relation to another (Fogle, 1990). Young wild dogs employ more active dominant behaviours than older dogs (Deoilliers et al., 1997).

A dominant dog may react to a human by raising hackles, baring of teeth, or it may behave more subtly with its tail carried high above the back. This might be seen as a

lack of control by a human has over a dog; the dog may pull at the lead; walk in front of the handler as if taking the direction; the dog may jump on or hump the handler (O'Farrell, 1989).

Submissive behaviours of a dog may be exhibited similarly to a human as to another dog. The dog may lick at the handler; have a lower body posture or even roll over and urinate; the dog may lower the tail or in an extreme case have the tail clamped under the body. The submissive dog will look to the human for reassurance of allowed behaviours as pack members look to their leader, or more dominant member, for guidance.

The canine uses vocal communication, but not to the extent as humans. A dog may bark, howl, growl or whimper as forms of communication. Howling allows for information to be passed over great distances, and growling allows the rest of the body to be in position for a fight response. Whimpering of the young allows the mother to distinguish the needs of her pups. In most circumstances, vocal communication is not used by dogs on its own and it has limited uses as a means of communication in the pack or home.

When dogs are fearful, they may display submissive behaviours. Dogs have an ability to pick up fear in other animals by the chemical and visual signals displayed by that animal (Pruitt and Burghardt, 1977; Lorenz and Leyhausen, 1973). These may be in the form of general olfactory signals or pheromones. It is said that dogs can pick up such signals from humans, and anecdotally that they can pick up on human moods. The use of the olfactory system by the dog may be due to the human autonomic nervous system response to fear, which includes an increase in sweat gland activity. In response to emotional stress and sexual stimulation, the apocrine sweat glands release secretions through hair follicles that may be detectable to other animals and that may indicate the intensity of the emotion (Memmler et al., 1992; Thompson, 1988). It is more likely that dogs pick up on the minute changes in behaviours by the human in combination with any changed olfactory signals (Curio, 1976).

Agnetta, Hare and Tomasello (2000) found that domestic dogs have the ability to take cues from humans as to the location of hidden food. The cues were gaze, head turning

and pointing. The ability is not learnt from extended human contact and Hare et al. (2002) suggested that it is social cognation, selected for during domestication. When a similar study was done with Arctic wolves, they were not able to follow the cues to find the hidden food. When domestic dogs' responses are compared to chimpanzees', one of the humans' closest relations, the domestic dog was more successful at taking guidance to find the food from the human cues than the chimp (Agnetta et al., 2000).

Humans react to situations in both a conscious and a subconscious manner. Fear evokes an instinctive and primal response to fight or flight (Sato, 2004). The body's sympathetic systems ability to react in times of need, sometimes before the conscious existence of fear is recognised (Marosi et al., 2004). Adrenalin is pumped round the body, the heart rate increases and the supply of blood to the motor system is increased. As humans we can observe some of these behaviours and the physiological changes in other humans on close examination. Many of our emotions are exhibited by way of subtle changes in our facial expressions and behavioural mannerisms (Ekman, 1972). Our companion animals can probably read these signs and they may pick up on different cues than we do. There is benefit to the dog in picking up on emotions, such as happiness or anger. Dogs that spend a lot of time in the presence of humans and witness many emotions, may experience some classical conditioning due to the human's reactions during different emotional states. The physiological response of humans to fear is very similar to that experienced by dogs (Fox, 1971; O'Farrell, 1989).

Humans use verbal language as our main form of communication with body language backing up the words spoken. Do dogs sense the confidence or fear of an individual human? This is an interesting question for the veterinary profession. Vets handle dogs in situations of extreme stress for the dogs and their human owners. Dogs may pick up on the emotions of the handlers. These may be influenced by the attitudes and past experiences of the handlers. Is there a way to find out if, and then what, the dog is "reading" the vet? Is there a way to select or train vet students so that dogs will be easier to handle in their professional life? A docile, co-operative or submissive dog is easier to handle in a veterinary practice. Does the vet communicate any unseen information to the dog about his or her attitude to dogs, and is this seen to affect the dog's behaviours towards the human? This research attempts to answer these questions.

1.2.3. Human – Dog Relations

We use affective responses to determine attitude. This is the evaluation of, and feelings toward, the object, in this case the dog. Cognitive responses are measured by looking at beliefs about dogs, and conative behavioural responses are measured by the observed actions toward dogs (Corsini, 1994). Affective responses are now used because of the development of scientific experimentation methods. The two latter methods of measuring attitude allow for significant bias, either from the participant with the cognitive responses, as we are asking how they "might" react in a situation, without actually being in it. Measuring conative responses is open to researcher bias, as the researcher is observing the actions of the participant and attempting to limit them to a single source, i.e. attitude. This method looks at the external response to an object or environment and tries to piece together a single internal cause. Measuring affective responses allows participants to express their feelings and beliefs about the object, in this case the dog, without either having to be in the situation as with conative responses, and without having to put themselves in a hypothetical situation. Affective response measurements allow the researcher to decide what information is relevant to attitude, by use of past experiments looking at reliability and validity.

Attitudes are formed from many influences and not all are formed from personal experiences. Some are formed from observations or the influence of others on our beliefs and expectations. Attitudes can form from, or be influenced by, such things as culture, generation, social roles, laws, mass media, institutions, schools, parents and family, peers, reference groups and direct experience (Ramachandran, 1994). Such of these influences will affect attitude formation towards dogs (Herzog and Burghardt, 1988). Some breeds, which resemble wolves, induce fear and a negative attitude due to the terror the wolves caused among some communities of people. The media, family and peer groups pass these attitudes on. People may have different attitudes towards dogs with different physical or behavioural characteristics, such as a general negative attitude to pit bull terriers. Such a negative attitude to specific breeds may be formed by personal experiences, or those of others.

Dogs have been used as a source of food and in these circumstances, it is a production animal and may evoke a general attitude similar to that we have to livestock. Humans

have used dogs as a sacrifice, which suggests that dogs are important enough to be gifts to the gods (Serpell, 1995). In recent years a positive attitude towards dogs may develop in people isolated from society for physical or social reasons.

Investigations into peoples' attitudes towards pets have measured attitude in a variety of ways and in conjunction with a variety of other psychological tests. For example, a study done by Kidd and Kidd (1989) looked at the factors influencing adults' attitudes toward pets. Kidd and Kidd looked at attitude and attachment to pets using the Pet Attitude Inventory on 900 adults and the effects of present pet ownership, non-pet ownership, childhood pet ownership or non-childhood pet ownership, sex and family size. Kidd and Kidd found there is greater attachment to pets by pet owners or childhood pet owners than that of non-pet owners. Current pet owners were shown to have owned more pets in childhood. Candidates that were single, female, or without children showed significantly more attachment than married candidates, males or parents respectively. Kidd and Kidd (1990) also used the Pet Attitude Inventory to look at factors in children's attitudes toward pets. They found that where parents showed strong attachments to pets and lived in pet-owning homes, children scored higher scores on activities and interest in pets than children with parents who were weakly attached to pets and non-pet owning homes. Children in one-parent homes, full-time working mothers and girls in pet-owning homes showed higher scores in responsibility. Boys scored higher on interest and girls were seen to score higher on activities. Previous work done by Kidd and Kidd (1985) showed that children have an overall positive attitude toward pets. This was seen by the responses of the children to owning or wanting to own a pet. The results showed that 90% of the children currently owned a pet but 99.3% wanted to own a pet.

Differences in attitude exist between countries, even in specific areas such as veterinary medicine. Kogure and Yamazaki (1990) investigated the attitudes to animal euthanasia in Japan, and in doing so compared Japanese and British veterinarians. They used questionnaires on pet loss and human emotions to look at these attitudes. They found that 44% of Japanese vets would put a healthy animal down at the owner's request, whereas 74% of United Kingdom vets would do so. They concluded that this difference in attitude was due to historical influences such as early Japanese worship and the Shinto attitude toward death.

Research has looked into the connection between loneliness and attitudes toward pets. Moroi (1984) used the UCLA loneliness scale, the Pet Attitude Scale (PAS) and a college life questionnaire to over 300 undergraduates at two universities in Japan. It found that loneliness was significantly related to various aspects of college life. The PAS is known by factor analysis in this research to have three factors: of affection, interaction and pets in the home. Moroi found there was a negative correlation between loneliness and affection, and also with pets in the home, but a positive correlation with interaction factor scores.

O'Farrell (1997) has investigated owner attitudes and dog behaviour problems. O'Farrell suggests attitudes of the owner better looked at by an investigation of owner's personality. O'Farrell saw the owner's attachment to pets as a complex issue but there was an association between dominance aggression in the dog and the anthropomorphic ideas and behaviour of the owner. The investigation also showed there was an association between over-excitement in the dog and anxiety in the owner.

Research by Stubbs and Cook (1999) showed that those participants that strongly disliked dogs had a more obsessive and anal character than those that did like dogs. People that liked dogs were found to have greater empathy and less difficulty relating to people.

Retrospective studies have been used in an effort to predict adult pet attitudes or to understand the reasons for them. Paresky et al. (1988) investigated young children's companion animal bonding and adults' pet attitudes as a retrospective study. One hundred and eighty-eight 14-49-year-old people completed measures of pet ownership, childhood and adult pet bonding and attitudes toward pets. Paresky et al. found that attitudes to pets were related to the age participants had their first pet and the bonds they formed with their most important pet. Adult attitudes were positively correlated with retrospective childhood animal bonding scores. The greater positive attitude scores were seen for those who had their first pet younger than six years of age and least positive for those who had their first pet after ten years of age.

In addition to personal experiences, parents and family can influence attitude formation. Schenk et al. (1994) investigated the effects of parents' pet attitudes on those of their children. The Pet Attitude Scale and family environment scores were taken by Schenk et al. along with life experiences regarding animals. One hundred and fifteen adolescents, 64 fathers and 78 mothers participated. Correlations between adolescents and their parents supported the hypothesis that similar pet attitudes would be apparent. Daughters were more highly correlated with the parents' pet attitude scores than sons. Those with positive attitudes toward pets had more permissive family environments, lived in homes with pets and were more likely to have been bitten by a pet. The latter was a product of having more pets in the home and this meant they were more likely to approach other animals.

1.2.4. Human – Livestock and Poultry

There are a number of studies that look at the effects of human attitudes, behaviours and other attributes in relation to production animals. Much of this is due to the requirements of animal welfare legislation. Also, the quality of the meat and production is negatively affected by an increase in the animals' stress levels. Stress, often induced by fear, increases the production of cortisol steroids, which affects meat quality and reproduction in production animals.

A relationship has been established between a person's attitude to pigs and their observed behaviour towards the pigs when working with them. Stockpersons' behaviours have a direct effect on growth and reproduction in pigs due to the intense interactions between them. The study by Coleman et al. (1998) looked at attitude, job satisfaction, empathy and job knowledge. It was found that attitude was the most consistent predictor of the stockperson's behaviour to pigs. It was noted that in this study, there was a very low percentage of women, thus limiting the conclusions drawn. It was also found that empathy was correlated with other job related variables. From observation of pigs' behaviour, pigs were found to generalise interactions from one handler to other handlers when exposed to handlers with differing technique and experience (Hemsworth et al., 1994a and 1994b). Hemsworth et al. (1994a and 1986) found that by modifying the stockperson's attitude and improving their handling behaviours by an intervention, there was a significant reduction in fear by the pigs towards humans.

Looking at the relationship of humans and layer hens, the behavioural responses of commercial laying hens shows there is a generalisation to human attributes. Layer hens were observed showing a fear response to experimenters in novel clothing. Barnett et al. (1993) found that when variables such as gender, height, clothing and spectacles were tested, the only changes in behaviour were towards experimenters in overalls, a novel form of clothing used for hens.

1.3. Attitudes

Our ability to determine attitudes towards the dog is complicated due to the hypothetical nature of attitude itself.

1.3.1. What are attitudes?

Attitude theory looks at the history and the conceptual properties of attitudes and attitude measurement. Attitude theory also incorporates an analysis of the formation and strength of attitudes and the similarities and consequences of attitudes. These ideas are important to define and understand, and to allow us to interpret the existing research about the interaction of humans and dogs. The effects attitude has on the relationship between humans and dogs may also help to explain some interactions.

Attitudes have played a central role in social psychology as an explanation of social behaviour. Attitudes are defined as a predisposition to respond in a favourable or unfavourable way to something from the environment, an object, a person, or an event.

Attitude is a hypothetical construct, i.e. it is unobservable. The only way to measure attitude is to measure responses - positive and negative - to the attitude object. There are three categories of responses:

a) cognitive responses or beliefs which show the individual's perception and information about the object;
b) affective responses which include evaluations and feelings toward the object;
c) conative responses which show behavioural intentions, tendencies and actions toward or with regard to the object.

These are explained further with the following examples of a person's response towards dogs. The cognitive response shows the person's attitude can be inferred from stereotyped beliefs (whether true or biased) that attribute certain traits, behaviours and actions to dogs. Perhaps they believe all dogs are aggressive due to media information about dogs attacking humans. Or from an affective response, such as expressing a general like or dislike of dogs, which can be based on experience or personal fulfilment from interactions with dogs. The final response, conative, is seen by intentions or actions that reflect attitude, e.g. an avoidance of dogs. It is only this last response that

shows actual observable behaviours in the human that can be attributed to attitude, but many things can influence observable behaviours.

Most attitudes are defined in terms of affective responses, i.e. evaluation and feelings rather than beliefs, intentions or behaviours.

Positive and negative attitudes are seen across all cultures and age groups. This ubiquity of attitudes has long been a source of study for social theorists. From its beginnings in the early 1900s, social psychology was concerned with the study of attitudes. The term has encompassed a variety of psychological and behavioural dispositions. One of the problems with defining the term 'attitude' is that different kinds of dispositions have been grouped together under the heading of a single attitude. A fearful attitude is the result of many factors and can have associated personality traits (Ramachandran, 1994).

The earliest theoretical efforts were directed toward devising sets of categories into which different attitudes could be classified. A number of dichotomies were proposed for distinguishing between fundamental types of attitudes including mental/physical, voluntary/non-voluntary and conscious/unconscious.

This diversity in usage of attitude and these categorical distinctions are still found in some discussions about attitudes. Since the 1930s, however, the technical usage has employed much more restricted definitions. The attitude concept is distinguished from other dispositions such as situation-specific expectancies, personality characteristics, traits or moods (Bornstein, 1989). Attitude is seen to be independent of these other dispositions and longer lasting.

The most prominent feature of an attitude is its evaluative character, the ability to respond toward an object in a positive or negative manner. Attitudes can range from very favourable to very unfavourable on an evaluative continuum (Converse, 1970). For example, someone can have a positive attitude to dogs, but this does not mean they "love" every dog. There is a continuum on which they sit.

As attitude is not directly observable, its existence must be inferred from stimulus-response patterns. Several properties help distinguish attitude from allied dispositions

such as personality dimensions and moods. There must be a specific attitude object, i.e. an identifiable concept, action, or entity toward which evaluative responses can be directed, in this case, the dog or the entire dog species. It is an enduring disposition, relatively stable over time and over situations (Ramachandran, 1994), such that one does not have a negative attitude to dogs just because today one is wearing a black suit and a dog may get hair on it.

Theory attempts to relate this hypothetical construct to observable behaviours (Ramachandran, 1994). Attitude theorists assume that attitudes are acquired through experience. This experience may not immediately affect the person's attitude, such as a keen "dog" person having a couch chewed by a dog. But time, in conjunction with other experiences such as repeated destruction or loss of property, may influence and change the person's attitude from a positive attitude to a more negative attitude. Their mood may however have changed instantly from the discovery of the initial destruction.

One important issue is to establish the past history of attitude formation and change, i.e. the background behind the attitude. Theorists assume that attitudes exert a directive influence on overt responses. How do we determine the consequences of attitude? A fully comprehensive theory of attitudes would provide an understanding of both background and consequences of the attitude formation and/or change.

Attitude theories draw on various psychological processes and theories. These include the areas of reinforcement and learning, cognition and memory, and needs and motivation. To a lesser extent, attitude theories draw on perceptual, physiological and genetic research. The reason for this process approach of working through existing theories in associated areas is to develop a theory that will work across multiple attitude objects. This will also allow for the various settings in which attitudes are affected or expressed (Ramachandran, 1994).

The idea of the relevance of attitudes to social behaviour has perhaps been the greater interest in how attitudes can be changed and therefore manipulated in society (Petty et al., 1994).

Other issues that need looking at in any study of attitudes are to do with which theory of attitude you hold. In the study of attitudes it must be decided what exactly is to be studied and what is attempted to be measured. The use of attitude tests is limited by the theory under which they are written and then carried out. The questions asked in any given attitude test have limits by the way they are asked. Consideration must be given to what is to be looked at, the placement upon a continuum, the strength, the formation, and the change of attitude of the individual (Ramachandran, 1994).

1.3.2. Psychological measures of Human/Animal Relationships

As attitudes are an outcome of psychological processes, they are not directly observable. An attitude is a learned predisposition to behave in a certain way with respect to a given object. In relation to animals, and more specifically pets and companion animals, a number of scales and methods of assessment have been developed. Comments on the major measurement tests follow.

Pet Attitude Scale (PAS)

D.I. Templer, C.A. Salter, S.Dickey and R.Baldwin (1981) developed this scale to measure an individual's attitude toward pets. The test is self administered with an 18-item Likkert format scale. The test measures favourable attitudes by three factors (as tested by factor analysis): love and interaction, pets in the home and the joy of pet ownership. The PAS has been tested for reliability and criterion validity. The test-retest reliability is .92 ($p>.001$) and a Cronbach's Alpha coefficient of .93 ($p> .001$). This shows a stable and internally consistent test, but construct validity has only been looked into in a limited manner. There are low or non-significant correlations personality and psychopathological measures (Templer et al., 1981).

Companion Animal Bonding Scale

This scale was developed by Poresky et al. (1987). This scale looks at the relationship between people and their pets. This scale is administered with 8 items and has been seen to have satisfactory internal consistency and on further study was seen to correlate with the Pet Attitude Scale (Poresky, 1997).

Pet Inventory Assessment

The Pet Inventory Assessment was developed by Ory and Goldberg (1983) from a community based study in Maryland. This assessment consists of person-to-person questions attempting to measure attachment levels, attitudes toward ownership and social interaction. In a secondary interview, additional questions were raised about the presence of a pet in the household, the type of pet and the degree of attachment (Ory, Goldberg, 1983).

Companion Animal Project Survey

Lago, Connell and Knight (1978) developed the companion animal project survey as an interview-based survey. They tested demographics, measures of physical, mental and social resources, functional status, and morale, mortality of participants, animal ownership, and attitudes and relationships with pets. The attitudes and relationships with pets were measured using a 74-item Likert scale with two subscales of pet involvement and mutual care giving which showed high reliabilities of .85 and .81, respectively. The rest of the survey has not had reliability tests done on it.

Pet Attitude Inventory (PAI)

Wilson, Netting and New (1987) developed the Pet Attitude Inventory as a measure of pet attitudes and attachments levels. They also asked related questions from the fields of medicine, psychology, social work and ageing. The PAI has been developed for community settings and can be given as a self-administered test or as an interview. The test consists of seven demographic and self-related health questions. The pet ownership test has an additional 36 specific questions and the non-owner test has 11 additional specific questions. The PAI is said to have content validity, but as it is a new test there has been, as yet, no test of reliability.

Pets and Personal history

Bastad (1981) developed the Pets and Personal History questionnaire for use in the possible placement of pets with participants, such as to benefit the person's health. This brief questionnaire is used in conjunction with consultation with the candidate's doctor that aids in the placement of pets. The test itself only covers the physical dimension of health status.

1.3.3. The ways in which attitude is measured

A psychological test in the form of a questionnaire is generally used when attitude is measured by way of affective responses, e.g. looking at a person's evaluation of and feelings toward an object. There are many important considerations when developing or using any psychological test. The ability to evaluate the quality of a test is important. Some of the more important issues showing good and bad implications and possible solutions to problems are discussed in the following paragraphs.

Validity

"Validity refers to the ability of a test to measure what it was designed to measure" (Weiten, 1995). For example, if we develop a new test of assertiveness, we must provide evidence that it actually measures assertiveness. There are a number of ways to estimate validity, depending of the nature of the test (examples follow).

"Content validity refers to the degree to which the content of a test is representative of the domain it's supposed to cover" (Weiten, 1995). Content validity is checked by a logical look at the test, rather than a statistical analysis. Poor content validity would be like setting an exam and adding questions that were not covered in the work during the year.

"Criterion-related validity is estimated by correlating subjects' scores on a test with their scores on an independent criterion (another measure) of the trait assessed by the test" (Weiten, 1995). Many psychological tests are used to predict behaviour. By measuring criterion-related validity, we have the ability to check that the test is giving an accurate prediction.

"Construct validity, the extent to which there is evidence that a test measures a particular hypothetical construct" (Weiten, 1995). In many tests such as attitude tests, there is no obvious criterion to test against, as it is an abstract idea. To try to ensure construct validity can be complicated. There must be an examination of correlations between the results of the test in question and other results on related traits. The

outcome is a convincing or unconvincing result of construct validity, after as many as possible correlations have been investigated.

Reliability

Reliability refers to the ability of the test to be consistent and repeatable when measuring the attribute. Internal consistency reliability refers to the information in the test, testing the same attribute. Test-retest reliability refers to the test having stability over time, normally tested by a retest a couple of weeks after the initial test.

1.4. Aims of the thesis

To use scientific methods, with an understanding of their limitations, to answer the three following questions:

1. **Who are the veterinary students of New Zealand?**

2. **Where have they come from; background, attitudes, experience?**

3. **Do the demographic characteristics and attitudes of the veterinary students influence the behaviour of dogs?**

2. *CHAPTER TWO –*

WHO ARE THE VETERINARY STUDENTS OF NEW ZEALAND?

WHAT ARE THEIR DEMOGRAPHIC CHARACTERISTICS AND ATTITUDES?

REAL KNOWLEDGE
IS TO KNOW
THE EXTENT
OF
ONE'S IGNORANCE
CONFUCIUS

2.1. INTRODUCTION TO STUDY ONE

2.1.1. Veterinary education and practice in New Zealand.

The Bachelor of Veterinary Science degree at Massey University, Palmerston North, is a five-year degree. After the first four months, the first semester of year one, there is a selection process to determine which students are eligible to continue in the degree. Prior to selection, each student is required to complete two weeks' practical work experience in a veterinary clinic, with no stipulation as to whether it is a large or small animal clinic.

In New Zealand the veterinary field is divided into large and small animal work. Large animal practices deal with mainly large animals such as cattle, horses, sheep and other animals. They will also deal with the animals that help run the farm, such as farm dogs. Small animal practices deal almost exclusively with companion animals (cats, dogs).

During the veterinary degree, students spend a proportion of time doing practical, hands-on husbandry work with small animals. In addition, they study companion animal behaviour.

Internationally there has been a vast amount of research done to establish the current state of the profession (Heath, 1997; Miller, 1998; Brown and Silver, 1999; Cron et al., 2000; Kogan, 2004). These have exposed the changing demographic make up of the veterinary profession, and the changing requirements to succeed. It is now well documented overseas that to succeed in the veterinary profession requires knowledge and skills beyond the technical, animal based science. There is now a requirement to be proficient at the non-technical skills, such as, business acumen and relationship building (Brown and Silver, 1999; Cron et al., 2000; Lewis and Klausner, 2003; Greenfield et al., 2004; Lloyd and King, 2004). In New Zealand Fay and Bell (1988) found there was a changing culture with clients at veterinary practices. Clients were becoming more demanding and less loyal.

This leads to the question of 'what is happening in New Zealand?' There is evidence of a similar change in the demographic makeup (Boland and Morris, 1988). There have also been changes to the professional environment, with an increase in small animal practices (Kelly, 1983; Jones, 2002).

Gaining information about the present state of the veterinary profession in New Zealand will allow for future research into the changes that are occurring. During a students' time in the veterinary degree there are changes that occur in addition to the knowledge and learning. Overseas there is seen to be a hardening of attitudes towards animals as the students distance themselves from the animals they are working on and with (Shurtleff, 1983).

2.1.2. Aims of study one

Who are the veterinary students of New Zealand? Where have they come from; background, attitudes, experience.

1. *What is the gender mix within the veterinary degree?*
2. *Is there a visible difference across the five years?*
3. *Where were they born?*
4. *Where do they live?*
   Rural, semi-rural, suburban, urban
5. *Have they had prior tertiary education? If so, what?*
6. *Have they had experience owning a dog?*
7. *What breed of dog have they owned, and for what purpose?*
8. *What pets have they owned?*
9. *Using a psychological measure, what is their attitude to dogs?*
10. *Is this attitude affected by any of the following?*
    a) Gender, b) dog ownership, c) ownership of the top five pets, d) where they live, e) prior tertiary education, f) year of veterinary study

In this study the demographic makeup of veterinary students attending Massey University will be investigated. The attitude of these students to dogs will be determined using a modified psychological measure. When an attitude score is calculated, the factors that affect this score will be investigated.

Of particular interest are;

1) Do female students have a more positive attitude to dogs than male students?

This is of particular interest because of the feminisation of the veterinary profession within the last two decades.

2) Do students who have owned a dog have a more positive attitude to dogs?

It is possible that if a student has a dog that he or she may have a more positive attitude to dogs.

3) Do students who live in rural and semi-rural locations have a more negative attitude to dogs?

It is possible that if dogs are viewed as working then there will be a different attitude towards them

4) Does a student's attitude to dogs change while in veterinary school?

2.2. METHODS AND MATERIALS OF STUDY ONE

The veterinary students were selected from Massey University because it is the only institution that teaches veterinary science in New Zealand. This is seen as an appropriate way to gain insight into the characteristics of New Zealand-trained veterinary practitioners and identify possible ideas to improve the selection or education of these students through their professional training.

2.2.1. Sample

Students from years one to five of the veterinary degree at Massey University were given a questionnaire.

Permission was given by the institute to approach students in the second semester of 1999 at a lecture that all students of each year should be attending. The lecturer was asked for assistance and informed about the research by the researchers. The questionnaire was delivered at the beginning of class.

The students who attended the lectures were asked if they were willing to take part in research into the attitudes towards dogs. The students were advised it would take approximately five minutes to fill in the questionnaire. There was no random choice of participants. All students who attended class on the day the questionnaire was administered were told about the research, asked to participate but given the chance to decline. A summary of this procedure is seen below.

Procedure for administration of questionnaire

- Lecturers administered the questionnaire at the beginning to students from year 1-5
- The students were given 5 minutes to fill in the questionnaire in the lecture environment and the questionnaires were then returned to the lecturer.

On the front page of the questionnaire, there was a covering letter (Appendix 2.1). This letter explained that the research was being carried out to investigate veterinary students' attitudes to dogs. It identified the people conducting the research, and stated

that all information received would be treated as confidential. The rights of the participants to ask any questions they wished, and to withdraw from the research at any point, was highlighted at the time the questionnaire was delivered to the sample by the lecturer. This was done to allow for a quick response to all questions that arose.

Human ethics concerns were addressed by the openness of information, confidentiality and assurance that the participants understood the research they were taking part in. They had the time and opportunity to have their questions answered, and were fully aware of their rights to withdraw at any stage of the research.

2.2.2. Questionnaire

The questionnaire included demographic questions, general questions about pet and dog ownership, and the modified Pet Attitude Scale (PAS) measure.

Demographic and General Questions

The questionnaire contained a series of demographic and general dog questions. These included age, gender, living environment and education of the participants and their experience and ownership of pets, and dogs. The full questionnaire is attached in Appendix 2.2.

Psychological instrument

A psychological measure for attitudes towards pets - the Pet Attitude Scale (PAS) developed by Templer et al. (1981) was modified for this research to emphasise dogs rather than pets. This was done by replacing the term "pet" with the term "dog".

The modified PAS test was chosen for this questionnaire as it has been found to be a stable and internally consistent test. It has low correlations with any personality and psychopathological measures, and allows investigation of attitude. Love and interaction, pets in the home and the joy of pet ownership were the three positive factors identified in a factor analysis of the PAS.

The ability to modify this measure with little change to question structure was seen as a positive attribute. The use of the term "pet" for companion animal was substituted with "dog" to allow for a more specialised measure. None of the other available and tested

measures allowed for such an uncomplicated change. The question which related to wild animals was kept as standard. The modified PAS measure is shown in Figure 2.1 as it appeared in the questionnaire with the seven-point options from Agree Strongly to Disagree Strongly.

THE MODIFIED PET ATTITUDE SCALE		Circle the most appropriate for you						
		AGREE STRONGLY						DISAGREE STRONGLY
1	I really like seeing dogs enjoy their food.	1	2	3	4	5	6	7
2	My dog means more to me than any of my friends.	1	2	3	4	5	6	7
3	I would like a dog in my home.	1	2	3	4	5	6	7
4	Having dogs is a waste of money.	1	2	3	4	5	6	7
5	House dogs add happiness to my life (or would if I had one).	1	2	3	4	5	6	7
6	I feel that dogs should always be kept outside.	1	2	3	4	5	6	7
7	I spend time every day playing with my dog (or I would if I had one).	1	2	3	4	5	6	7
8	I have occasionally communicated with a dog and understood what it was trying to express.	1	2	3	4	5	6	7
9	The world would be a better place if people would stop spending so much time caring for their dogs and started caring more for other human beings instead.	1	2	3	4	5	6	7
10	I like to feed animals (dogs) out of my hand.	1	2	3	4	5	6	7
11	I love dogs.	1	2	3	4	5	6	7
12	Animals belong in the wild or in zoos, but not in the home.	1	2	3	4	5	6	7
13	If you keep dogs in the house you can expect a lot of damage to furniture.	1	2	3	4	5	6	7
14	I like house dogs.	1	2	3	4	5	6	7
15	Dogs are fun but it's not worth the trouble of owning one.	1	2	3	4	5	6	7
16	I frequently talk to my dog.	1	2	3	4	5	6	7
17	I hate dogs	1	2	3	4	5	6	7
18	You should treat your house dogs with as much respect as you would a human member of your family.	1	2	3	4	5	6	7

Figure 2.1 The modified Pet Attitude Scale as seen in the questionnaire for Massey Veterinary students.

2.2.3. Procedure for coding data and descriptive analysis of data

All the data collected was kept secure and it was not possible to relate data to individuals. The computer software package of SPSS 9 (then up graded to 11) was used for data entry and analysis.

Demographic and general question procedure

Coding is the procedure of taking the marked questionnaires and assigning a number to each response for each question or part question. If the question was a yes/no answer, the coding was 1/0. Responses to categorical data were also coded numerically. The general questions used a coding scheme to group like answers together, such as breeds of dog.

Frequency and distribution analysis was carried out for all the demographic and general questions. This consisted of frequency counts, percentages, distribution curves and skew tests. Further manipulation was done for groupings of prior tertiary education. Education was grouped with all science degrees together to allow for reporting of specific results. This allowed for larger sample sizes and to look for any relationships. The groupings for breeds of dog were that of the New Zealand Kennel Club groupings with the addition of mongrel and heading/hunterway groupings.

It is to be noted that for a number of questions, there were possible multiple answers. For example, the participant may have owned a dog as a pet and a hunting dog. All answers were coded, so some participants had numerous results for some questions.

PAS calculation

A seven-point Likert rating scale, from strongly disagree to strongly agree was used.

The data can be coded separately for the 11 positive questions and the seven negative questions, to give two separate figures to identify the attitude score. In the standard PAS, the score is given as a single number - an overall attitude score combining the results from the positive and the negative questions.

To calculate a single score all coded data is added together. The methods used for coding are seen in Table 2.1. Once coded and added, a more positive attitude will give a greater score. This is by grading the positive questions high and the negative questions low. The negative questions are coded in "reverse". For example, a "strongly disagree" response to a negative question is coded as a greater number and thus is added to give a more positive result. Once coded, as shown in Table 2.1, the attitude score is the sum of all answers as a numerical addition.

Thus, someone with a more positive attitude will answer the positive questions (Questions 1,2,3,5,7,8,10,11,14,16,18) positively (seen as <4 in the raw data) and disagree (seen as >4 in the raw data) with the negative questions (Questions 4,6,9,12,13,15,17). When the coded data is added this way, a higher attitude score is taken to mean a more positive attitude to dogs.

The two methods of coding are shown in Table 2.1 . Method one gives a total answer above zero. Method two was chosen by the researcher as the score is around the zero mark. This method makes it simpler for people to understand the positive versus negative scoring. In this method of coding, just as in method one, all answers are added, to give an attitude score. Any score over zero shows some positive attitude towards dogs.

The need for reversing the coding comes with the negative questions. When they disagree with the negative statements they are actually making a response that shows a positive attitude to dogs; thus although their answer is in disagreement, it is coded as positive.

Table 2.1 The questionnaire answer coding for method one and two of calculating the modified PAS measure

Answer as circled or marked on questionnaire	Answer as coded for method one, positive questions	Answer as coded for method one, negative questions	Answer as coded for method two, positive questions	Answer as coded for method two, negative questions
1 Strongly agree	7	1	+3	-3
2	6	2	+2	-2
3	5	3	+1	-1
4	4	4	0	0
5	3	5	-1	+1
6	2	6	-2	+2
7 Strongly disagree	1	7	-3	+3
No mark	4	4	0	0

2.2.4. Procedure for statistical analysis

Frequencies and distributions

The responses to the modified PAS test were coded as per the method two mentioned above. The final score was found by the addition of these coded answers. A frequency distribution graph was drawn to examine the data. A curve was inserted, and the normality and skewness of the distribution was measured. This information is required to see if there is a normal distribution.

To further test the modified PAS, the correlation of the responses to the negative and positive questions was examined. For the test to be seen as reliable, there is an expectation that there should be a strong negative correlation, ie if you strongly agree with a positive question, indicating a positive attitude, you should be more likely to disagree with the negative questions that indicate a negative attitude when agreed with.

Analysis

Comparisons of the final attitude scores with the demographic responses of gender, year of veterinary study, past dog and pet ownership and location of residence were investigated.

As gender and dog ownership offered only two descriptive values, an independent samples t test was conducted looking for a significance at $p<0.05$. Looking at the ownership of other pets, the top four pets other than dogs were chosen after the frequency information was available. These pets were then looked at for the correlation of ownership of them and the score on the dog attitude test, the PAS test.

When looking at the year of study with five groupings of students, one at each year level, an anova and multiple comparisons were done. These allow for a look at any significant differences between individual years. The post hoc tool of Tukey test was used, as it gives an intermediate level of strictness. As this data is not a longitudinal look, it was important to look at the groups at each year level as distinctive groups, as well as the generalisations.

To look for any trends across all five years of study, a regression analysis was performed and the results graphed. In addition, to look for any effect of gender on the attitude score across the years of study, separate regression analyses were performed for males and females and compared. To analysis the location of residence against the mPAS scores, a one way ANOVA with Tukey post hoc analysis was used.

2.3. RESULTS OF STUDY ONE

Two hundred and sixty one questionnaires were collected from 360 possible students. However many of the students not surveyed were probably not in class when the questionnaire was delivered. There were three partially completed questionnaires. These were included, when answers were incomplete the questions were coded as missing data. In some cases this means the percentages do not add to 100%. For the purposes of this study the researcher has adopted significance at a P value < 0.05.

1-9) Demography

Gender:

Females outnumbered males 66% to 34% (Figure 2.2). There was a marked drop-off in participants up through the years, with 28% of all participants from the first year and 12% of participants from the 5th year students (Table 2.2).

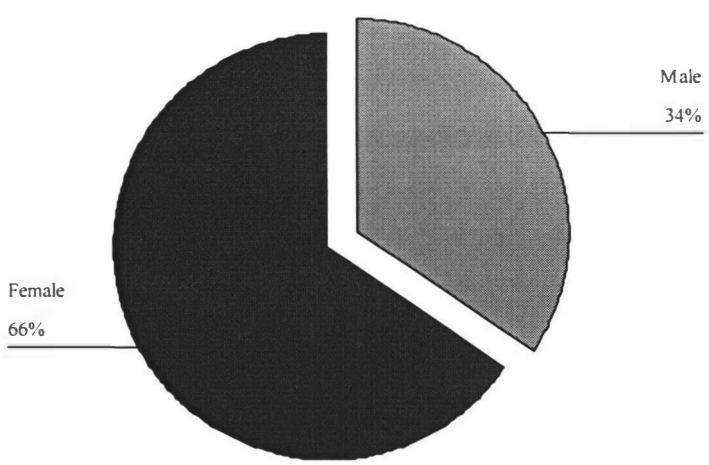


Figure 2.2 Graph of gender mix

Table 2.2 Table showing the gender and year of veterinary study frequencies and percentages

		Year of veterinary study					Total
		1	2	3	4	5	
Gender	male	19	27	17	18	8	89
	female	53	32	31	30	24	170
Total		72	59	48	48	32	259
Percentage		28	23	18	18	12	

Location of residence:

Thirty three percent of participants lived in a rural or semi-rural location and 67% lived in suburban or urban location (Table 2.3).

Table 2.3 Table showing the gender and location of residence of the participants with frequencies and percentage

		AREA				Total
		town	suburb	semi-rural	rural	
Gender	male	42	18	8	21	89
	female	53	61	27	29	170
Total		95	79	35	50	259
Percentage		37	30.5	13.5	19	

Country of origin:

Eighty six percent of the participants were born in New Zealand, 12% were not. Europe was the largest of overseas categories with 5% (13 participants). Four participants did not answer this question (Table 2.4).

Table 2.4 The place of birth of participants, given in frequency and percentage

		Frequency	Percent
Valid	0	1	.4
	New Zealand	225	86.2
	Australia	5	1.9
	Hong Kong	2	.8
	European	13	5.0
	Indian	2	.8
	Polish	1	.4
	African	2	.8
	Asian	3	1.1
	Pacific Is	1	.4
	USA	3	1.1
	Total	258	98.9
Missing	System	3	1.1
Total		261	100.0

Prior tertiary education:

It was seen that 31% of the veterinary students had prior tertiary education (Table 2.5). Seven percent of all the participants had a partial degree, 11% had a BSc, 2% BAgSc or BAppliedSc (Table 2.6). There was significant correlation between the year of veterinary study and the presence of prior tertiary education. This was a negative correlation, the further through the degree the less likely the participant was to have prior tertiary education (Table 2.7).

Table 2.5 Frequency and percentage of participants with prior tertiary education

		Frequency	Percent
Valid	no	175	67.0
	yes	82	31.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Table 2.6 Frequencies and percentages of what the prior tertiary education of the participants is.

		Frequency	Percent
Valid	0	175	67.0
	BSc	29	11.1
	BAgSc/BAppliSc	5	1.9
	BSc Hon/DipSc/ MSc	18	6.9
	BVSc Overseas	1	.4
	Part Degree		
	BSC, BA, BAppli	18	6.9
	Technology	2	.8
	Vet nursing	2	.8
	BBS	2	.8
	LLB Hons	1	.4
	BA	1	.4
	PHD	1	.4
	Nursing	3	1.1
	Trade Cert.	1	.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Table 2.7 Correlation of prior tertiary education to year of veterinary study

			Prior tertiary education	Year of veterinary study
Spearman's rho	Prior tertiary education	Correlation Coefficient	1.000	-.122
		Sig. (2-tailed)	.	.050
		N	259	259
	Year of veterinary study	Correlation Coefficient	-.122	1.000
		Sig. (2-tailed)	.050	.
		N	259	259

Pet and dog ownership:

Ninety three percent of participants had owned a pet (Table 2.8). Seventy five percent had owned a dog (Table 2.9). The most common pet was a cat and the top five were cat, dog, bird, fish and horse, in that order (Table 2.8).

Table 2.8 Pet ownership and top five pets

Pet ownership	Have owned a pet	242 (93%)
	Never owned a pet	17 (7%)
Top 5 pets	Cat	221
	Dog	196
	Bird	97
	Fish	90
	Horse	71

Table 2.9 Frequency and percentage of dog ownership by the participants

		Frequency	**Percent**
Dog Ownership	no	62	23.8
	yes	196	75.1
	Total	258	98.9
Missing	System	3	1.1
Total		261	100.0

Of those participants who owned a dog, 91% (178) had it as a pet. Thirty four participants owned a dog for herding with hunting and obedience/agility was the next most common purpose for owning a dog with 15 participants each. It is noted that many participants owned dogs for a number of purposes. Given this, it is interesting to note that 18 participants that owned a dog did not own it for the purpose of a pet (Table 2.10).

Table 2.10 Reason for dog ownership

Purpose	Frequency	Percentage of dog owners (can be multiple purposes)
Pet	178	91
Hunting	15	8
Herding	34	17
Obedience/Agility	15	8
Show	11	6
Breeding	1	0.5

Attitudes to dogs:

The participants' responses to the modified Templer Pet Attitude Scale, once calculated, gave a range from – 45 To +54 (Table 2.11).

The frequencies were plotted to analyse the distribution (Figure 2.3). There was a normal distribution bell curve with a mean of 22.6 and a standard deviation of 13.5 (Table 2.11)

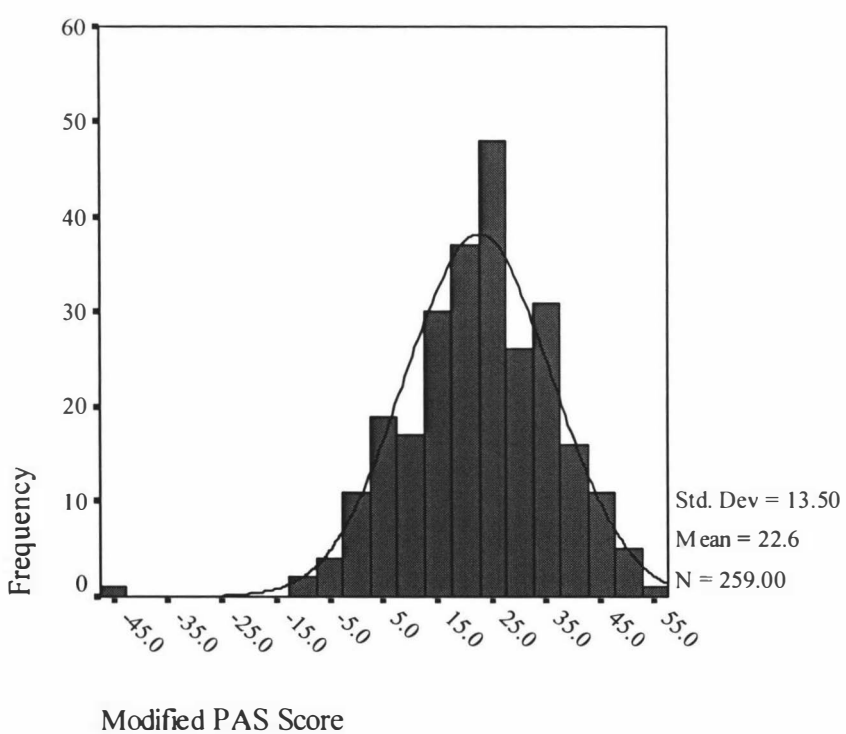


Figure 2.3 Frequency, distribution and normality curve of attitude scores

Table 2.11 Statistics of the frequency, distribution and normality of the attitude scores

N	Valid	259
	Missing	2
Mean		22.5598
Std. Error of Mean		.83911
Median		23.0000
Std. Deviation		13.50421
Variance		182.36365
Skewness		-.535
Std. Error of Skewness		.151
Kurtosis		1.575
Std. Error of Kurtosis		.302
Range		99.00
Minimum		-45.00
Maximum		54.00

Some points worth noting are that Q3, "I would like to have a dog in my home", had the highest number of participants strongly agreeing (grading 1 on the Likert rating scale of 1-7). Thirty nine percent of participants rated this question one and 29% rated this question two on the rating scale. The question that raised the greatest disagreement was question 17, "I hate dogs". Eighty five percent of participants strongly disagreed with this statement, rating it 7 on the rating scale. Worth noting is that 2.5% (6 participants) agreed with this statement, rating 1-3 on the scale (Appendix 2.3).

There was a very strong negative correlation between the negative and positively rated questions in the modified Templer PAS. This is seen as Pearson correlation = -0.52 (Table 2.12).

Table 2.12 Correlation between the responses to the positively and negatively rated questions in the modified Templer PAS

		Positive	Negative
Positive Questions	Pearson Correlation	1	-.520(**)
	Sig. (2-tailed)	.	.000
	Sum of Squares and Cross-products	22802.749	-7525.031
	Covariance	88.383	-29.167
	N	259	259
Negative Questions	Pearson Correlation	-.520(**)	1
	Sig. (2-tailed)	.000	.
	Sum of Squares and Cross-products	-7525.031	9197.012
	Covariance	-29.167	35.647
	N	259	259

** Correlation is significant at the 0.01 level (2-tailed).

10) Do other aspects of the participants' characteristics affect the attitude score?

Gender:

Since the attitude score data was normally distributed, parametric measures were able to be used for analysis. The difference in the mean scores between males and females was highly significant to a $p<.01$ (Table 2.13). Females had a higher score. Females' mean attitude scores were 25.6 while the males' were 16.7 (Table 2.12).

Table 2.13 The mean mPAS scores for males and females

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Modified PAS score	male	89	16.7	14.2	1.506
	female	170	25.6	12.0	.925

Table 2.14 T Test for variance between the mPAS scores for males and females

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Modified PAS score	Equal variances assumed	2.608	.108	-5.316	257	.000	-8.932	1.680	-12.241	-5.623
	Equal variances not assumed			-5.052	155.45	.000	-8.932	1.768	-12.425	-5.440

Pet and Dog Ownership:

Using a t test of independent means, a significant difference between the attitude score of students who had owned a dog and students who had not owned a dog was found, (P =0.001) (Table 2.15). A student that had owned a dog scored higher on the attitude test and thus had a more positive attitude to dogs.

Further investigation was done to look at general pet ownership in relation to attitude towards dogs. No significant difference existed between owners of the other top four pets and those that did not own that pet. Looking at the mean attitude score, the students that had owned these animals, a horse, bird, fish or cat, on average did have a higher score than those that did not, but not significantly higher (Table 2.16).

Table 2.15 T tests of variance in mean mPAS scores for owners of the top five pets

			Levene's Test for Equality of Variances		t-test for Equality of Means						
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
Dog ownership	Modified PAS Score	Equal variances assumed	1.787	0.182	-3.356	256	0.001	-6.474	1.929	-10.274	-2.675
		Equal variances not assumed			-2.993	87.140	0.004	-6.474	2.163	-10.774	-2.174
Horse Ownership	Modified PAS Score	Equal variances assumed	1.365	0.244	-1.491	257	0.137	-2.799	1.876	-6.494	0.896
		Equal variances not assumed			-1.598	145.856	0.112	-2.799	1.751	-6.260	0.662
Cat ownership	Modified PAS Score	Equal variances assumed	1.034	0.310	-1.529	257	0.127	-3.616	2.365	-8.274	1.041
		Equal variances not assumed			-1.781	58.528	0.080	-3.616	2.031	-7.682	0.448
Bird ownership	Modified PAS Score	Equal variances assumed	1.290	0.257	-1.342	256	0.181	-2.325	1.733	-5.738	1.087
		Equal variances not assumed			-1.321	192.329	0.188	-2.325	1.760	-5.798	1.147
Fish ownership	Modified PAS Score	Equal variances assumed	1.182	0.278	-0.972	257	0.332	-1.713	1.762	-5.183	1.757
		Equal variances not assumed			-0.959	175.102	0.339	-1.713	1.785	-5.237	1.810

Table 2.16 The mean mPAS scores for owners of the top five pets

	Ownership	N	Mean	Std. Deviation	Std. Error Mean
Dog Owner	no	62	17.7	15.532	1.972
	yes	196	24.2	12.439	.888
Horse Owner	no	188	21.8	13.983	1.019
	yes	71	24.6	11.999	1.424
Cat Owner	no	38	19.5	11.132	1.805
	yes	221	23.0	13.823	.929
Bird Owner	no	161	21.6	13.150	1.036
	yes	97	23.9	14.020	1.423
Fish Owner	no	169	22	13.30	1.023
	yes	90	23.7	13.883	1.463

Location of residence:

An Anova was performed with the use of the post hoc Tukey method to examine if there was any difference in attitude score in relation to the area of residence. Results found no significant difference between any of the four groups, nor across the range from town to rural (Table 2.17). There was no evidence by the post hoc test that there were any significant differences when grouped together (Table 2.18).

Table 2.17 Multiple Comparisons of the mPAS score in relation to the location of residence

(I) AREA	(J) AREA	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
town	suburb	.740	2.046	.984	-4.550	6.031
	semi-rural	-2.941	2.666	.688	-9.836	3.953
	rural	2.772	2.371	.647	-3.359	8.905
suburb	town	-.740	2.046	.984	-6.031	4.550
	semi-rural	-3.682	2.732	.534	-10.748	3.384
	rural	2.032	2.445	.840	-4.293	8.357
semi-rural	town	2.941	2.666	.688	-3.953	9.836
	suburb	3.682	2.732	.534	-3.384	10.748
	rural	5.714	2.984	.224	-2.002	13.431
rural	town	-2.772	2.371	.647	-8.905	3.359
	suburb	-2.032	2.445	.840	-8.357	4.293
	semi-rural	-5.714	2.984	.224	-13.431	2.002

Table 2.18 Tukey HSD method used for post hoc analysis

AREA	N	Subset for alpha = .05
		1
rural	49	20.142
suburb	80	22.175
town	95	22.915
semi-rural	35	25.857
Sig.		.117

Means for groups in homogeneous subsets are displayed.
a Uses Harmonic Mean Sample Size = 55.551.
b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Prior Tertiary Education

Participants that had prior tertiary education had a mean modified PAS score of 24.8, compared with those that did not scoring 21.7 (Table 2.19). The analysis of variance showed a sig 2-tailed = 0.08 (Table 2.20). This was not significant, but a definite trend.

Table 2.19 The mean mPAS scores for those that had prior tertiary education and those that did not

	Prior tertiary education	N	Mean	Std. Deviation	Std. Error Mean
Modified PAS score	no	175	21.7	13.951	1.054
	yes	82	24.8	12.146	1.341

Table 2.20 T Test for the variance between mPAS scores for participants with and without prior tertiary education

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Modified PAS score	Equal variances assumed	.595	.441	-1.723	255	.086	-3.090	1.793	-6.623	.442
	Equal variances not assumed			-1.811	180.063	.072	-3.090	1.706	-6.457	.276

Year of veterinary study:

An ANOVA test to compare mPAS score means was used with a post hoc comparison using Tukey. Results showed there was no significant difference between the scores from any years of the veterinary degree. (Table 2.21 and 2.22).

Table 2.21 ANOVA results looking at the difference in mean mPAS scores across the year in veterinary study

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	725.737	4	181.434	.995	.411
Within Groups	46324.085	254	182.378		
Total	47049.822	258			

Table 2.22 Multiple Comparisons mPAS scores in relation to the year of veterinary study

(I) Year of veterinary study	(J) Year of veterinary study	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	2.005	2.371	.916	-4.510	8.521
	3	4.562	2.516	.368	-2.351	11.476
	4	3.500	2.516	.634	-3.413	10.413
	5	1.260	2.869	.992	-6.622	9.143
2	1	-2.005	2.371	.916	-8.521	4.510
	3	2.556	2.625	.867	-4.655	9.769
	4	1.494	2.625	.979	-5.717	8.706
	5	-.745	2.964	.999	-8.891	7.400
3	1	-4.562	2.516	.368	-11.476	2.351
	2	-2.556	2.625	.867	-9.769	4.655
	4	-1.062	2.756	.995	-8.636	6.511
	5	-3.302	3.082	.821	-11.769	5.165
4	1	-3.500	2.516	.634	-10.413	3.413
	2	-1.494	2.625	.979	-8.706	5.717
	3	1.062	2.756	.995	-6.511	8.636
	5	-2.239	3.082	.950	-10.707	6.228
5	1	-1.260	2.869	.992	-9.143	6.622
	2	.745	2.964	.999	-7.400	8.891
	3	3.302	3.082	.821	-5.165	11.769
	4	2.239	3.082	.950	-6.228	10.707

A regression line showed a marginally downward trend (-0.66), although this is not significant at the p<.005 (Figure 2.4). As this is weak, it does not explain the variation in attitude score seen, but is of note.

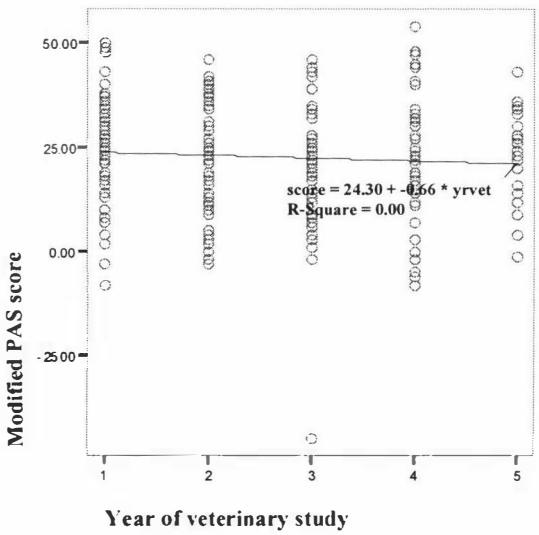


Figure 2.4 The linear regression of mPAS score to the year of veterinary study

A univariate analysis was performed to see if there was a difference over the year of veterinary study in relation to the gender of the student with regard to their attitude score. There was no difference in attitude score between gender over the years interaction equals -0.7 for males and -0.63 for females (Figure 2.5).

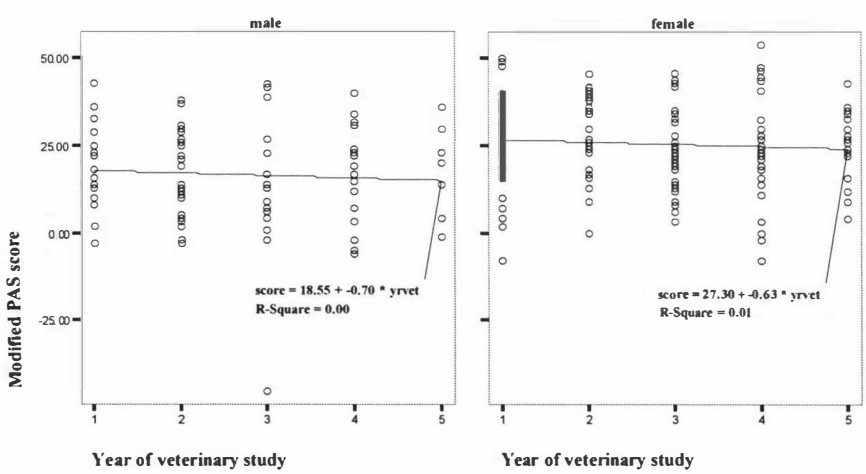


Figure 2.5 Linear regression of the mPAS score to year of study, separated into gender

Result summary

- There were 66% females, 34% males
- 67% live in suburban or urban areas
- 86% are from New Zealand, 2nd 5% from Europe
- 31% have prior tertiary education, 11% completed a BSc
- Significant difference between prior tertiary education and year of study, the later years have less
- 93% have owned a pet, top five in order, cat, dog, bird, fish, horse
- 75% have owned a dog, 91% of which owned with a purpose of being a pet
- The participants' attitude to dogs was generally positive, mean score on the modified PAS measure was 22.6, range -45 to +54
- Distribution was normal, with a significant negative correlation between the results to the positive and negative questions
- There was a significant difference between males and females on the mPAS measure, females showed a more positive attitude to dogs
- Dog owners showed a significantly more positive attitude to dogs than non owners. No other pet ownership had significant differences between owners and non owners on the dog attitude score
- There was no significant difference in the attitude to dogs based on location of residence
- There was no significant difference in the attitude to dogs of those that had prior tertiary education, but there was a trend of them having a slightly more positive attitude ($p=0.086$).
- There was no significant difference in the attitude to dogs when looked at based on year in the veterinary study, or across the years.
- When regression was looked at there was a slight downward trend, non significant.
- When split for males and females, there was the same slight non significant downward trend.

2.4. DISCUSSION OF STUDY ONE

Discussion of Sampling and Participants:

Sampling was seen as an inclusive grouping, rather than purely a representative group. It was established that a random sample, as would be produced by the researcher once all ethical responsibilities were met, would possibly lead to a very small sample size. This would influence the ability of this study to give any answers or even guidance about the general veterinary student population. For this reason, it was decided to attempt to sample all the students. This attempted full representation of the students in each year of veterinary study in 1999 would mean the study could comment on a point-in-time view of veterinary education in New Zealand. The downside is that those who did not take part may represent a particular self-selection bias. It was seen that as we progress through the years of study there was a lower percentage response to the questionnaire. Reasons could possibly be the lack of attendance at the lecture that the questionnaire was given out, or, with specific reference to the fifth-year students, that it was difficult to get one lecture that all students regularly attended. However, it is still seen that this was the best possible way to answer the questions about the background of the veterinary students. The implications with the lesser number in the later years are that there are more errors when looking at the mean differences and that there will be less ability to note significant differences because of the sample sizes in the later years.

Discussion of Questionnaire and Instrument:

Questionnaires all have the issue of bias. The wording of questions can lead to certain answers. Does the participant actually understand what the questions are asking? What needs particular awareness with this questionnaire is bias due to the perception of socially acceptable responses. This may be of particular importance among first-year students who may still feel that they are trying to prove they should be in veterinary science, as the veterinary degree requires students to be specially selected into it. The questionnaire was administered not long after their acceptance into the degree on strict academic and aptitude grounds. An attempt to combat this was made by the information about the confidentiality and security of their responses - only the researcher would be privy to the information, which would not be able to be traced back to the specific participant.

The PAS questionnaire is a psychological measure. As such, there are issues around the reliability and validity of the test. As attitude is a hypothetical construct, there are many different ways of measuring it. The PAS measure looks at the beliefs and feelings of the participant to the topic. In the original study, PAS was tested for retest reliability and factor analysis, to confirm it was looking at the correct set of beliefs to measure. This test was modified for this questionnaire to give it a focus on dogs. As such, it was important to check some of the information to ensure it was still an appropriate test to be using. This included the correlation of the negative and positive responses to ensure they were apposing. This was shown to be true. The results of the test also showed normality in distribution, and as the literature would have us expect, veterinary students had a generally positive attitude to dogs.

There were a number of methods put forward to calculate the score from the responses given. The method decided on was not the same as used in previous uses of the test but was seen to be appropriate for this study. The implications of this choice are that the results are not easily comparable with existing data from the use of the PAS measure. However, this was seen to be of little importance when the test had been changed in such a way as to look specifically at a single species. Thus the results would not be comparable anyway. The advantage of this method is that the score placed round zero. Further modification to this measure would be to separate the negative and positive

responses. This was done for coding. If this were done it may give a better view of the over-all attitude. It would then consider the practical attitudes veterinary professionals separately to empathy. Some of the negative questions were related to the practical cost and disadvantages of dog ownership such as property damage. Veterinary students with more experience of dog ownership, may score a more negative attitude to dogs which is actually a more practical attitude to dog ownership. Having said this, the correlation of negative to positive questions did show the test to be measuring opposing viewpoints.

Discussion of Results:

Gender:

Results showed an interesting contrast in the gender of students. The females outnumber the males two to one overall and in most years of study it is greater than this. The exception was in year two, where it is 27 females to 31 males. This result of more females than males, is consistent with the 1980s results of Boland and Morris (1988 and 1989), as well as Jones (2002) discussing the increase in females entering the profession. As was discussed in chapter one, there could be a number of reasons for this. With regard to gender, this may still be a representative sample and that there are actually more males in that one year.

This large percentage of females in veterinary degree courses in New Zealand follows the trends of both the United States and Australia. Researchers in both these countries have analysed the feminisation of the profession in their countries. The effects of this will be interesting to note in New Zealand, where there is still a large amount of production and farm animal work. Having said this, it was also seen that 33% of the students came from a rural or semi-rural residence.

Heath's Australian longitudinal study showed that gender had not made a difference to long-term working careers in relation to mixed practice or small animal practice ten years after graduation. But in the initial years, there was a greater percentage of those who had lived on a production farm working in mixed practice. So, although only 33% of students came from a rural or semi-rural residence, this is not likely to indicate shortages of future veterinarians for mixed practice. However, there are other reasons for such shortages. It should be noted that in today's society, semi-rural residence may be that of a lifestyle block that is not production based. As such, these students would possibly still have a "townie" view on the use, and practice, of production animals. It would be fair to say that in relation to future discussion on this, the semi-rural residence, even if production based, it is unlikely to be a large sheep farm, or similar, that requires pure herding and working dogs.

Country:

It is also worth noting that these results are similar to those from other countries. In Australia there were seen to be questions about the impact of such a drastic increase in females, and the existing problems of attracting veterinarians to work in rural settings. Although there were still issues with retention regarding people coming into small, tight-knit communities, there was an increase in females working in these positions, corresponding to the increase in female graduates.

It is thought that this would be similar in New Zealand.

Prior tertiary education:

Given the five-year term of the veterinary degree, it was interesting to see that 31% of the students had participated in other tertiary education prior to enrolling in veterinary science. Seven percent of the participants had studied part-way to a degree. This is probably due to the fact that acceptance into the veterinary programme occurs midyear. The figures of participants who had studied part-way to a degree will include some students who failed to gain acceptance when they completed the introductory veterinary papers and had managed to pull up their grade-point averages by studying towards another degree.

The majority of the students who had previous tertiary education had studied for and completed a Diploma in Science; Bachelor of Science, Bachelor of Applied Science or Bachelor of Agriculture; science honours; Masters in Science. These science-based courses account for 20% of all veterinary students. This gives an interesting makeup of abilities to those studying veterinary science. It was noted that there was an interesting mix of other professional degrees that participants had completed, including law, veterinary qualifications from overseas, veterinary nursing, general nursing and technology.

With respect to the "new" requirements now needed for acceptance into veterinary education, there was a negative correlation between the years in the veterinary degree and the number of participants who had prior tertiary education. There may be students who failed to be accepted their first time, but have continued to study, increased their grade-point average and have then been accepted. Or this may be the result of the

profession becoming one that people are "learning towards". This means that students start their study elsewhere and then go into the veterinary profession. This may be a deliberate choice, made early on to allow for them to excel in chosen subjects to help with their grade-point average, or a later decision made while studying towards something else, that veterinary science is actually the professional path they would like to take.

Dog and pet ownership:

As was to be expected, most participants had owned a pet. Seventy-five percent had owned a dog. The seven percent who had not owned a pet may not have done so for many reasons: allergies within the households they have lived in; inappropriate residence for the type of pet they wanted; cost of ownership and maintenance; or constant movement restricting such abilities. These ideas are backed by research conducted by Quigley et al. (1983) in the US about why non pet owners were non pet owners. The reasons included responsibility, noise/odor/feaces, costs, allergies.

In the US in 1983 the top companion animals kept were cats, dogs, birds and fish. Forty percent of households owned an average of 1.5 dogs, 20% of households owned 1.7 cats, 15% owned 2.1 birds and 12% of households owned 25 fish (Beck, 1983).

Of interest is that dog ownership, which was asked as part of the pet ownership question, and as a separate "have you owned a dog" question, was that not all people who owned a dog listed it as being a pet. Nine percent of people that owned a dog did not consider it a pet. It is assumed that these participants saw their dogs having a primary purpose of working for their existence.

Modified PAS score:

The ranges of scores on the modified PAS measure were to be expected, given the measures' design and purpose. Normal distribution allowed for parametric analysis within the results which allows for greater assessment of significant differences. The mean was 22.6, showing a strongly positive attitude by the participants to dogs. Given the field of study, this was expected. Templer et al. (1981) found that the original pet attitude score measure resulted with animal shelter workers gaining a more positive score. There are a number of possible reasons for some of the more negative attitudes,

or those that scored some questions with a very negative response. These were examined by looking for trends in the attitude scores against other information taken from the participants.

One of the greatest influences was seen to be gender. Females had significantly more positive attitudes. As more dog bites are recorded in the US to males, is it possible that attitude influences the aggressive nature of the dog? Given the greater number of females to males in the veterinary degree, this gives rise to a number of questions and possible concerns:
Will this positive attitude and change in the gender mix affect the characteristics of professional veterinarians when these students get out in the work force, and what are the other, currently unknown effects?

The first chapter discussed a number of possible reasons why more women are taking to the veterinary profession. One of these was that it is seen as a more caring and nurturing profession, with the increase in companion animal practices. This may go some way towards explaining the increase in females entering into the veterinary profession who have a positive attitude. As there is no background data, it cannot be known if ten years ago the same positive attitudes were seen in the few female students that entered the degree.

Will female students, who have possibly been attracted to the profession by the more nurturing nature of the profession, once qualified, handle the sometimes practical and less nurturing aspects of the profession?

It is seen, and has been stated that the veterinary profession needs more psychological help and services than other professionals.

Will the positive attitude toward the dog stop these students from being able to handle the dogs in the practice environment appropriately and efficiently?

There are many concerns and questions raised when any profession finds itself in the midst of change. It is good to note now what things are like, as this allows for a point to then refer back to when looking at future changes.

The possible positives to come from the increase in positive attitudes to dogs include:

- The matching of these students with the increased companion animal practices that are now in existence;
- The ability to communicate a positive attitude to clients when the client and professional are in a stressful situation;
- Increased empathy and the ability to build a rapport with clients which is one of the most important attributes of a good veterinary practice, in the eyes of the client. This is an important business issue for practices, as it is the clients who make the choice of what vet to go back to with their dog.

Further possible benefits include the ability of the dog to be responsive and biddable with a handler who is positive towards them, though this may be more greatly affected by confidence, experience or fear, than by attitude.

The modified PAS scores were looked at across a number of different variables, to give an insight into any properties about the test that are affected by different characteristics. This included the idea that students' attitudes to animals become more hardened as they go through the veterinary degree (Shurtleff, 1983). Through their learning, they see the animals for all their parts and their place within the animal kingdom, rather than just for their cuteness (Paul and Podberscek, 2000). There was no significant effect of this seen in this study. This was separated out by gender to look at any possible disparity between males and females. There was found to be no significant differences. However, as this is only a point-in-time study and not a longitudinal study, a large amount of weight cannot be put on this. Each year the group is made up of different participants rather than one closed group's progression through the system. In this study it would be advantageous to account for all other differences and look specifically at this.

Dog ownership was a significant variable in relation to the more positive attitude score. This follows, as those that like dogs, where they are able to, will own a dog. This also shows there were no influences of practical dog ownership and bad experiences of dog ownership on the attitude scores. The other top four pets did not show any relationship with the dog attitude score. This modified test looks specifically at dogs rather than

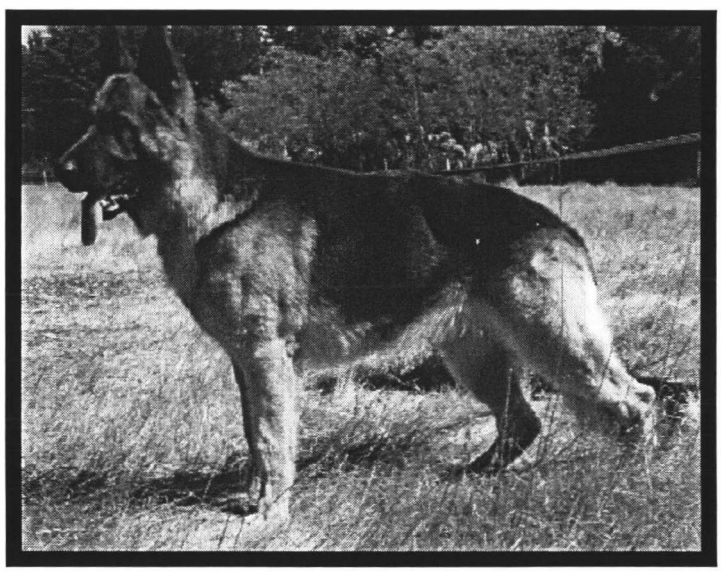
general attitudes to animals or pets. This leads to the idea that this attitude test may be a good test of attitudes towards dogs.

Some participants actually stated they strongly agreed to the statement "I hate dogs". This is concerning, especially when considering the prevalence of dogs in all areas of veterinary practice. These participants may have had extremely bad experiences with dogs. Results from the mPAS were normally distributed, so it is expected that there will be some participants in the second or more standard deviations, and it was noted that there was one negative outlier.

As was discussed earlier, in regard to the location of residence, although divided into four groupings, only one, 'rural', can really be accepted as a possible farming or production group. There were no significant differences in the mean of the attitude score with regard to where a participant lived. Having said this, the greatest difference seen, yet not significant to the 0.05, was between semi-rural and rural locations. Even though the result was not significant, and part of the reason is the increased error size due to only a small sample size at semi-rural level, people living in semi-rural locations were seen to have a more positive attitude to dogs than those living in rural locations. This may be due to the production use of dogs at the rural level and the ideological views of townies that move to the semi-rural country without a real farming/production view.

3. Chapter Three –

Do the Demographic Characteristics and Attitudes of Veterinary students Influence the Behaviour of Dogs?



Now this is the Law of the Jungle—
as old and as true as the sky;
And the Wolf that shall keep it may prosper,
but the Wolf that shall break it must die.
Rudyard Kipling

3.1. INTRODUCTION TO STUDY TWO

The domestic dog plays a significant role in our society. Humans domesticated the dog after the last Ice Age, and since that time the dog has assisted our success as a species.

The veterinary profession regularly works in close proximity to dogs. Even large animal vets will come across farm and working dogs on visits to see other animals (Boland and Morris, 1989). During the veterinary students' time of study, they spend time working with dogs in small animal practice environments.

Some students are better than others when handling dogs, and the dogs react better to them. There is anecdotal evidence, from talking to lecturers and hands-on tutors in the profession, that this is often the result of prior experience and confidence with dogs and that some students just have a better attitude towards dogs and the dogs "know it".

Pigs have also been noted to behave differently in response to the attitudes of the stockman (Hemsworth, 1994 a). In dogs it has been found that gender characteristics of a person influences the dog's behaviour (Lore and Eisenberg, 1986).

Humans express their attitudes to objects, events, people and animals by the ways they respond to them. The response is not always a measurable behaviour. Human attitudes to dogs have been studied for ways to measure the behaviour. The human attitude is an enduring disposition to respond, in this case to a dog, in an expected manner. Attitude is seen to form over a period of time by experiences, and is a continuum from negative to positive.

Given the dog's social behaviour and communication by sensory perceptions, it is reasonable to assume the dog can communicate with humans. As such, due to the differences in what senses we use for the majority of our communications, it is understandable that dogs will understand and read things from humans that humans are unaware of. Dogs, through the process of their domestication, have accepted humans as pack members (Fogle, 1990). There are advantages, in any social group, in understanding the emotional state of others. The use of submissive and dominant behaviours allows for reduction in aggression and fighting (Schenkel, 1967). It has

been noted that dogs are capable of reading human body language to find hidden food (Agnetta et al., 2003). Dogs have also been shown to learn by classical and operant conditioning by human actions and toward human behaviours (Fogle, 1990). Both Fox (1971) and O'Farrell (1989) suggest that dogs react to subtle changes in human behaviour and changes in the human chemical signal when the human experiences different emotions.

Do canine patients react differently to people who have certain characteristics not overtly visible on observation, such as attitude? Does this affect the ability to handle the dog?

The veterinary profession has had an increase of females entering and an increase in small animal/companion animal practices around the world, including New Zealand (Boland and Morris 1988; Jones 2002; Miller, 1998; Heath, 2002).

The way in which the dog reacts to the veterinary is important in the setting of the veterinary practice. The dog's behaviour may be affected by the veterinarian's actions or other environmental cues. In the context of looking for any differences in the behaviour of the dog, it is important for this study to use the same dogs to hold any other possible variables constant and examine the variations in their behaviours towards the different veterinary students.

3.1.1. Aims of study two

Do the demographic characteristics and attitudes of the veterinary students influence the behaviours of dogs?

1. Identify the backgrounds of the first year veterinary students.

a) Gender, b) attitude, c) age, d) dog ownership, e) work experience, f) confidence, g) fear

2. Using a dominance-submission continuum, using observed behaviours from the dogs that are accepted as being either dominant or submissive, how did the dogs react to the participants? Was there variation of the dogs' behaviour between participants?
3. Are the differences in the dogs' behaviour toward the participant affected or related to the characteristics, such as;

a) Gender, b) attitude, c) age, d) dog ownership, e) work experience, f) confidence, g) fear

4. Were there observable differences in the participants' behaviours between the two different dogs?
5. To record subjective evaluations of confidence, fear and roughness and determine if these had any relationship to the submission result or other aspects of the dogs' behaviour or the participants' attitude?
6. Given all of this, do the dogs show significant differences in their behaviour towards the participants due to any particular characteristics?

3.2. METHODS AND MATERIALS FOR STUDY TWO

There were two parts to Study Two - a questionnaire and an exercise combining humans and dogs.

3.2.1. Sample

Veterinary students in the second semester of year one, of the veterinary science degree programme at IVABS Massey University in 2000, were asked to participate in the research.

Permission was given by the institute to approach the students. There was no random choice of participants. Students were told about the research in a lecture and invited to participate. They were divided into groups, of 10 to 15 students. Students were told of the time for the research and where to go. When the students arrived at the testing location, they were given an in-depth explanation of the study, were able to ask any questions and allowed to withdraw if they wished. As encouragement to participate, the students who gave consent to take part were put into a draw for a number of veterinary books. This draw was made after all the data had been collected.

3.2.2. Questionnaire Section

The students allocated to a set time were directed into a room in the testing location.

Each student was given the research booklet (Appendix 3.1). The booklet had an instruction page, an information sheet, a consent form and the two-page questionnaire.

- The instruction page explained to the participant what was going to happen and what they needed to do if they agreed to take part in the research.
- The information sheet introduced the researchers, discussed the reason for the research, described what the participants would be asked to do and reiterated the rights of the participants.
- The consent form stated that, if signed, the participants had read the information sheet and instruction page, understood what was to be asked of them, they had answered all their questions and that they understood their rights as participants to withdraw at any stage.

- The questionnaire combined the demographic questions and the modified Pet Attitude Scale test (as described in Chapter 2).

The questionnaire included questions about the participants' experience with animals, their ownership of pets, in particular dogs, their confidence with dogs and their fear of them, and if a dog had ever bitten them.

The booklet included the modified Pet Attitude Scale (mPAS) test. This is a psychological measure for attitudes towards dogs, modified from the PAS developed by Templer et al. (1981).

The students in each group filled in the booklet before the first participant took part in the practical section. While the students were waiting for their time to participate, there was room available for them to study or spend the time as they wished but not within sight of the practical exercise. Once a student was finished in the practical section, they were asked not to discuss any aspect of it with the students who had not yet been involved.

3.2.3. Practical Exercise

Setup and materials

Materials

An indoor arena was used for the practical section of the study. The arena was approximately 20 metres in diameter. Two video cameras were set up on the exterior of the fenced-ring area, looking in. One was positioned to give an overview of the entire arena. The second was focused more closely and followed the participant and dog round the arena. Two dog cages were set in one corner of the arena. Two boots were used as markers for the points of the triangle that the participants were asked to move round. Appendix 3.3 shows a diagram of the setup.

The dogs were placed in cages made of wire, such that the dogs could see the participant coming towards them and they could see the other dog. The dogs were used to being in the cages. Large numbered cards were used to identify each participant on

each camera before the manoeuvres began, allowing the practical data to be correlated with the questionnaire data.

Approval was given for the use of two dogs for the purpose of this study. The dogs were watered and toileted prior to each group of participants. There were two groups of students each of the three days the study was conducted. The dogs were walked through the manoeuvre in the arena ten times by the researcher prior to each group starting. This was to ensure the dogs had an opportunity to settle in the environment. The manoeuvre it self was one the dogs were used to doing on a regular basis prior to the experiment. This reduced possible changes in behaviour over time due to habituation and training to the manoeuvre sequence.

Animals

Pilot Study

The objective of the pilot study was used to decide which of four possible breeds of dog would be most successful for the study. A video recorder was used to record the behaviour of four dog breeds when walked through a practical exercise. The video recording was studied to record the behaviours of the dogs. Behaviour occurrence, variation in response and ease of observation from a video recording were noted. The differences between the breeds were of interest to aid in the selection of which breed or breeds would be most appropriate.

The breeds that were used were: golden retriever, Shetland sheepdog, greyhound and a German shepherd. The participants were asked to take the dog out of a cage and walk the dog along to a marker and back again, then place the dog back into the cage.

Results:

Golden retriever

The golden retriever was easy to handle, keen to come out of the cage and walked confidently with all the participants. The golden retriever had subtle differences in behaviour with the different participants, such as licking some participants' hands, jumping up at some and pulling away from others. All of these behaviours were easily observed on the video recording.

Shetland sheepdog

The Shetland sheepdog was more standoffish with the participants, and extremely friendly with some and unsure and nervous with other participants. It showed behaviours along the dominance-submission continuum, but these were not easy to observe on the video recording due to the size of the dog.

Greyhound

The greyhound was highly energetic, jumping at all the participants, licking and exerting considerable energy once removed from the cage. The greyhound's behaviour was the same with all participants.

German shepherd

The German shepherd behaved differently with different participants. The size of the German shepherd enabled easy observation of behaviours on the video recording in comparison to the other breeds. The German shepherd was steady, but varied in responses, and was seen to exhibit a number of behaviours along the dominance-submission continuum.

Pictures from the pilot study are in Appendix 3.2

Outcome:

The Shetland sheepdog was seen as too small to use as its behaviours, although distinctive and different with different handlers, were not easy to record off the video footage. There was also concern about the effects on the dog of such a study. There was also concern about the stability of the dog's responses over time. The greyhound, may tire and differ in responses due to repetition rather than participant. The behaviours were also difficult to measure due to the liveliness.

The golden retriever is a breed that many people own as a family pet, and is seen as approachable by most people. For this reason, and because of its stability of responses, observed behaviours were varied. The German shepherd, in contrast, is a breed that many consider to be a guard dog. The German shepherd used was a large, solidly built male. It was easy to observe the behaviours from the video footage and the behaviours varied with the different participants.

Given that this study examines the behaviours of the dog towards veterinary students, it is also appropriate to use these two breeds. The golden retriever was rated by New Zealand veterinarians as one of least aggressive breeds in a survey conducted by Stafford (1996), and the German shepherd was ranked as extremely aggressive.

The golden retriever and the German shepherd were used for Study Two. They were chosen because of the ability to observe the behaviour from the video recording; the varied, yet stable behaviours exhibited; and the contrast of society views.

The dogs used were an entire two-year-old golden retriever bitch and an entire six-year-old German shepherd dog. The dogs had a collar and a one-metre lead on them. The cages were numbered one and two. These numbers were randomly changed to ensure there was no bias about the first or second dog handled.

Procedure for participants

Once the students had completed the questionnaire booklet, the instructions for the practical section were given. Each part of the instruction page was explained, and any questions about the manoeuvres were answered. Table 3.1 shows the instructions given to the students.

Table 3.1 Instruction for practical exercise

Behavioural section
In this section you will be videoed.
Please firstly hold up the board with your identification number on it to the video.
Throughout this section you are asked **NOT** to talk to the dog .
Walk up to the dog in cage **one** and hold your hands out for the dog to smell for 10 seconds.
Take the dog out of the cage and hold onto the **END** of the lead. Do not shorten or gather up the lead.
Walk the dog round the markers on the ground.
Place the dog back into the cage.
Repeat with the dog in cage **two**, remembering to allow the dog to smell you first. Do not talk to the dog.

We are looking at the dog's placement and reaction to you, not at your control of the dog, so if the dog tries to move around, do not be concerned and allow it to.
At any point in this study, you have the right not to answer any question or to withdraw from the study.

- A map of the arena was drawn in the room where participants completed the questionnaire booklet.
- The participants were given instructions to enter into the arena and to go directly to the researcher who was operating camera one.
- Consent forms were checked by the researcher at camera one as being filled out and signed.
- The researcher reiterated the instructions once more.
- The participants were asked if they had any further questions.
- The researcher allocated an identification number to each participant. This number was written on the questionnaire booklet and a large card with this number on it was given to the participant to hold up to both cameras.
- At this point, the researchers on both cameras started recording and signalled that they had recorded the ID card.
- The participant was then instructed to place the card down and commence with the manoeuvres.

Once the manoeuvres were finished, the participant was asked not to discuss the practical exercise with other students who had yet to participate in the study.

Procedure for researchers

Throughout the manoeuvre, camera 1 was focused on the overall picture. Camera 2 was used to follow the handler and dog throughout the manoeuvres. This allowed a closer examination of behaviours when recording data from the videos.

3.2.4. Data Management

To enable an efficient analysis of all this data, management systems and procedures were put in place to maintain the data's integrity and to ensure appropriate information was gathered from each source of data.

All data was coded. Categorical data was given a number, and then entered into SPSS, a statistical package for social sciences. The system for coding, and the coded data are included on the attached CD. This data was held securely and confidentially.

Questionnaire data

All responses were coded. The responses to the modified PAS measure were coded as in study one.

Practical session data

For each participant there were two videos. The first one was taken from a distance to encompass the entire manoeuvre area. The second followed the handler and dog so that they took up most of the picture. The use of the number cards, to indicate the ID numbers as assigned to questionnaires and as videoed at the beginning of each participant's manoeuvre, enabled all the data to be allocated to the correct individual for analysis.

The data on the videos included both the behaviours of the participants and the behaviours of the dogs.

To aid in the collection of this data from the videos, coding sheets were compiled along with procedures on how to collect the data (Appendix 3.6).

The procedures used for the collection of data at the same point and during the same time periods with each participant meant using general identifying markers in each manoeuvre such as;

- Breaking the manoeuvres with each dog into six section (Table 3.2)
- Setting a method to accurately stop the video of all participants at six points (Table 3.3)

All data for each person was collected separately for each dog. This was important especially for the subjective evaluations.

When looking at each section, behaviours were recorded by the predominant behaviour in that section, or for some measures, it was a one/zero sampling if the behaviour occurred in that section. For the collection of data at each of the points, the videos were

paused to allow for assessment of the behaviours. To ensure they were paused at as close to the same point, the action and placement of each point was described in detail (Table 3.3).

Table 3.2 Explanation of sections within the manoeuvre

Section One	Starts when the participant is within half a metre of the cage	Finishes as participant opens cage door
Section Two	Starts as participant opens cage door	Finishes as participant has dog out of cage and at point one
Section Three	Starts at point one	Finishes at marker one
Section Four	Starts at marker one	Finishes at marker two
Section Five	Starts at marker two	Finishes at point six
Section Six	Starts at point six	Finishes once door is closed on the dog

Table 3.3 Explanation of points within the manoeuvre

Point One	When the participant was one step from the cage towards the manoeuvre course, with the dog
Point Two	When the participant was one step out from reaching the first marker in the manoeuvre course
Point Three	When the participant was one step out from the first marker heading towards the second marker in the manoeuvre course
Point Four	When the participant was one step out from reaching the second marker in the manoeuvre course
Point Five	When the participant was one step out from the second marker heading back towards the cages
Point Six	When the participant was one step out from placing the dog back into the cage

In addition to these, different video views were used to gain additional data.

The camera 1 video, taken to include the whole manoeuvre, was used to measure:

- Total time of the manoeuvre, which was taken from the time the cage door opened to the time the cage door closed
- Placement of the dog at each of the six points.
- Distance of the dog from the handler, observed by jumping at the handler, loose on the lead or pulling at the lead, at each of the six points

It was also used to help with the subjective evaluation of fear, confidence and roughness in the handling of the dog, giving an overall picture of the whole manoeuvre.

The video data from camera 2 was used to record:

- If the dog barked
- The time and posture of the participant when allowing the dog to smell their hands. The time was counted from when the participant stopped at the cage. The hand placement was taken as either:

a) open hands on the side of the cage while kneeling

b) open hands on the side of the cage while standing

c) open hands on top of the cage while standing

d) closed hands by the side of the cage while standing

e) closed hands by the side of the cage while kneeling.

- The direction of the dog's head at the six measurement points, as towards the handler or not towards the handler
- The interest of the handler in the dog during sections 1-6, the handler looking at the dog or not looking at the dog, the predominant observation over the time of each section
- The tail position of the dog in sections 2-5, data taken as the predominant behaviour during that section
- The dog licking the handler during sections 1-6, noted as it occurred or did not.

This camera data was also used to help formulate the subjective evaluation of fear, confidence and roughness. There are photos taken from the video included in Appendix 3.4 and 3.5 to show examples of the behaviours that were measured.

In relation to the subjective measures, they were evaluated and rated on a five-point scale: not at all, slightly, somewhat, very, or extremely on each of the three.

Examples at either end of the scale:

Extreme:

- Extreme fear would be a refusal by a participant to remove the dog from the cage due to concern for their safety.
- Severe checking with the lead, hitting, or general, unwarranted physical punishment and correction would indicate extreme roughness.
- Extreme confidence would be seen as no hesitation in any aspect of the exercise and an ability to manoeuvre the dog through the entire exercise with no difficulties.

Not at all:

- No fear would be a lack of any hesitation.
- No roughness would be seen as the lack of any physical control used, even warranted to enable completion of the manoeuvre.

- No confidence would be indicated by hesitation on each aspect of the exercise and an appearance of the participant as being unsure how to handle the situation.

The reliability of the researcher's observational methods was tested. To test this, six individuals re-observed 10 participants, looking at both videos and recording the data as explained in this methodology. This was undertaken as a trained reliability test, as the individuals were shown examples of the behaviours the researcher had noted during the data collection, in particular, examples of the subjective evaluation data were explained. These were then compared to the data recorded by the researcher for the 10 participants. The result was calculated as a percentage of agreements. Methodology and the results are included in Appendix 3.7. The raw data is included on the enclosed CD of data.

With the coding of this data into SPSS, total counts or figures were calculated for the number of sections where the dog's distance was predominantly loose or pulling, the dog's placement was predominantly beside, behind or in front of the handler and the total number of sections where the dog licked the handler at least once. These totals were then used, along with whether the dog barked at the participant, to give a result indicating the dog's dominance-submission score to that person.

This was calculated using submissive or co-operative behaviours and dominant or difficult behaviours that were recorded from the video recordings. The data was summarised by summation of section data and point data, to give totals. All the behaviours used, with the exception of the dog barking, were measured over 6 points or 6 sections. Each of the behaviours could therefore have a maximum of 6. The dog barking was considered in a one/zero count.

The submissive or co-operative behaviours:

- the total points that the dog was predominantly loose on the lead
- the total number of points that the dog was placed behind or beside the handler
- and the total number of sections when the dog licked the handler once

The dominant or difficult behaviours:

- the total points the dog was pulling at the end of the lead
- the total count of points that the placement of the dog was in front of the handler

- and the dog barking at the handler.

The explanation of dominant and submissive behaviours is described in Chapter One, under communication. O'Farrell (1989) and Fogle (1990) describe the relationship of this communication to humans. Fox (1971) discusses the inclusion of humans into the dogs' social pack, and Schenkel (1967) discusses the use of the submissive/dominant behaviours as a way to reduce antagonistic and aggressive behaviours while strengthening the pack hierarchy.

The total submission result was calculated by the addition of the data given by the submissive/co-operative behaviours and the subtraction of the dominant/difficult behaviours. Thus a possible range of -13 to +24.

Combined data

The data was combined such that each manoeuvre with a dog was treated separately. As we wanted to examine the effects of student background on dog handling and the dog's behaviour, the questionnaire responses were added to the observed data from the practical section. This means there are 126 responses - two from each participant, as they handled two dogs.

3.2.5. Procedure for Statistical Analysis

Frequency and percentage descriptive statistics were gained for the variables of gender; age; dog ownership; dogs biting something or someone and what; experience with dogs - having trained a dog, how many and for how long, also by working for more than two weeks with dogs; working with other animals; confidence in handling dogs; requirement of medical treatment for a dog bite; rating of questions on danger of dogs; confidence with different breeds and fear. Frequency, distribution and normality statistics from the modified PAS measure were graphed and measured after being calculated from the coded data.

Observed dog behaviour was calculated to give the total submission result. This was then graphed to examine distribution, normality and frequencies. To test the method of calculation for this result, correlations were conducted to look at the relationship of the

results from the individual components of the total submission result. The average result from each component was also calculated, and the corresponding percentage for the amount of time the dog was doing that behaviour or the percentage of cases or sections it occurred in. Given the differing breeds and genders of the dogs used, the total submission result of each breed separately was tested and the variance was tested for significance using a t test. The individual breed submission results were examined for frequency, distribution and normality. These were then divided further and examined for any difference in the submission result for each dog, given the gender of the participant. This was done using a two-way ANOVA, testing for equality of error variances, plotting means.

To comment on any differences in the dog's behaviour toward the participants, the relationship between the total submission result and the participant information was investigated. The variation of means was tested by t tests for gender; dog ownership; confidence in handling dogs; more than two weeks working with dogs, more than two weeks working with one of the stated animals and each stated animal separately; requirement of medical treatment for a dog bite. The age was tested using an ANOVA with a post hoc test of Tukey HSD.

Regression analysis and plots were used to look at the relationship of the total submission result with the attitude of the participants, by way of the modified PAS score. This was then split for gender to examine any differences. Investigation into the effect of the modified PAS score on the total submission result was then conducted, removing the confounding variables of gender of participant and breed of dog.

The behaviours observed in the participants were recorded by frequency and percentage. These included the time taken by the handler to allow the dog to smell their hands; the body and hand posture during the time given to allow the dogs to smell their hands; and the time taken to complete the manoeuvre. The latter was also tested for distribution and normality. The total time taken to complete the manoeuvre was then compared to a number of variables testing for the significance of the variance with a t test. These included gender; dog ownership; confidence in handling dogs; working for more than two weeks with dogs; and breed of dog. A regression plot was used to look at any relationship between the time taken to complete the manoeuvre (all sections) and the

mPAS score and the time taken to complete the manoeuvre and the total submission result.

Correlation analysis was done to look for any relationship between the time taken by the handler to allow the dog to smell his/her hands and if the dog barked at him/her; the posture of the handler during the smelling of the hands and if the dog barked; dog ownership and dog barking, confidence in handling dogs and the dog barking; or handler posture and the breed of dog.

Correlation looks for relationships between variables. It does not give the direction of the relationship, cause and effect, but can analyse data to see if the relationship is significant, positive or negative. The method used to look at correlation depends on the normality of the data. Parametric data can use the Pearson correlation; non-parametric data uses the Spearman's Rho correlation. Given the nature of the categorical questions, Spearman's Rho was used.

Correlation using Pearsons was used to look at the relationship between the total submission result and the three subjective evaluations of fear, confidence and roughness. These were also looked at in relationship to the mPAS score. Spearman's Rho correlation was used to look for any relationship between the three subjective evaluations, and mean scores across all participants were also calculated. The frequency and distribution of results from these subjective evaluations were also described in relation to the breed of dog handled. The non-parametric Mann-Whitney test was used to look for any significant difference in these evaluations, based on the breed of dog handled.

3.3. RESULTS OF STUDY TWO

A total of 63 students took part in the study. The demographic and attitude questions were taken from the questionnaire. The results from the practical exercise were treated as a new record for each dog handled, with the questionnaire responses as background. Thus there were 126 participants for the practical exercise, but only 63 individuals.

1) What are the backgrounds of the first year veterinary students?

Frequency and Distribution Analysis from Questionnaire Data

Gender:
Females outnumber males in the participants, 24% to 76% (Figure 3.1 and Table 3.4).

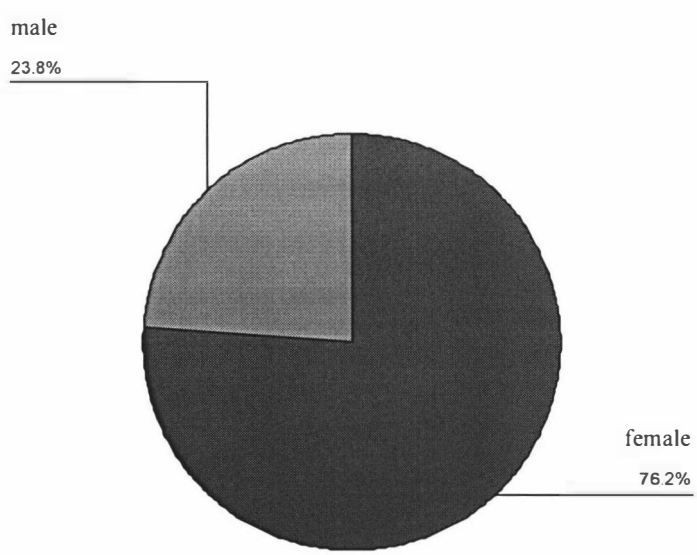


Figure 3.1 Graph of the gender mix in participants of study two

Table 3.4 Frequency and percentage of males and females

		Frequency	Percent
Gender	female	48	76.2
	male	15	23.8
	Total	63	100.0

Age:

Of the first year veterinary student, 47.6% of participants were under 20 years of age and 47.6% were between 20-34 with the remaining 4.8% between 35 and 49 years (Figure3.2).

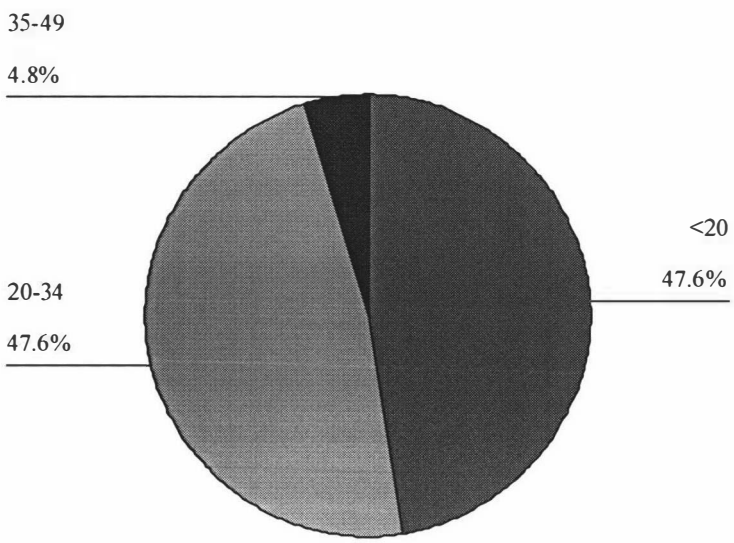


Figure 3.2 Graph of the frequency percentage in each age groups

Dog ownership:

Of the 63 participants, 34 had owned a dog (54%) and 40 (63%) had taken responsibility of a dog (Table 3.5 and 3.6). Thirty percent of participants' dogs had bitten someone or something. Nine participants' dogs had bitten a household member, (14% of all participants and 26% of participants that owned a dog). The same number had bitten another dog (Table 3.7).

Table 3.5 Frequency and percentage of dog ownership

		Frequency	Percent
Dog Ownership	no	29	46.0
	yes	34	54.0
	Total	63	100.0

Table 3.6 Frequency and percentage of participants that have had responsibility for a dog

		Frequency	Percent
Responsibility of a dog	no	23	36.5
	yes	40	63.5
	Total	63	100.0

Table 3.7 Frequency and percentage of participants that have owned a dog that has bitten something or someone and who or what they have bitten

		Frequency	Percent
Has your dog bitten something or someone	no	44	69.8
	yes	19	30.2
	Total	63	100.0
A member of the household	no	52	82.5
	yes	9	14.3
	Total	61	96.8
Missing	System	2	3.2
Total		63	100.0
A visitor	no	58	92.1
	yes	3	4.8
	Total	61	96.8
Missing	System	2	3.2
Total		63	100.0
An intruder	no	61	96.8
Missing	System	2	3.2
Total		63	100.0
Another dog	no	52	82.5
	yes	9	14.3
	Total	61	96.8
Missing	System	2	3.2
Total		63	100.0
Another animal	no	55	87.3
	yes	6	9.5
	Total	61	96.8
Missing	System	2	3.2
Total		63	100.0

Experiences with dogs:

Sixty percent of participants had not trained a dog, only 13%, or 8 participants, had trained more than one dog (Table 3.8). Those that had trained a dog had done so for 1-5years (16 participants). Eleven percent had been training dogs for over ten years (Table 3.8).

Table 3.8 Frequency and percentage of dogs the participants have trained and for how long they have trained dogs

		Frequency	Percent
How many dogs have you trained			
	0	38	60.3
	1	16	25.4
	2-5	8	12.7
	Total	62	98.4
Missing	System	1	1.6
Total		63	100.0
How long have you been training/handling dogs	0	30	47.6
	<1	4	6.3
	1-5	16	25.4
	5-10	6	9.5
	>10yr	7	11.1
	Total	63	100.0

Forty-one percent of the participants had worked for more than two weeks with dogs (26 participants). The most common place of work was in a veterinary practice, with 22% of all participants having worked for more than two weeks with dogs in a veterinary practice. Sixteen percent of all participants had worked with sheepdogs (Table 3.9).

The questionnaire requested information about work with other animals. It was seen that 67% (42 participants) had worked with one of the five listed animals. The most common animal to have worked with was horses, with 49% of all the participants. Thirty-two percent and 27% of all the participants had worked for more than two weeks with cattle and sheep respectively. This question was asked in such a way to allow for participants to mark more than one animal that they had worked with for more than two weeks (Table 3.10).

Table 3.9 Frequency and percentage of participants that have had more than two week experience working with dogs, and in what context

		Frequency	Percent
Have you worked with dogs >2wks	no	37	58.7
	yes	26	41.3
	Total	63	100.0
Kennels	no	59	93.7
	yes	4	6.3
	Total	63	100.0
Veterinary Practice	no	49	77.8
	yes	14	22.2
	Total	63	100.0
Grooming parlour	no	63	100.0
Sheepdog work	no	53	84.1
	yes	10	15.9
	Total	63	100.0
Hunting pack	no	63	100.0
Gundogs	no	58	92.1
	yes	5	7.9
	Total	63	100.0

Table 3.10 Frequency and percentage of participants that have worked with either horses, cattle, deer, sheep or pigs, and with which animals for more than 2wks

		Frequency	Percent
Have you worked >2wks with these animals	no	21	33.3
	yes	42	66.7
	Total	63	100.0
Horses	no	32	50.8
	yes	31	49.2
	Total	63	100.0
Cattle	no	43	68.3
	yes	20	31.7
	Total	63	100.0
Deer	no	62	98.4
	yes	1	1.6
	Total	63	100.0
Sheep	no	46	73.0
	yes	17	27.0
	Total	63	100.0
Pigs	no	63	100.0

When asked the yes-no question of "do you feel confident handling dogs?", 51 participants (81%) answered yes, 11 (18%) answered that they did not feel confident handling dogs (Table 3.11).

Only three participants had required medical treatment for a dog bite (Table 3.12).

Table 3.11 Frequency and percentage of participants that feel confident handling dogs

		Frequency	Percent
Do you feel confident handling dogs	no	11	17.5
	yes	51	81.0
	Total	62	98.4
Missing	System	1	1.6
Total		63	100.0

Table 3.12 Frequency and percentage of participants that have needed medical treatment for a dog bite

		Frequency	Percent
Needed medical treatment for a bite	no	60	95.2
	yes	3	4.8
	Total	63	100.0

Six participants (9%) agreed, to some degree, that dogs are dangerous. Twenty-four participants (38%) are afraid of some breeds of dogs and twenty-four participants (38%) are fearful of unknown dogs. In contrast, 28 participants (44%) feel confident with any breed of dog, 55 (87%) have had pleasant experiences with dogs and 27 (43%) enjoy handling strange dogs (Table 3.13).

Table 3.13 Frequencies and percentages of responses along the 7 point rating scale regarding views on danger of dogs, confidence with different breeds and fear

		Frequency	Percent
Consider dogs to be dangerous	2	1	1.6
	3	5	7.9
	4	18	28.6
	5	16	25.4
	6	19	30.2
	7	4	6.3
	Total	63	100.0
Feel confident with any breed of dog	1	4	6.3
	2	12	19.0
	3	12	19.0
	4	15	23.8
	5	7	11.1
	6	12	19.0
	7	1	1.6
	Total	63	100.0
Experiences with dogs have been pleasant	1	25	39.7
	2	23	36.5
	3	7	11.1
	4	5	7.9
	5	1	1.6
	6	2	3.2
	Total	63	100.0
Afraid of some breeds of dogs	1	5	7.9
	2	5	7.9
	3	14	22.2
	4	12	19.0
	5	8	12.7
	6	13	20.6
	7	6	9.5
	Total	63	100.0
Fearful of unknown dogs	1	2	3.2
	2	2	3.2
	3	20	31.7
	4	10	15.9
	5	10	15.9
	6	14	22.2
	7	5	7.9
	Total	63	100.0
Enjoy handling strange dogs	1	4	6.3
	2	8	12.7
	3	15	23.8
	4	15	23.8
	5	12	19.0
	6	8	12.7
	7	1	1.6
	Total	63	100.0

Attitudes to dogs:

The range of scores on the modified PAS measure was from –3 to 47. A frequency plot was drawn to observe the normality of the curve (Figure 3.3). The scores had a mean of 26.9 (Table 3.14).

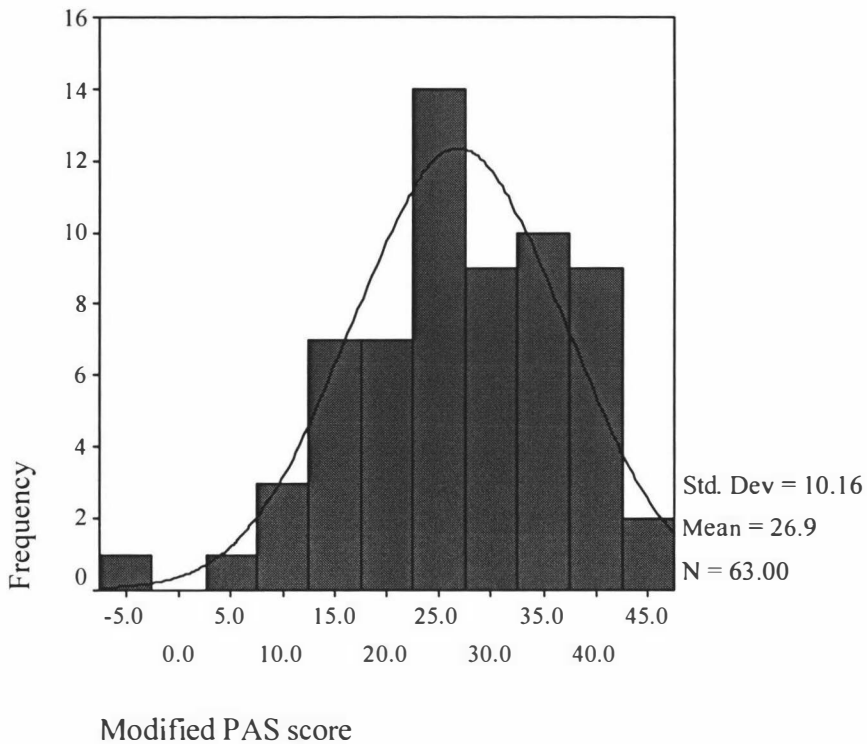


Figure 3.3 *Histogram and normality curve of the frequency of modified PAS scores*

Table 3.14 *Table frequency and distribution information regarding the mPAS scores*

N	Valid	63
	Missing	63
Mean		26.8730
Std. Error of Mean		1.28014
Median		26.0000
Std. Deviation		10.16079
Variance		103.24168
Skewness		-.362
Std. Error of Skewness		.302
Kurtosis		.073
Std. Error of Kurtosis		.595
Range		50.00
Minimum		-3.00
Maximum		47.00
Percentiles	25	21.0000
	50	26.0000
	75	34.0000

2) How did the dogs react to the participants?

Was there variation of the dogs' behaviour between participants?

Observed Dog Behaviour Data

The total submission results ranged from -12 to 22 with a mean of 2.9 and was seen to have a normal distribution, skewness =0.161, Std error 0.216 (Figure 3.4 and Table 3.15).

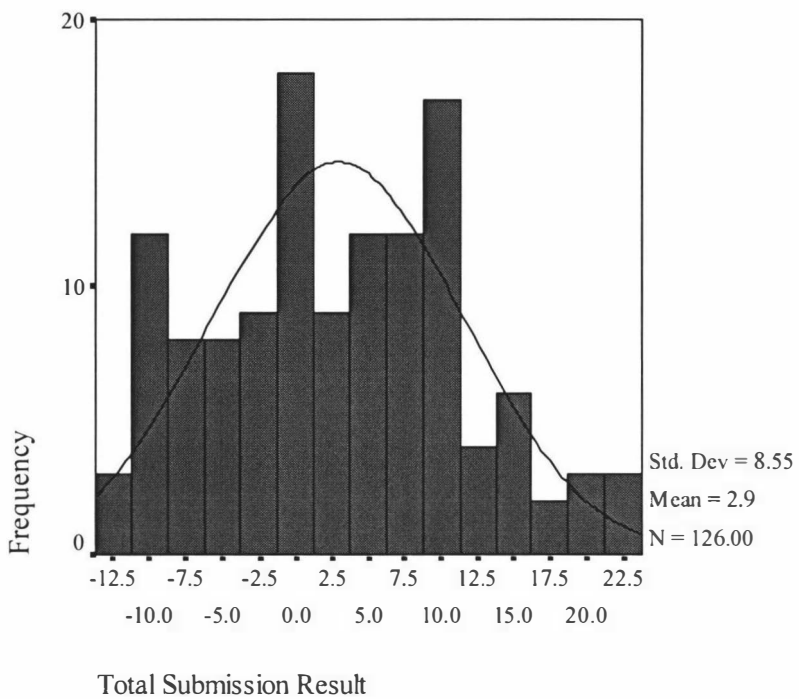


Figure 3.4 Frequency, distribution and normality curve for the total submission result

Table 3.15 Frequency and distribution information about the total submission result

N	Valid	126
	Missing	0
Mean		2.9286
Std. Error of Mean		.76130
Median		3.0000
Std. Deviation		8.54558
Variance		73.02686
Skewness		.161
Std. Error of Skewness		.216
Kurtosis		-.720
Std. Error of Kurtosis		.428
Range		34.00
Minimum		-12.00
Maximum		22.00

Looking at the variables that were used to make up the total submission result it can be seen there are significant correlations, both positive and negative (Table 3.17).

The averages of the variable responses that were used to give the submission result indicated that the dogs were beside the handler at three out of the six measurement points, in front for two and behind for one. During 37% of the practical exercises, the dog barked at the handler. Only the German Shepherd barked at the handlers. Only the Golden retriever licked the handler, and did so in 35% of the four sections measured for this behaviour (Table 3.16).

Table 3.16 Mean results for the elements used to calculate the total submission result and percentages when compared to method of sampling

	TOT LICK	TOT LOOSE	TOT PULL	TOT BESID	TOT BEHIN	TOT FRONT	TOT LOK@H	TOT SUB	did the dog bark
Mean	.698	2.761	3.039	2.968	.936	1.944	.920	2.92	.332
Std. Error of Mean	.101	.164	.167	.159	.115	.176	.125	.761	.052
Std. Deviation	1.140	1.847	1.877	1.793	1.300	1.985	1.406	8.545	.589
Variance	1.300	3.414	3.526	3.214	1.691	3.940	1.977	73.026	.347
Number of samples	4	6	6	6	6	6	6		1
Percentage	17	46	51	50	16	32	15		33

Table 3.17 Correlations between the elements used to calculate the total submission result

			TOT LICK	TOT LOOSE	TOT PULL	TOT BESID	TOT BEHIN	TOT FRONT	TOT LOK@H	TOT SUB	did the dog bark
Spearman's rho	TOT LICK	Correlation Coefficient	1.000	.393 (**)	-.347 (**)	.196 (*)	.191 (*)	-.314 (**)	.376 (**)	.499 (**)	-.364 (**)
		Sig. (2-tailed)	.	.000	.000	.028	.033	.000	.000	.000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT LOOSE	Correlation Coefficient	.393 (**)	1.000	-.877 (**)	.538 (**)	.294 (**)	-.607 (**)	.466 (**)	.880 (**)	-.412 (**)
		Sig. (2-tailed)	.000	.	.000	.000	.001	.000	.000	000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT PULL	Correlation Coefficient	-.347 (**)	-.877 (**)	1.000	-.407 (**)	-.259 (**)	.698 (**)	-.441 (**)	-.851 (**)	.314 (**)
		Sig. (2-tailed)	.000	.000	.	.000	.003	.000	.000	.000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT BESID	Correlation Coefficient	.196 (*)	.538 (**)	-.407 (**)	1.000	-.045	-.644 (**)	.151	.637 (**)	-.419 (**)
		Sig. (2-tailed)	.028	.000	.000	.	.620	.000	.092	000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT BEHIN	Correlation Coefficient	.191 (*)	.294 (**)	-.259 (**)	-.045	1.000	-.516 (**)	.350 (**)	.487 (**)	-.335 (**)
		Sig. (2-tailed)	.033	.001	.003	.620	.	.000	.000	.000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT FRONT	Correlation Coefficient	-.314 (**)	-.607 (**)	.698 (**)	-.644 (**)	-.516 (**)	1.000	-.358 (**)	-.870 (**)	.498 (**)
		Sig. (2-tailed)	.000	.000	.000	.000	000	.	.000	000	.000
		N	126	126	126	126	126	126	126	126	126
	TOT LOK@H	Correlation Coefficient	.376 (**)	.466 (**)	-.441 (**)	.151	.350 (**)	-.358 (**)	1.000	.579 (**)	-.300 (**)
		Sig. (2-tailed)	.000	.000	.000	.092	000	.000	.	000	.001
		N	126	126	126	126	126	126	126	126	126
	TOT SUB	Correlation Coefficient	.499 (**)	.880 (**)	-.851 (**)	.637 (**)	.487 (**)	-.870 (**)	.579 (**)	1.000	-.581 (**)
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000
		N	126	126	126	126	126	126	126	126	126
	did the dog bark	Correlation Coefficient	-.364 (**)	-.412 (**)	.314 (**)	-.419 (**)	-.335 (**)	.498 (**)	-.300 (**)	-.581 (**)	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.001	000	.
		N	126	126	126	126	126	126	126	126	126

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

It was noted however, that there was a significant difference in total submission score, dependent upon which breed of dog was being handled (Table 3.18, 3.19 and Figure 3.5). Each participant handled each dog, and the order was randomly assigned. The German Shepherd was significantly more dominant than the Golden retriever according to the total submission result.

It was seen that there was a normal distribution of the frequencies of the total submission results when separated by breed and the standard deviations were very similar (Figure 3.6 and 3.7).

Table 3.18 Mean total submission result for the Golden retriever and the German Shepherd

	Breed of dog	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	Golden retriever	63	8.76	6.656	.838
	German Shepherd	63	-2.90	5.810	.732

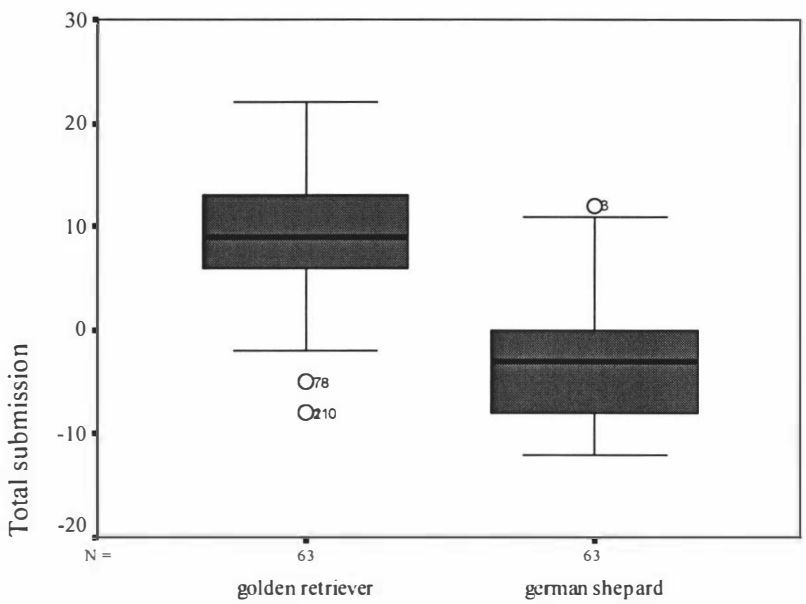


Figure 3.5 Difference in total submission result between breeds

Table 3.19 T test for variance between the Golden retriever and the German Shepherd total submission results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Inter al of the Difference	
									Lower	Upper
TOT SUB	Equal variances assumed	.123	.726	10.480	124	.000	11.666	1.113	9.463	13.870
	Equal variances not assumed			10.480	121.777	.000	11.666	1.113	9.462	13.870

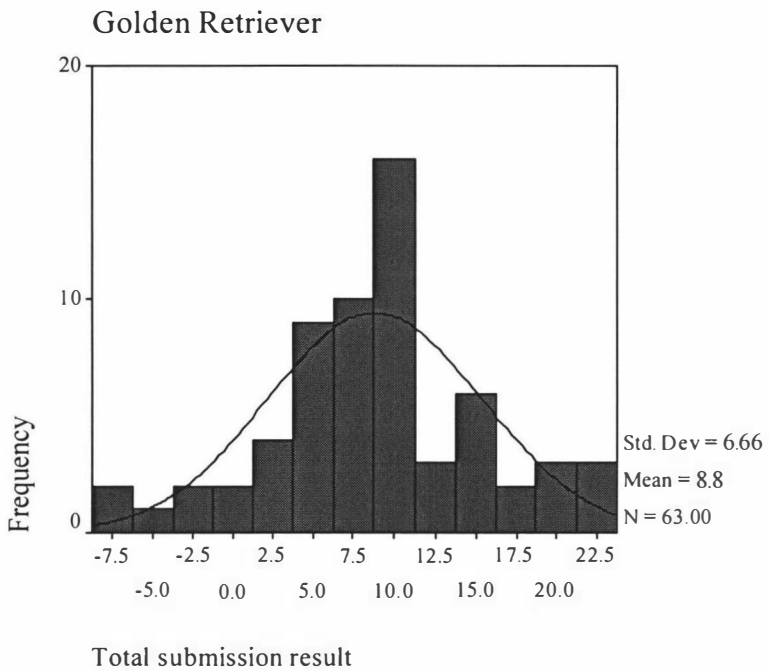


Figure 3.6 Histogram and normality curve of total submission result for the Golden retriever

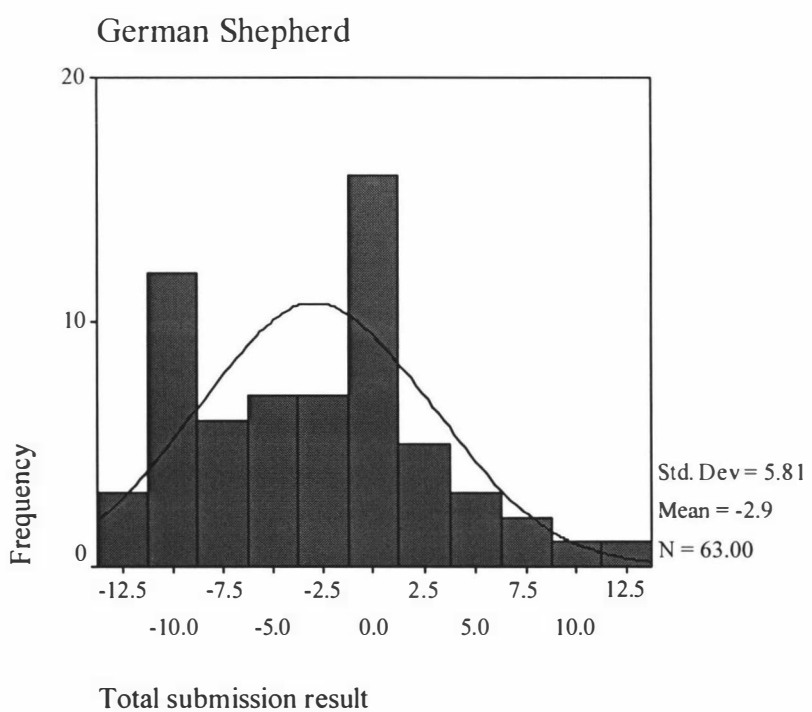


Figure 3.7 Histogram and normality curve of total submission results for the German Shepherd

Given the difference in the total submission results for each breed of dog and that there was no overall gender difference it was found there was no significant difference

between how either breed behaved towards males or females (Table 3.20). The standard deviations appear relatively homogeneous.

Table 3.20 Descriptive Statistics

Dependent Variable: TOTSUB

GENDER	Breed of dog	Mean	Std. Deviation	N
female	Golden retriever	8.270	6.834	48
	German Shepherd	-2.958	5.500	48
	Total	2.656	8.362	96
male	Golden retriever	10.333	5.996	15
	German Shepherd	-2.733	6.922	15
	Total	3.800	9.200	30
Total	Golden retriever	8.761	6.656	63
	German Shepherd	-2.904	5.810	63
	Total	2.928	8.545	126

There is no reason to believe that the equal variances assumption is violated (Table 3.21). Thus, the small differences in group standard deviations observed in the descriptive statistics table are due to random variation.

Table 3.21 Levene's Test of Equality of Error Variances

Dependent Variable: TOTSUB

F	df1	df2	Sig.
.344	3	122	.794

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a Design: Intercept+GENDER+DOG1+GENDER * DOG1

Nearly parallel lines shows there is little interaction of gender and breed on the submission result (Figure 3.8).

Figure 3.8 Graph of interaction between gender of participant, submission result and breed of dog

The analysis of variance shows that the breed of dog has a significant relationship with the total submission, and the partial Eta squared confirms this after the variation of error has been considered. The combination of gender and breed of dog is not significant, nor is it when the variation errors are considered (Table 3.22).

Table 3.22 Analysis of variance between the breed of dog and the gender of the handler in relation to the total submission result

Tests of Between-Subjects Effects
Dependent Variable: TOTSUB

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4336.695	3	1445.565	36.805	.000	.475
Intercept	952.758	1	952.758	24.258	.000	.166
GENDER	29.901	1	29.901	.761	.385	.006
DOG1	3373.072	1	3373.072	85.881	.000	.413
GENDER * DOG1	19.294	1	19.294	.491	.485	.004
Error	4791.663	122	39.276			
Total	10209.000	126				
Corrected Total	9128.357	125				

a R Squared = .475 (Adjusted R Squared = .462)

3) **Are the differences in the dogs' behaviour toward the participant affected or related to the characteristics of the participants?**

Comparison of Questionnaire Data with Observed Data

The questionnaire data and the observed behaviour data were compared to look for any links. There was no difference between males and females with regard to the total submission result (Table 3.23 and 3.2). The participants that had owned a dog showed a tendency to have a higher total submission result. This was not significant, but a tendency with p=0.132 (Table 3.25 and 3.26).

The participants that answered negatively to the question "Do you feel confident?" were found to elicit a higher total submission result, a mean for the group of 4.3. Those participants that answered the question positively elicited a mean result of 2.6 from the dogs. This was not significant, due to the larger standard error from the small group of negative participants (11 individuals, 22 dog manoeuvres) (Table 3.27 and 3.38).

The participants that had spent more than two weeks working with dogs or one of the listed animals did not show any difference in mean total submission results when compared to those that had not (Table 3.29 - 3.32; Appendix 3.9).

The mean submission result, for participants that had required medical treatment for a dog bite was 0.5, while for those that had not, it was 3.1. This result was not significant due to the errors introduced by the small sample size of six participants who had required treatment (Table 3.33 and 3.34).

There was no significant difference in total submission result in relation to age, either across all age groups, or between any two (Table 3.35, 3.36 and 3.37).

Table 3.23 Mean total submission results for males and females

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	female	96	2.65	8.362	.853
	male	30	3.80	9.200	1.679

Table 3.24 T test for variance between total submission results for males and females

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOT SUB	Equal variances assumed	1.157	.284	-.638	124	.524	-1.1437	1.79169	-4.690	2.402
	Equal variances not assumed			-.607	44.992	.547	-1.1437	1.88417	-4.938	2.651

Table 3.25 Mean total submission results for dog owners and non-dog owners

	have owned a dog	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	58	4.17	7.971	1.046
	yes	68	1.86	8.927	1.082

Table 3.26 T test of variance between the total submission results based on dog ownership

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOT SUB	Equal variances assumed	1.037	.310	1.517	124	.132	2.304	1.519	-.702	5.312
	Equal variances not assumed			1.531	123.725	.128	2.304	1.505	-.675	5.285

Table 3.27 Mean total submission results of those that feel confident handling dogs and those that do not

	do you feel confident handling dogs	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	22	4.31	8.908	1.899
	yes	102	2.68	8.546	.846

Table 3.28 T test of variance between the total submission results based on confidence handling dogs

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOT SUB	Equal variances assumed	.013	.908	.806	122	.422	1.631	2.024	-2.374	5.638
	Equal variances not assumed			.785	29.920	.439	1.631	2.079	-2.615	5.879

Table 3.29 Mean total submission result of those that have worked for more than two weeks with dogs and those that have not

	have you had more than 2wks work with dogs	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	74	3.05	8.292	.963
	yes	52	2.75	8.972	1.244

Table 3.30 T test for variance of total submission result based on more than two weeks working with dogs

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOT SUB	Equal variances assumed	.419	.518	.196	124	.845	.3041	1.552	-2.768	3.376
	Equal variances not assumed			.193	104.336	.847	.3041	1.573	-2.817	3.425

Table 3.31 Mean total submission result for working for more than two weeks with other stated animals

	have worked with one of stated animals more than 2wks	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	42	1.73	7.898	1.218
	yes	84	3.52	8.836	.964

Table 3.32 T test for variance of total submission result based on working for more than two weeks with other stated animals

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	.250	.618	-1.107	124	.271	-1.785	1.613	-4.979	1.407
	Equal variances not assumed			-1.149	90.802	.254	-1.785	1.554	-4.872	1.30

Table 3.33 Mean total submission result of participants that have required medical treatment for a dog bite and those that have not

	ever needed medical treatment for a dog bite	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	120	3.05	8.657	.790
	yes	6	.50	5.856	2.390

Table 3.34 T test for variance between the total submission result based on requirement of medical treatment for a dog bite

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	2.162	.144	.712	124	.478	2.5500	3.581	-4.539	9.639
	Equal variances not assumed			1.013	6.149	.349	2.55	2.518	-3.575	8.675

Table 3.35 Between and within group measures for influence of age of participant on total submission of the dog

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.240	2	5.120	.069	.933
Within Groups	9118.117	123	74.131		
Total	9128.357	125			

Table 3.36 One-way ANOVA looking at the influence of participant age on the total submission of the dog

Dependent Variable: TOTSUB
Tukey HSD

(I) AGE	(J) AGE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<20	20-34	.316	1.571	.978	-3.412	4.046
	35-49	-.966	3.686	.963	-9.712	7.779
20-34	<20	-.316	1.571	.978	-4.046	3.412
	35-49	-1.283	3.686	.935	-10.029	7.462
35-49	<20	.966	3.686	.963	-7.779	9.712
	20-34	1.283	3.686	.935	-7.462	10.029

Table 3.37 Post hoc analysis of ANOVA using Tukey HSD

AGE	N	Subset for alpha = .05
		1
20-34	60	2.716
<20	60	3.033
35-49	6	4.000
Sig.		.912

The modified PAS score, when compared to the total submission result using a regression model, showed no significant relationship, but there was a downward trend (Figure 3.9). This was then split into male and females, based on the known difference in modified PAS scores. This showed a more significant downward trend for females (-0.13), that when females with a more positive attitude to dogs handled the dogs, the dogs behaved with less submissive behaviours. This was not the case for males, who showed very little difference, but there was a very minute upward trend (0.03) (Figure 3.10).

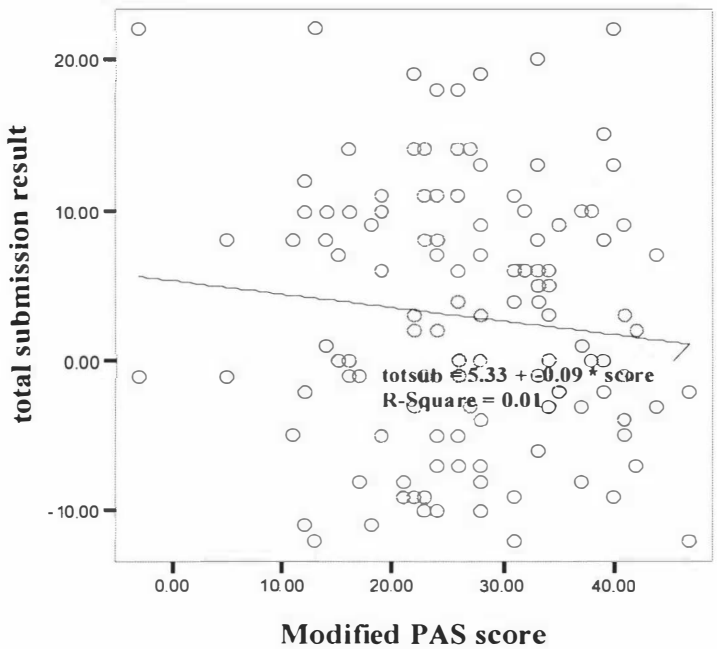


Figure 3.9 Linear regression of mPAS score to the total submission score

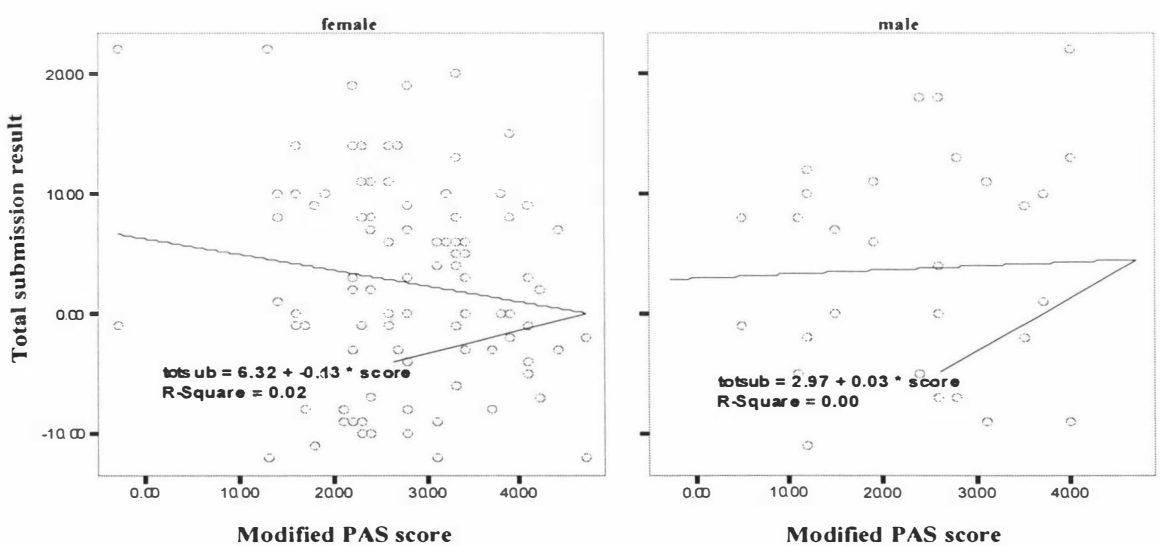


Figure 3.10 Linear regression of mPAS score to the total submission score divided by gender

There was a need to look beyond the influence of other variables such as gender, which were seen in study one to be significant in the modified PAS score and breed of dog, which is seen to have a significant influence on the total submission score. It was seen that when the influences of the confounding variables were removed, there was a negative trend of 8.396. This at 0.134 was not significant (Table 3.38). This means that, as the modified PAS score increases, becomes more positive, the total submission result becomes lower, when the confounding variables of gender and dog breed are accounted for.

Table 3.38 Coefficients total submission result to mPAS score with confounding variables of breed of dog and gender held constant

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	21.652	2.955		7.328	.000
	Modified PAS score	-8.396E-02	.056	-.099	-1.508	.134
	Breed of dog	-11.667	1.109	-.685	-10.524	.000
	GENDER	.834	1.317	.042	.633	.528

4) Were there observable differences in the participants' behaviours toward the dogs and between the two different dogs?

Observed Participant Behaviour Data

The majority of participants took 5-10 seconds for the dogs to smell their hands (51%) and did so from a standing position with hand open (71%) (Table 3.39 and 3.40).

Table 3.39 Frequency and percentage of time given by the handler for smelling of hands

		Frequency	Percent
Valid	0	3	2.4
	0-5	23	18.3
	5-10	64	50.8
	10-20	25	19.8
	>20	9	7.1
	Total	124	98.4
Missing	System	2	1.6
Total		126	100.0

Table 3.40 Frequency and percentage of hand/body posture of handler while smelling

		Frequency	Percent
Valid	.00	2	1.6
	open hands kneeling	17	13.5
	open hands standing	89	70.6
	open hands on top	3	2.4
	closed hands standing	10	7.9
	closed hands kneeling	4	3.2
	Total	125	99.2
Missing	System	1	.8
Total		126	100.0

Total time taken to do the manoeuvre

The mean time for participants to complete the full manoeuvre was 41 seconds. The range was from 19 to 148 seconds (Table 3.41). There was seen to be normal distribution (Figure 3.11).

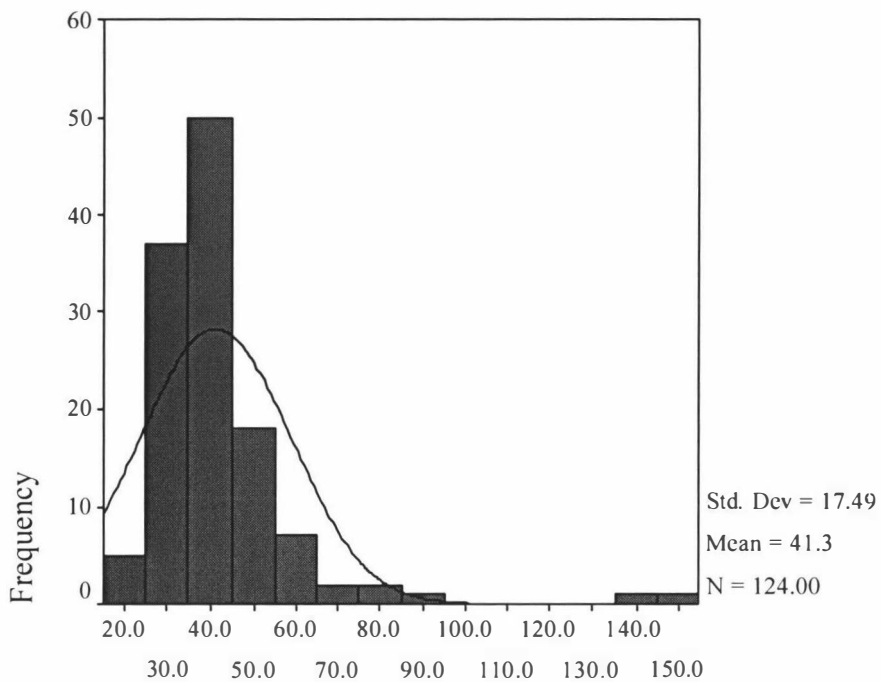


Figure 3.11 Histogram and normality curve of the frequency of time to complete manoeuvre

Table 3.41 Frequency and distribution information regarding the time to complete the manoeuvre

N	Valid	124
	Missing	2
Mean		41.282
Std. Error of Mean		1.570
Std. Deviation		17.485
Variance		305.732
Skewness		3.668
Std. Error of Skewness		.217
Kurtosis		18.552
Std. Error of Kurtosis		.431
Range		129.00
Minimum		19.00
Maximum		148.00
Percentiles	25	32.00
	50	37.00
	75	45.00

Females took significantly longer than males to complete the manoeuvres (Table 3.42 and 3.43). The results from the t tests showed no significant differences between the participants that had owned a dog and the total time taken (Table 3.44 and 3.45); or those participants that felt confident handling dogs and the total time taken to complete the manoeuvres (Table 3.46 and 3.47). Those that had worked with dogs for more than 2 weeks did not show a significant difference, but there was a slight trend with significance of 0.146 (Table 3.48 and 3.49). There was no significant difference between the breed of dog and the length of time taken to complete the manoeuvre (Table 3.50 and 3.51).

Table 3.42 Mean time taken to complete the manoeuvre by males and females

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
total time to complete the manoeuvre	female	95	43.70	19.077	1.957
	male	29	33.34	6.007	1.115

Table 3.43 T test of variance between times taken to complete the manoeuvre based on gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
total time to complete the manoeuvre	Equal variances assumed	5.395	.022	2.874	122	.005	10.360	3.604	3.224	17.496
	Equal variances not assumed			4.599	121.83	.000	10.360	2.252	5.900	14.820

Table 3.44 Mean time taken to complete the manoeuvre based on dog ownership

	have owned a dog	N	Mean	Std. Deviation	Std. Error Mean
total time to complete	no	57	41.22	13.959	1.848
the manoeuvre	yes	67	41.32	20.110	2.456

Table 3.45 T test of variance between times taken to complete the manoeuvre based on dog ownership

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
total time to complete the manoeuvre	Equal variances assumed	.036	.849	-.032	122	.975	-.100	3.163	-6.362	6.162
	Equal variances not assumed			-.033	117.506	.974	-.100	3.074	-6.189	5.989

Table 3.46 Mean time taken to complete the manoeuvre based on confidence handling dogs

	do you feel confident handling dogs	N	Mean	Std. Deviation	Std. Error Mean
total time to complete the manoeuvre	no	22	41.36	8.115	1.730
	yes	100	40.21	16.304	1.630

Table 3.47 T test of variance between time taken to complete the manoeuvre based on confidence handling dogs

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
total time to complete the manoeuvre	Equal variances assumed	1.567	.213	.322	120	.748	1.153	3.577	-5.930	8.237
	Equal variances not assumed			.485	64.126	.629	1.153	2.377	-3.595	5.902

Table 3.48 Mean time taken to complete the manoeuvre based on if the participant had worked for more than two weeks with dogs or not

	have you had more than 2wks work with dogs	N	Mean	Std. Deviation	Std. Error Mean
total time to the manoeuvre	no	73	43.19	17.452	2.042
	yes	51	38.54	17.337	2.427

Table 3.49 T test of variance between the time taken to complete the manoeuvre based on working with dogs for more than 2 weeks or not

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
total time to complete the manoeuvre	Equal variances assumed	.136	.713	1.462	122	.146	4.642	3.176	-1.645	10.930
	Equal variances not assumed			1.463	108.196	.146	4.642	3.172	-1.645	10.931

Table 3.50 Mean time taken to complete the manoeuvre based on the breed of dog used

	Breed of dog	N	Mean	Std. Deviation	Std. Error Mean
total time to complete all sections	Golden retriever	63	41.93	20.688	2.606
	German Shepherd	61	40.60	13.549	1.734

Table 3.51 T test of variance between the time taken to complete the manoeuvre based on the breed of dog taken

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
total time to complete all sections	Equal variances assumed	.124	.725	.422	122	.674	1.330	3.151	-4.908	7.568
	Equal variances not assumed			.425	107.332	.672	1.330	3.130	-4.876	7.536

The score the participants got on the modified PAS measure was no indication of the total time taken to complete all the sections, as seen in the regression model Figure 3. 12. There was a slight downward trend among those that had a lower total submission and who took longer to complete the manoeuvres (Figure 3.13).

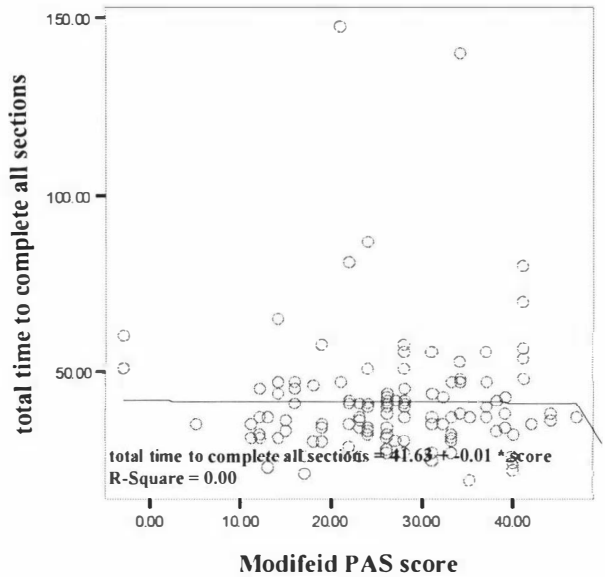


Figure 3.12 Linear regression of mPAS score to total time taken to complete all sections of the manoeuvre

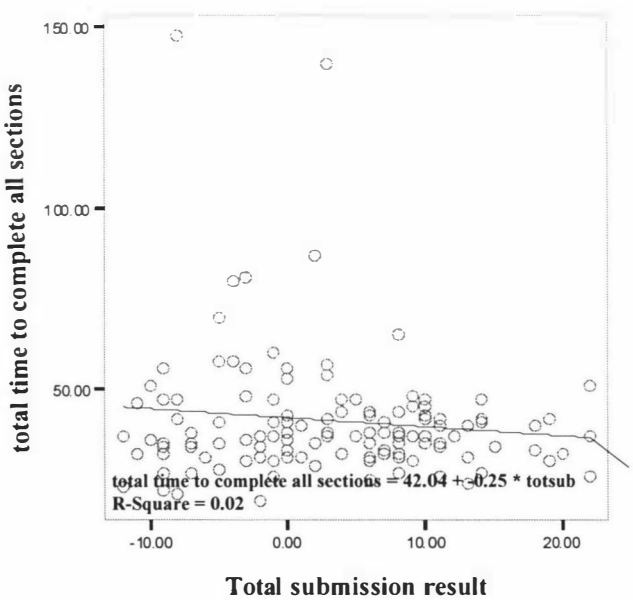


Figure 3.13 Linear regression of total submission result to total time taken to complete all sections of the manoeuvre

The dog barking and the participants' behaviour

The dog barking at the participant was significantly correlated with the length of time the participant took to allow the dog to smell their hands (Table 3.52). It was not correlated with the posture of the hand smelling (Table 3.53). Nor was there any correlation between those that the dog barked at and the total time taken to complete the manoeuvres. There was no correlation between the dog barking and the results to questions 26-31 (Appendix 3.8).

Table 3.52 Correlation of the dog barking and the time given by the participant for the dog to smell their hands

			time handler gave for smelling of hands	did the dog bark
Spearman's rho	time handler gave for smelling of hands	Correlation Coefficient	1.000	.267(**)
		Sig. (2-tailed)	.	.003
		N	124	124
	did the dog bark	Correlation Coefficient	.267(**)	1.000
		Sig. (2-tailed)	.003	.
		N	124	126

** Correlation is significant at the 0.01 level (2-tailed).

Table 3.53 Correlation of the dog barking and the handler's posture while allowing the dog to smell their hands

			did the dog bark	handler hand/body posture while smelling
Spearman's rho	did the dog bark	Correlation Coefficient	1.000	.145
		Sig. (2-tailed)	.	.106
		N	126	125
	handler hand/body posture while smelling	Correlation Coefficient	.145	1.000
		Sig. (2-tailed)	.106	.
		N	125	125

There was no significant correlation between the posture the participants used while allowing the dogs to smell their hands and the breed of the dog. Nor was there a correlation between the dog barking at the participant and if they owned a dog, or the dog barking and if the participant felt confident to handle dogs (Table 3.54, 3.55 and3.56).

Table 3.54 Correlation of the participants' posture while smelling with breed of dog

			handler hand/body posture while smelling	Breed of dog
Spearman's rho	handler hand/body posture while smelling	Correlation Coefficient	1.000	.086
		Sig. (2-tailed)	.	.341
		N	125	125
	Breed of dog	Correlation Coefficient	.086	1.000
		Sig. (2-tailed)	.341	.
		N	125	126

Table 3.55 Correlation of the dog barking and dog ownership

			did the dog bark	have owned a dog
Spearman's rho	did the dog bark	Correlation Coefficient	1.000	-.106
		Sig. (2-tailed)	.	.237
		N	126	126
	have owned a dog	Correlation Coefficient	-.106	1.000
		Sig. (2-tailed)	.237	.
		N	126	126

Table 3.56 Correlations of the dog barking and confidence handling dogs

			did the dog bark	do you feel confident handling dogs
Spearman's rho	did the dog bark	Correlation Coefficient	1.000	-.054
		Sig. (2-tailed)	.	.550
		N	126	124
	do you feel confident handling dogs	Correlation Coefficient	-.054	1.000
		Sig. (2-tailed)	.550	.
		N	124	124

Withdrawals

There were three participants that withdrew when going to handle the German shepherd. In all cases the dog barked at the participant as they approached the cage. A summary of their profiles: Two were males, one female, all were 20-34years, all had owned a dog, all said they were confident in handling dogs, two had worked for more than two weeks with dogs. One had required medical treatment for a dog bite. Their responses to questions 26-31 ranged from strongly agreeing to strongly disagreeing.

5) Did the subjective evaluations of confidence, fear and roughness have any relationship to the submission result, other aspects of the dogs' behaviour or the participants' attitude?

There was a significant positive correlation between the subjective evaluation of the handler's confidence and the total submission result and significant negative correlation with the attitude score (Table 3.57). This evaluation of confidence was significantly negatively correlated with the evaluation of fear, and significantly positively correlated with roughness (Table 3.58). There was a negative relationship between the evaluation of fear and the total submission result. This was a trend but not significant with sig.(2 tailed) = 0.086 in the pearson correlation.

Table 3.57 Correlation of subjective evaluations, total submission result and mPAS score using Pearson correlation

		TOT SUB	subjective evaluation of handler's confidence	subjective evaluation of handler's fear	subjective evaluation of handler's roughness	Modified PAS score
TOTSUB	Pearson Correlation	1	.234(**)	-.154	-.074	-.106
	Sig. (2-tailed)	.	.008	.086	.417	.238
	N	126	126	126	123	126
subjective evaluation of handler's confidence	Pearson Correlation	.234(**)	1	-.540(**)	.348(**)	-.190(*)
	Sig. (2-tailed)	.008	.	.000	.000	.033
	N	126	126	126	123	126
subjective evaluation of handler's fear	Pearson Correlation	-.154	-.540(**)	1	-.078	.104
	Sig. (2-tailed)	.086	.000	.	.391	.246
	N	126	126	126	123	126
subjective evaluation of handler's roughness	Pearson Correlation	-.074	.348(**)	-.078	1	-.022
	Sig. (2-tailed)	.417	.000	.391	.	.810
	N	123	123	123	123	123
Modified PAS score	Pearson Correlation	-.106	-.190(*)	.104	-.022	1
	Sig. (2-tailed)	.238	.033	.246	.810	.
	N	126	126	126	123	126

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 3.58 Correlation of subjective evaluations, total submission result and mPAS score using Spearman's rho correlation

			TOT SUB	subjective evaluation of handler's confidence	subjective evaluation of handler's fear	subjective evaluation of handler's roughness	Modified PAS score
Spearman's rho	TOTSUB	Correlation Coefficient	1.000	.260(**)	-.172	-.075	-.084
		Sig. (2-tailed)	.	.003	.055	.410	.352
		N	126	126	126	123	126
	subjective evaluation of handler's confidence	Correlation Coefficient	.260(**)	1.000	-.441(**)	.367(**)	-.216(*)
		Sig. (2-tailed)	.003	.	.000	.000	.015
		N	126	126	126	123	126
	subjective evaluation of handler's fear	Correlation Coefficient	-.172	-.441(**)	1.000	-.140	.129
		Sig. (2-tailed)	.055	.000	.	.121	.149
		N	126	126	126	123	126
	subjective evaluation of handler's roughness	Correlation Coefficient	-.075	.367(**)	-.140	1.000	-.010
		Sig. (2-tailed)	.410	.000	.121	.	.910
		N	123	123	123	123	123
	Modified PAS score	Correlation Coefficient	-.084	-.216(*)	.129	-.010	1.000
		Sig. (2-tailed)	.352	.015	.149	.910	.
		N	126	126	126	123	126

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

There was a significant difference in the observer's subjective evaluation of fear when split for the breed handled. The participants were rated with a significantly higher level of fear when handling the German Shepherd than the Golden retriever (Table 3.63). Only the German Shepherd had any ratings of extremely fearful (Table 3.60). There was a full range of ratings for confidence (Table 3.59). No participants were rated as extremely rough with either dog (Table 3.62). The participants were found to be evaluated as having more confidence with the Golden retriever and rougher with the German Shepherd, but these variances were not significant (Table 3.62 and 3.63)

Table 3.59 The frequency of ratings for the subjective evaluation of roughness split by the breed handled

		subjective evaluation of handler's roughness				Total
		not at all	slightly	somewhat	very	
Breed of dog	Golden retriever	7	17	35	4	63
	German Shepherd	6	11	37	6	60
Total		13	28	72	10	123

Table 3.60 The frequency of ratings for the subjective evaluation of fear split by the breed handled

		subjective evaluation of handler's fear					Total
		not at all	slightly	somewhat	very	extremely	
Breed of dog	Golden retriever	52	10	1	0	0	63
	German Shepherd	40	19	0	1	3	63
Total		92	29	1	1	3	126

Table 3.61 The frequency of ratings for the subjective evaluation of confidence split by the breed handled

		subjective evaluation of handler's confidence				
		not at all	slightly	somewhat	very	total
Breed of dog	Golden retriever	3	15	35	10	63
	German Shepherd	2	22	25	13	63
Total		5	37	60	23	126

Table 3.62 The Mann-Whitney Test to investigate the differences in the subjective evaluations based on the breed of dog handled

	Breed of dog	N	Mean Rank	Sum of Ranks
subjective evaluation of handler's confidence	Golden retriever	63	65.23	4109.50
	German Shepherd	63	61.77	3891.50
	Total	126		
subjective evaluation of handler's fear	Golden retriever	63	57.30	3610.00
	German Shepherd	63	69.70	4391.00
	Total	126		
subjective evaluation of handler's roughness	Golden retriever	63	58.78	3703.00
	German Shepherd	60	65.38	3923.00
	Total	123		

Table 3.63 The significance of variations in the subjective evaluations based on breed using the Mann-Whitney test

	subjective evaluation of handler's confidence	subjective evaluation of handler's fear	subjective evaluation of handler's roughness
Mann-Whitney U	1875.500	1594.000	1687.000
Wilcoxon W	3891.500	3610.000	3703.000
Z	-.573	-2.463	-1.159
Asymp. Sig. (2-tailed)	.566	.014	.247

a Grouping Variable: Breed of dog

Results summary

Question One

- 23.8% male, 76.2% female
- 47.6% under 20, 47.6% 20-35 and 4.8% over 35 years of age
- 54% had owned a dog, 64% had responsibility of a dog
- 30% of all participants had owned a dog that had bitten something or someone - 56% of the participants that were dog owners
- 14% of all participants had owned a dog that had bitten a household member - 26% of the participants that were dog owners
- 5% had owned a dog that had bitten a visitor, 9% of the dog owners
- 61% had never trained a dog, 26% had trained one and 13% had trained 2-5 dogs
- 6.3% had trained a dog for less than one year, 25.4% 1-5yrs, 9.5% 5-10% and 11.1 had trained dogs for more than 10yrs
- 41.3% had worked for more than 2 weeks with dogs, 58.7% had not
- 22.2% of all participants had worked for more than 2 weeks in a veterinary practice
- 49.2% of all participants had worked for more than 2 weeks with horses, 31.7 with cattle, 27 with sheep (participants could have worked with more than one of these)
- 81% feel confident handling dogs, 17.5% did not
- 4.8% have needed medical treatment for a dog bite
- 90% of participants were neutral or disagreed that dogs are dangerous
- 44% feel confident with any breed of dog, 24% were neutral, 32% were not
- 95.2% agreed or neutral that their experiences with dogs have been pleasant
- 38% are afraid of some breeds of dogs, 19% are neutral, 43% are not afraid
- 38% are fearful of unknown dogs, 16% neutral, 46% are not fearful
- 43% enjoy handling strange dogs, 24% were neutral, 33% do not
- Scores on the modified PAS measure were seen to be normal with a mean of 26.9, range of -3 to 47

Question Two

- The total submission results ranged from -12 to 22, the mean was 2.9
- Total submission, licking, loose lead, beside handler, behind handler and looking at handler were all positively correlated with each other, but they were negatively correlated with total pulling, in front of handler and barking
- The dogs spent 46% of the time on a loose lead, 51% pulling.
- The dog was beside the handler 50%, behind 16% and in front 32%
- The dog was looking at the handler 15%
- The dog barked at the handler 33%
- The mean total submission for the golden retriever was 8.8
- The mean total submission for the German shepherd was -2.9
- With analysis of variance, this was significant with a two tailed test
- When tested with gender, there was no significant difference in how either breed reacted to either gender
- There were variations in all the variables used to calculate the total submission result

Question Three:

- Females had a mean total submission result of 2.7, males 3.8. This was not significant (sig. 2-tailed =0.524)
- Those that had owned a dog had a mean total submission result of 1.9, those that had not, 4.2. This was not significant (sig. 2-tailed =0.132)
- Participants that feel confident to handle dogs had a mean total submission result of 2.7, those that did not, 4.3. This was not significant (sig. 2-tailed = 0.422)
- Those that had worked with dogs for more than 2 weeks had a mean total submission result of 2.7, those that had not, 3.0. This was not significant (sig. 2-tailed = 0.845)
- The participants that had worked with one of the stated animals had a mean total submission result of 3.5, those that had not 1.7. This was not significant (sig. 2 tailed = 0.271). When separated to the animal groups, there was no significant difference in results.
- Participants that had required medical treatment for a dog bite had a mean total submission result of 0.5. Those that had not required treatment had a mean of

3.1. This difference was not significant (sig. 2-tailed =0.478) due to the standard error from the small group (6/126) of those that had required treatment, (Std. error mean 2.4).

- There was no significant difference based on the age of the participant
- Regression analysis of total submission result and modified PAS score showed a very slight downward trend, totsub = 5.33 + -0.09 score
- Separate analysis for gender showed female totsub =6.32 + -0.13 and males totsub = 2.97 + 0.03
- When confounding variables of gender and breed of dog held constant, there was a slight negative trend between score and total submission result. This effect was not significant (sig. = 0.134)

Question Four:

- 51% of participants gave the dog 5-10 seconds to smell their hands
- 71% of participants held their hands open while standing for the dogs to smell them
- The mean time to complete the manoeuvres was 41 seconds, the range was 19-148 seconds
- Spearman's rho correlation of the dog barking and the time given by the participant for the dog to smell their hands was positive and significant (sig. 2-tailed = 0.003)
- Spearman's rho correlation of the dog barking and the posture while allowing the dog to smell hands showed no correlation
- Females took an average of 44 seconds to complete the manoeuvres, males took 33 seconds. This was a significant difference of means (sig. 2 tailed = 0.005)
- There was no significant difference in means of those that had owned a dog, and those that had not; those that felt confident handling dogs and those that did not; those that had worked for more than 2 weeks with dogs, and those that had not.
- Linear regression analysis of the modified PAS scores and the total time taken to complete the manoeuvres saw there was no relationship.
- Linear regression analysis of the total submission result and the total time taken to complete the manoeuvres saw a very slight downward trend, total time = 42.04 + -0.25 totsub.

- Spearman's rho correlation of the dog barking and the participant owning a dog was negative, but not significant (sig. 2-tailed = 0.237)
- Spearman's rho correlation of the dog barking and the participant feeling confident handling dogs was negative, but not significant (sig. 2-tailed = 0.550)
- There were three withdrawals from the practical section. All withdrawals were with the German Shepherd, after the dog had barked at them. All had owned a dog, said they were confident in handling dogs and were 20-34 years.

Question Five:

- With the Pearson correlation, the subjective evaluation of the handler's confidence correlated very strongly with the total submission result; this was positive and significant (sig. = 0.008). This also correlated with the modified PAS score, negatively and significantly (sig. =0.033).
- Total submission result and modified PAS score did not correlate significantly with either of the other subjective evaluations, although total submission results showed a negative trend with the subjective evaluation of fear, (sig. 0.086).
- Using the non-parametric spearman's rho correlation, the subjective evaluation of confidence was seen to be significantly correlated with both the subjective evaluation of fear, negatively and the subjective evaluation of handler's roughness, positively, both sig. 2-tailed = 0.000.
- When separated by breed of dog handled there was a significant difference on the average subjective evaluation of fear, with those handling the German Shepherd scoring higher.
- Both confidence and roughness were not seen to be significantly different between the average evaluations of the participants when handling the two breeds. However participants were seen to have greater confidence with the Golden retriever and greater roughness with the German Shepherd.

3.4. DISCUSSION OF STUDY TWO

Discussion of Methods:

The sample will have some bias due to the self-selection in the model of asking all first-year students to take part. Such a bias would arise from those that had a dislike, or no interest, in dogs. This would bias the study to the more positive attitude participants. Further, there may have been some time limits for students, which may have prevented them from being able to take part in this study.

In the practical section, there were a number of aspects of the methods that require discussing. The choice of breed was a factor that was limited by accessibility of dogs for the extended period required for the study. The dogs used for the pilot study did show the breed characteristics as suggested in the pilot introduction. The outcome was that the two breeds chosen had varied behaviours that appeared to vary with participants, not with repetition. It was also important that the behaviours were easily viable in the medium that was to be used - video.

The German shepherd was a large male, and in appearance fitted the stereotype of the large guard dog. He was, in fact, a dog that had been behaviourally tested by Guide Dog Services over a number of years and shown to have a very stable, responsive and gentle nature. He had been a stud dog for them on a number of occasions because of his temperament. The golden retriever bitch was a bitch that had a very stable temperament, and had travelled to and from Australia. The reason for using these two dogs came from wanting to cover some of the vast gap that exists between dog breeds. They were not used to test the stereotypes and the participants' reactions as such but these were looked at as an aside. This was to even out the responses of the participants so they were measured twice, once with each dog. This helped to even out their different reactions due to breed so that the underlying attitude, experience, confidence or fear was seen when averaged over the two dogs. From the literature by Hart and Hart (1985) and Hart and Miller (1985) it is seen that the golden retriever is placed in the grouping of the least dominant over their owners and the German shepherd is seen to be in the group ranked greatest for watchdog barking and the greatest obedience training, along with the Shetland sheepdog. The Shetland sheepdog was also highly placed for

excitability and lowly placed for dominance over owner, and thegGolden retriever was in the lowest grouping for being likely to snap at children.

Two video cameras allowed for data to be collected from a number of angles and looked at numerous times. This was critical to reliably test the observers' results as observer bias can have major implications. This also allowed for the recording method of focal sampling for both dog and human behaviours as the tapes could be replayed to watch each. The recording also allowed for several different recording systems to be used to look at different behaviours. A method was used for the licking of the handler in each of the movement sections. Instantaneous sampling was used with a one-zero scoring at marked points during the practical manoeuvres for the distance of the dog from the handler, the placement of the dog from the handler, and the direction of the dog's head to the handler. The points were decided so that it was not during a turn. There were two points in each section to account for any distractions in any given direction of the arena, and these were totalled to give a number out of six.

Recording observed behaviours by collecting them over a section, allowed for the observation of more subtle behaviours, those that were short in duration or those that were uncommon. The collections over sections were, however, subject to more interpretation and bias. The sections used allowed only a minimal time to and thus helped to reduce the bias, while still allowing for collection a different form of behaviours. All the sections were then added, and given as a total. The handler's hand and body position while the dog smelt the hands was one of these. The other behaviours that used this method, such as handler interest, ear placement and tail position, were not used in the further analysis as this method did produce bias. A one-zero sampling method was used during each section to measure the dog licking the handler. This method removed some of that bias.

The data used to calculate total submission was based on behaviours that are widely accepted as dominant and submissive. This result was used to give an indication of the placement of the dog's behaviour to the participant along the continuum during the manoeuvre. The calculation used for total submission was not equal on the submission and dominance sides, thus a 0 total is not in the middle of the continuum. The behaviours that were chosen were due to observation of them on the video footage and

the reliability of the data collected. It is suggested that these behaviours are also of practical use in veterinary practice. The ability to remove a dog of any breed from a cage, walk it as part of an examination and then return the dog to a cage is important.

Submissive behaviours were included as a positive, and dominant behaviours as a negative. There was a strong correlation between all the variables used to calculate the total submission result.

Discussion of results:

Do the demographic characteristics and attitudes of the veterinary students influence the behaviours of dogs?

1) What are the backgrounds of the first-year veterinary students?

The gender mix was similar to that of Study One. This was expected following the feminisation of the veterinary profession. Given that first year students in New Zealand are generally 17 or 18 year old, the fact that more than half the participants were over 20 years tells of something else going on. This may be to do with the selection process for the profession, including trends such as students having more prior tertiary education. In Study One; it was found that there were an increasing number of students who had prior education. The age of the students in study two indicates a gap between finishing school and starting the veterinary degree. This may be due to prior tertiary education. Another possible reason for this includes students going overseas prior to starting the veterinary degree, especially considering this is a five-year degree which requires commitment.

The participants were asked if they had owned a dog, and also if they had had responsibility for a dog. This was to allow for those that may never have been in a situation enabling them to own a dog, but who would have experiences in being responsible for a dog. Of those who had owned a dog, more than half had owned a dog that had bitten someone or something, 28% of these had bitten a household member, that is 14% of all the participants. This is supported by research by Moss and Wright (1987) that 80% of dog bite injuries taken to emergency rooms in the US are inflicted by a household dog or a direct neighbour's.

Prior to applying to study veterinary science at Massey University, students are required to work a minimum of two weeks in a veterinary practice. The question referring to working with dogs for more than two weeks looked at the hands-on experience the students had with dogs. Under half the participants had worked for longer than two weeks with dogs, and only 22% of all the participants had worked in a veterinary practice with dogs prior to this study. This means less than a quarter of the participants had experience with dogs in a veterinary environment as a vet. When looking at characteristics that a dog may pick up on in a human, experience is a major factor. This

can be in relation to confidence, knowledge of procedures and methods of handling the dogs in a situation that is likely to be very stressful for them. Almost half of the participants had, however, worked with horses for more than two weeks. Despite the number of participants that had owned, had responsibility for or worked with dogs, only 5% had required medical treatment for a bite. Of course, some of these participants may have been able to treat minor bites themselves and therefore not required professional medical treatment.

Given the nature of veterinary work and the majority of the canine work that is involved, both in small practice and mixed, it is surprising that 18% of these first-year veterinary students do not feel confident handling dogs. The question was a yes/no question, to force the participants to place themselves on one side or the other. The 5-point rating scale allowed a more moderated response with the questions about the participants' thoughts of 'dogs being dangerous', if they were 'afraid of some breeds of dog', or 'fearful of unknown dogs'. These questions found 32% of participants self reported that they were not confident to handle some breeds of dog, 38% who admitted they were afraid of some breeds of dogs (with 19% answering the question as neutral), and 38% fearful of unknown dogs. These results have ramifications for the students if these views do not change over the period of their education and their move into practice. Dogs entering a veterinary practice are likely to be unknown, and there will be many different breeds.

Reasons why these views exist are of interest, and further study may show if these change over time, or when more experience is gained. Despite all these negative views of dogs, and specific breeds of dogs, 95% of the participants considered their experiences with dogs to be pleasant, or did not disagree with the statement. The use of the modified PAS measure looked at attitude as an abstract hypothetical construct. The results are more about actual attitude, which has less fluidity over time, than emotions and viewpoints. The range of results to the mPAS measure were consistent with those seen in Study One.

2) How did the dogs react to the participants and was there variation in the dogs' behaviour between participants?

The total submission result was calculated from the observation of the dogs' behaviours. The specific behaviours were the distance of the dog from the handler, orientation of the dog from the handler, if the dog was looking at the handler, licking the handler or if the dog barked at the handler. When considering the human as a member of the dogs' social pack, these are dominant and submissive behaviours. These behaviours would be exhibited towards members either higher or lower in the pack hierarchy. The effect of these behaviours is also important in the ability of the participant to handle dogs in a general veterinary practice environment. An animal which pulls at the end of the lead and in front will be difficult in a practice where there is often limited room in the consulting rooms and hospital area. Pulling as been identified by O'Farrell (1997) as a problem behaviour that has its roots in the human-animal bond.

The behaviours identified as dominant for the calculation of the submission result may be seen by the owner/client as a lack of control by the veterinarian. This would erode the bond or relationship/trust in the veterinarian – client relationship. These behaviours were chosen for observation due to the more reliable data collection used for them. Most data collection used the point sampling. It was seen by the observer reliability test that there was a high level of agreement between the reliability observers and the single observer used for all the observation data collection.

The dogs spent 51% of the time pulling at the end of the lead. This was measured at six points at varying places round the manoeuvre area, to reduce any systematic bias due to collection and always at a point where there may have been something of interest outside the area, or when they had just turned a corner and the dog could see new things. The difference seen between the 51% pulling and 46% loose lead were the times the dog was jumping up at the handler. The dogs were beside the handler half of the time, 50%. This is useful in the context of the veterinary profession as this is a dog that will go with the participant willingly.

The mean total submission result across the two dogs was 2.9. This study found there was a significant difference between the two dogs. The Golden retriever was 8.8 and the German Shepherd was -2.9. There were differences between the breeds in most of

the behaviours used to calculate the result. In relation to specific behaviours, it was only the German Shepherd that barked at participants and only the Golden retriever that licked at them.

The two dogs were chosen because of their differing displays of behaviour, i.e. different from each other and different to participants in the pilot study. To come to any conclusions about the dogs' ability to pick up on the participants' background, it was important that the participants were faced with different types of dogs that might push their fear, or their confidence. The German Shepherd was a male, and the Golden retriever a female. Both had experienced extensive human contact, but both reacted differently in the pilot study. It was important, given the vast physical morphology within the *Canine familuris* family, to use two dogs that differ in appearance. Given the different breeds, it was expected that there would be differences in the dogs responses towards the participants. The appearance of these behaviours, notably aggression and excitability are noted by Hart (1985). The important thing was that there was also a variation in each of their behaviours between participants.

This study is limited by the use of only two dogs, but by using two dogs that exhibit different behaviour patterns - and that may invoke different responses and feelings within the participants - it is felt that this gives the study a firm base. It was important to note that the standard deviation was 5.9 and 6.6 in the German shepherd's and golden retriever's total submission results, indicating similar variation between the participants.

3) Are the differences in the dogs' behaviour toward the participants affected or related to the characteristics of the participants?

There was variation in the total submission result, based on observed behaviours that are practical in a veterinary practice. What caused the dogs to behave one way for one participant and another way for another? Instead of looking purely at the participants' behaviour, the study looked at the background, attitudes and feelings towards dogs for an indication of why the dogs reacted differently. The purpose of this was due to the limitations of human observation of another human towards a non-human animal. We will not pick up on subtle changes in skin chemistry, or subtle signals of fear or confidence that a dog may pick up. It has been conjectured for some time that dogs can

"read" humans feelings, attitudes, and can sense if you don't like them. The reason for observing the dog's behaviour was to allow for reading the humans through the dogs' reactions to them. It was more relevant to know if the dog walked beside the confident person, and thus was more easily handled in what would sometimes be a stressful situation at a veterinary practice. Again, this study is limited by the fact it is conducted in an arena rather than in a veterinary practice. The questions asked are in relation to first-year students to see if there are any recommendations that arise that might be useful at the time of selection for the course.

There was no significant difference in the total submission results due to gender, dog ownership, confidence in handling dogs, experience working with dogs or other animals, or having required medical treatment for a dog bite. The dog bite result is not significant due to the large error component from the small number of the sample who had required treatment, despite the larger variation in means. Evidence of fear from previous dog attacks, when compared to non-fearful participants in a study by DiNardo et al. (1988) found no increase in the frequency of attacks. With a more positive attitude, the submission result was seen to decrease slightly. Gender was found to be significantly related to attitude and the breed of dog was significantly related to submission result. When these confounding variables were controlled, the relationship between attitude and submission result was still not significant, but there was a trend (sig. 2 tailed = 0.134).

As indicated by Lore and Eisenberg (1986), it is generally believed by those working with dogs or employing people to work with dogs, such as kennel owners and veterinarians, that dogs can discriminate between gender and will behave differently to males or females. This is backed by the higher percentage of men attacked by dogs than women in the US (Moss and Wright, 1987). In an experiment involving an approach test with an unfamiliar man and woman, the male dogs did react differently to the unfamiliar men. The male dogs approached the unfamiliar men significantly less often than the unfamiliar women. The dogs used were reared as pets. They extended this research with a test of two dogs that had had the extreme variation of response to the unfamiliar man and woman. Using a larger woman dressed in men's clothing, they looked for the avoidance that was seen by the dogs towards the unfamiliar man. The dogs were hesitant at distance, and approached with caution, actively sniffed at 2m and

then appeared to relax and behave as they had with the other unfamiliar woman in the run and approached the woman. This does give an interesting comparison to what was observed in this study. There was seen to be no difference in the total submission result, with gender. There were differences in the behaviours of the female Golden retriever and the male German Shepherd, but there were no differences by either dog based on the gender of the participants. Koda and Shimoju (1999) also showed that dogs of both sexes made contact with women more frequently than men.

This study, which used only two dogs, was not designed to study this finding. The study of any interaction was more to counter the limitations of the bias that it would bring into this study about demographics and attitude, rather than to look for other differences. This perhaps indicates that the dogs chosen were well picked for looking at other factors that affect their behaviours rather than just gender. The dogs, as said earlier, were chosen to give differing points on the wide spectrum of domestic dog breeds, to avoid any bias. The fact that this study did not support the earlier research on differences of canine behaviour towards males and females is not to say such differences do not exist. This study chose dogs that were well socialised in environments that allowed exposure to many people.

Given the feminisation of the veterinary profession and the large number of females entering the profession around the world, it was seen that there was no difference in their ability to handle dogs in line with what is generally required in a veterinary practice. The attitude of the women was significantly different from that of the men towards dogs, and did give some concern about possible differences in the way dogs would react to them when required to do a simple manoeuvre. Research by Beck et al. (1975) suggests that men are the victims of more non-fatal dog bites than females. A dog bite can be caused by a number of different forms of aggression including, territorial defence, food competition, protection of young, or it can be fear induced (Lockwood, 1995). In this study there was no increase in dominant behaviours towards the male participants. This is perhaps due to the male German shepherd not seeing any need for competition within the hierarchy with the unfamiliar male participants. A reason for this is that both dogs were well socialised by experienced male and female owners and handlers, which included no ambiguity about placement in the mixed human-canine pack.

The finding that none of the characteristics measured influenced the dogs' behaviour is interesting and important. This means that such things as previous experience, attitude and fear are actually of no importance in the veterinarian – dog relationship. These characteristics are perhaps of more importance in the veterinarian – client/owner relationship.

4) Were there observable differences in the participants' behaviour toward the dogs and between the two different dogs?

The female participants took significantly longer to complete the manoeuvres. The length of time was not related to dog ownership, confidence in handling dogs or experience in working with dogs, nor was there any relationship seen between the attitude scores and the time taken to complete the manoeuvres. There was a subtle, but not significant, downward trend in the total submission results. It took longer, the lower the submission score was. This is expected as the lower the submission score, the less the dog cooperates with the participant. There was no relationship between gender and the total submission result, but there was a significant relationship with the time taken to complete the manoeuvre.

The total time taken to complete the manoeuvre is interesting, because although the German shepherd showed less submission to the participants, the participants still completed the manoeuvres in the same time. There was still some variation in times seen in both breeds. This implies that despite the dog showing more resistance to the participant, it did not systematically impede its ability to complete the manoeuvre, even in terms of the time taken. In veterinary practice, this shows there are no time management reasons for preferring veterinarians that elicit more submissive and cooperative behaviours from dogs. However, it is more likely to impact on the dog's stress levels, which were not tested in this study, and also possibly the owner's perception of the veterinarian and the practice.

There was seen to be a strong correlation between the time the participants gave the dogs to smell their hands and the dog barking at them. The longer the time the participant gave the dog to smell their hands, the more likely the dog was to bark at the

participant. This extended time to allow the dogs to smell, over the 10 to 20 seconds that was suggested as appropriate, could indicate a number of things. It could possibly be an indication of the apprehension of the participant towards the dog, that the dog picks up on, or that the dog is simply impatient with the time taken by the participant when the dog wants to get out of its cage. This, although it sounds reasonable, is questionable due to the fact that the dog never barked when it was the second dog to be walked. The other dog cage was right next door to it and the dog had full view of the participant working with the other dog.

The posture that the participant used during the smelling of the hands was not correlated to the length of time or the dog barking. This finding indicates the dog was not picking up on the observable behaviours from the participant. The length of time was not directly related to these behaviours. Thus when the dog barked at the handlers that took longer for the dog to smell must have been reacting to something else, unseen by general observations.

5) Did the subjective evaluations of confidence, fear and roughness have any relationship to the submission result or other aspects of the dogs' behaviour?

The subjective evaluations of confidence, fear and roughness were accessed by the researcher from the video footage. These evaluations relate to behaviours seen in both the dog and human. These are included, despite their subjective and qualitative qualities as an integral part of the study due to the subjective nature of future clients. Future clients will make subjective evaluations of the veterinarian in practice. Given the changes in client expectations and loyalty, this is now important in the veterinary profession.

A number of videos were viewed to set guidelines for the use of the five-point scale ranging from not at all, slightly, somewhat, very to extremely. The last was seldom used. The reason behind recording this subjective and biased information was to give the owner's point of view. In this study, the researcher was an owner both dogs. Also, it was a more intuitive response to the participants' behaviours. Such that these observations might show that there were behaviours that the dogs were reacting to that

were observable, yet subtle. Otherwise, this evaluation may, in fact, be giving a view of the team, the participant and the dog. This evaluation was also subjected to the reliability testing of other observers, after they were shown examples of participant videos and explained the methods and reasoning used for rating each area.

In general, the participants were seen to be somewhat confident and rough with the dogs, and slightly fearful. The difference between the breeds was shown using the Mann Whitney test. The difference between the breeds on the evaluation of fear was significant. The participants were more fearful of the German shepherd. This result will be affected by the three participants who withdrew from the manoeuvre with the German shepherd, due to what was deemed extreme fear.

The subjective evaluation of confidence correlated with the score from the modified PAS measured negatively. The evaluation of confidence correlated very strongly and positively with the total submission result. This means that the participants seen to be more confident by the observer also elicited the more submissive and cooperative behaviours from the dogs. A positive attitude to dogs did not, however, equate to the perception of confidence in this study.

The evaluations, when analysed against each other, showed there were strong positive correlations between confidence and roughness, and a strong negative correlation between confidence and fear. The idea that roughness was also seen as confidence would be a concern, but in this study roughness was not once scored as "extreme" and only 10 out of the 126 participants were scored 4 out of 5 as "very". It is thought that confidence is seen to be about the participant being in control of the situation and the dog, to achieve this, a certain level of roughness/firmness is required.

4. Chapter Four -

Summary

If we value the pursuit of knowledge,
we must be free to follow
wherever that search may lead us.
The free mind is not a barking dog,
to be tethered on a ten-foot chain.
Adlai E. Stevenson Jr.

4.1. Summary of Studies One and Two

This research was divided into two studies. The first was a study of the veterinary students attending Massey University in 1999. It found that 66% of the students were female, 75% had owned a dog, 86% were from New Zealand and 67% lived in suburban or urban areas. Thirty one percent had attended tertiary education prior to commencing the veterinary degree. Students in the later years of the degree were found to be less likely to have had prior tertiary education. The Pet Attitude Scale (Templer et al., 1981) was modified to specifically assesses the students attitudes to dogs. The attitudes of the average student towards dogs were positive, and the range and distribution were normal. Females and dog owners had significantly more positive attitudes to dogs. No other variable was found to have significant affect in attitudes towards dogs.

Study two looked at the influence of the demographic characteristics and attitudes of the veterinary students on the behaviour of dogs. The study consisted of a questionnaire and a practical exercise with first year veterinary students of 2000. A Golden retriever and a German Shepherd were used for the practical exercise; all participants completed manoeuvres with both dogs. The manoeuvres were based on a practical sequence that would occur in a veterinary practice. This was removing a dog from a cage, walking the dog round a course and returning the dog to the cage. Aspects of the dogs' behaviour were used to calculate the dog's submission result. The aspects included licking the handler, position of dog to the handler and distance from handler. The German Shepherd had a significantly lower submission result than the Golden retriever. There were no significant differences in the submission result based on the participants' gender. Attitude towards dogs did not influence the submission result of the dogs, nor did the participants' confidence in handling dogs, fear of unknown dogs, previous medical treatment for a dog bite, experience working with dogs or dog ownership. Females did take significantly longer to complete the practical exercise.

4.2. Limitations

- The study is limited as it was a one-time observation. A longitudinal study would allow greater conclusions about the development of the students over time.
- The use of questionnaires brings the limitation of bias. Bias in questionnaires can be from many different areas including the ability of the participants to understand the questions and feel that they can answer them truthfully. It is felt that all reasonable precautions were taken, but it does require an understanding of the possible implications of this.
- The use of the Pet Attitude Scale is limited, as all measures of attitude are, in that it is a hypothetical construct and a difficult disposition to measure with any accuracy. This measure, however, has been tested and found to be reliable and consistent.
- Many of the results were limited by the small sample size; for example, few participants had required medical treatment for a dog bite. This small sample size limits the significant conclusions that can be drawn from the results. To combat this and to look at these variables in more depth, a separate study would need to follow or source a greater number to enable statistical vigour.
- Due to the limited availability of time and room for write up, there were limitations placed on what data to follow through and to focus on. There would be advantages to continuing the statistical analysis to remove possible confounding variables in some of the areas. It would also be good to look at the interaction of more of the variables.
- The result calculated from the observed behaviours of the dogs is restricted to what was reliably observable from the video recordings. Further work could include closer investigation of some of the more subtle behaviours, such as ear placement.
- To give a more robust result, it would also be advantageous to use more dogs, varying the age, gender and breed to ensure there was were no systematic interactions.

4.3. Answering the research questions

Who are the veterinary students of New Zealand?

The average New Zealand veterinary student is a female, from New Zealand, who lives in suburban or urban area, is aged over 20 years, has owned a dog as a pet and has a positive attitude to dogs.

The average male veterinary student has a more negative attitude to dogs than his female counterpart. The average non-dog owning veterinary student also has a more negative attitude to dogs when compared to dog owners.

Students who were in the later years of the veterinary science degree were less likely to have attended tertiary education prior to the veterinary course.

Do the demographic characteristics and attitudes of veterinary students influence the behaviour of dogs?

This research found no significant influences of demographic characteristics or attitudes of the veterinary students, on the dogs' behaviour. Female veterinary students were found to take longer to complete the practical exercise, but this was not due to the dogs behaving differently for them than for the male veterinary students in any of the behaviours measured.

4.4. Implications

There are implications to the veterinary profession given the greater percentage of females entering veterinary science in New Zealand. Females were found to have significantly more positive attitudes to dogs than males, however, there were no significant differences in the dogs' behaviour either by gender or by attitude.

Females were found in this research to be different in attitudes and methods of completing tasks, the merit of these differences were not explored, such that it is not

said to be inferior or superior than the males, just different. Females are documented to have higher expectations of what constitutes success in the veterinary student and profession, and are also seen to require more psychological assistance probably due to not meeting these expectations. The New Zealand veterinary profession needs to be aware of the changing demographic and with it the changing proportions of attitudes of the veterinary profession. These implications are not of concern, but there is a need to be aware of them and help with the acceptance of the increased number of females in the profession.

4.5. Areas for future research

Future researchers could:

- Follow a selection of New Zealand veterinary students from pre-entry to working in the profession, such as Heath has done in Australia. This would enable much greater knowledge of what is occurring in New Zealand.

- Study the attitudes of fellow veterinarians and clients, from both the production animal and companion animal fields, towards the increase of female veterinary professionals. A study of this type would help with the adjustment of attitudes to the changes that are occurring in the veterinary profession.

- Look more closely at the dog behaviours elicited by humans. Further research could study the more subtle behaviours of dogs in relation to familiar people that the dogs are bonded with, and to unfamiliar people. Look at the effect of extreme human emotion on this relationship. Studies could also look at the possible cues for different behaviours and at the relationship of these to the human-canine pack bond and hierarchy.

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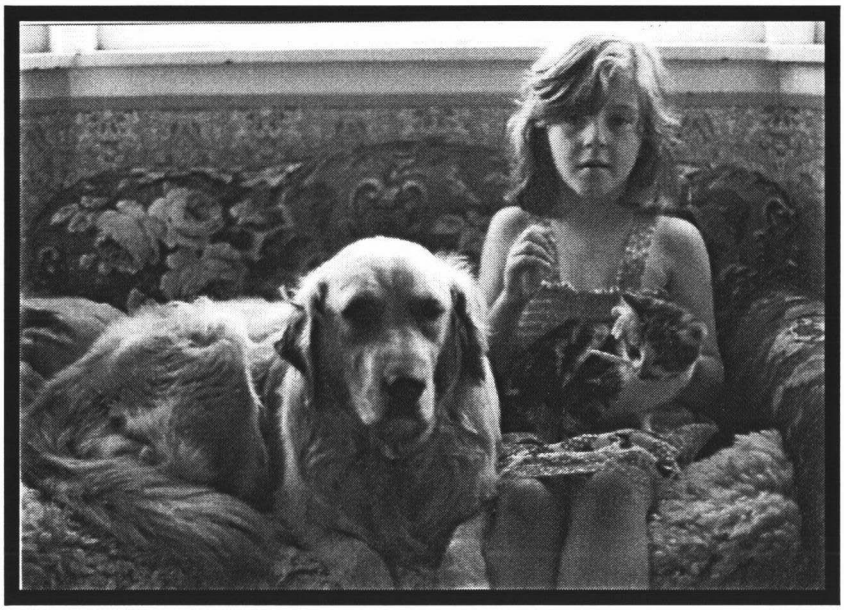
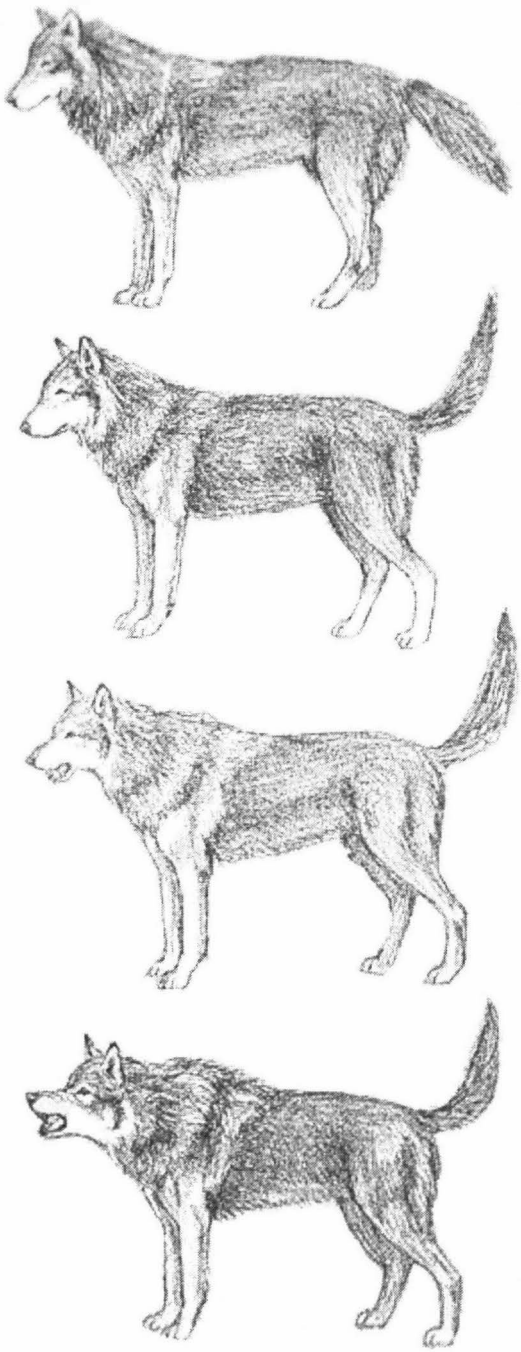
APPENDICES



APPENDIX ONE

Appendix 1.1 Illustration showing examples of dominant and submissive postures

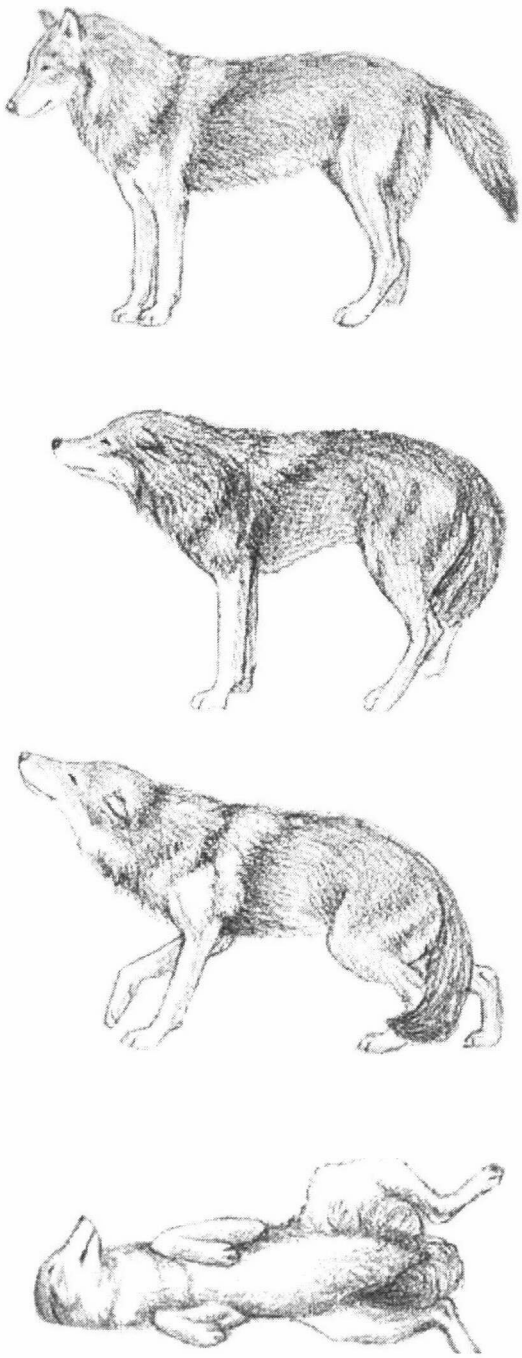
Dominant postures:



Body and facial postures flow from one set of signals to another. This dog's mind is changing from calm and alert to aggressive.

Taken from Fogle, (1990).

Submissive postures:



This dog's mind is changing from calm and alert to submissive.

Taken from Fogle, (1990).

APPENDIX TWO

Appendix 2.1 Covering letter for questionnaire

Dear Sir/Madam

- **This questionnaire is part of a pilot survey into New Zealanders' attitudes towards dogs. The study is looking at the dog fraternity, veterinarians, students, and the public.**

- **This information will form a basis for future study towards a Masters of Veterinary Studies at Massey University by Rebecca Hean.**

- **All information that is obtained is confidential.**

- **Thank you for agreeing to be part of this survey looking at the dog fraternity's attitude**

Yours sincerely

Rebecca Hean
Phone 021 251 7985 if any enquiries
(Supervisor Associate Professor Kevin Stafford)

QUESTIONS ABOUT ATTITUDES TOWARDS DOGS

GENERAL		Please circle the appropriate box/boxes				
1	**Sex**	Male	Female			
2	**Age**	<20	20-35	35-50	50-65	> 65
3	**Marital status**	single	married	divorced	widowed	
4	**Education**	school cert.	bursary	tertiary education		
5	**Type of area lived in**	town	suburb	semi-rural	rural	
6	**Number of occupants in the house**	1	2 - 3	3 - 4	more than 5	
7	**Occupation**					
8	**Ethnic group/Country of origin**					
9	**Have you owned a dog**	Yes	No	(please state type/breed)		
10	**What was your dog used for?**	Pet	Hunting	Herding	Showing	Obedience
		Other (please state)				
11	**What other pets have you owned?**	(please state)				
12	**What year of your vet degree are you?**	1	2	3	4	5
13	**What prior tertiary education do you have, if any?**					

THE PET ATTITUDE SCALE

		Circle the most appropriate for you AGREE STRONGLY						DISAGREE STRONGLY
1	I really like seeing dogs enjoy their food.	1	2	3	4	5	6	7
2	My dog means more to me than any of my friends.	1	2	3	4	5	6	7
3	I would like a dog in my home.	1	2	3	4	5	6	7
4	Having dogs is a waste of money.	1	2	3	4	5	6	7
5	Housedogs add happiness to my life (or would if I had one).	1	2	3	4	5	6	7
6	I feel that dogs should always be kept outside.	1	2	3	4	5	6	7
7	I spend time every day playing with my dog (or I would if I had one).	1	2	3	4	5	6	7
8	I have occasionally communicated with a dog and understood what it way trying to express.	1	2	3	4	5	6	7
9	The world would be a better place if people would stop spending so much time caring for their dogs and started caring more for other human beings instead.	1	2	3	4	5	6	7
10	I like to feed dogs out of my hand.	1	2	3	4	5	6	7
11	I love dogs.	1	2	3	4	5	6	7
12	Animals belong in the wild or in zoos, but not in the home.	1	2	3	4	5	6	7
13	If you keep dogs in the house you can expect a lot of damage to furniture.	1	2	3	4	5	6	7
14	I like housedogs.	1	2	3	4	5	6	7
15	Dogs are fun but it's not worth the trouble of owning one.	1	2	3	4	5	6	7
16	I frequently talk to my dog.	1	2	3	4	5	6	7
17	I hate dogs	1	2	3	4	5	6	7
18	You should treat your housedogs with as much respect as you would a human member of your family.	1	2	3	4	5	6	7

Appendix 2.3 *Frequencies of responses to individual mPAS measure questions and mean responses*

Statistics																		
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
N	Valid	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
	Missing	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mean		2.69	4.04	2.29	5.89	2.56	4.36	2.18	3.06	5.17	4.02	2.34	6.06	4.90	2.99	5.73	2.23	6.67	3.36

Q1			
		Frequency	Percent
Valid	0	2	.8
	+3	46	17.6
	+2	67	25.7
	+1	69	26.4
	0	69	26.4
	-1	4	1.5
	-2	1	.4
	-3	1	.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q2			
		Frequency	Percent
Valid	0	20	7.7
	+3	12	4.6
	+2	13	5.0
	+1	40	15.3
	0	71	27.2
	-1	39	14.9
	-2	38	14.6
	-3	26	10.0
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q3			
		Frequency	Percent
Valid	+3	102	39.1
	+2	77	29.5
	+1	33	12.6
	0	21	8.0
	-1	10	3.8
	-2	8	3.1
	-3	8	3.1
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q4			
		Frequency	Percent
Valid	0	3	1.1
	+3	4	1.5
	+2	6	2.3
	+1	11	4.2
	0	18	6.9
	-1	21	8.0
	-2	72	27.6
	-3	124	47.5
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q5			
		Frequency	Percent
Valid	0	2	.8
	+3	68	26.1
	+2	70	26.8
	+1	62	23.8
	0	32	12.3
	-1	15	5.7
	-2	3	1.1
	-3	7	2.7
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q6			
		Frequency	Percent
Valid	0	3	1.1
	+3	13	5.0
	+2	22	8.4
	+1	35	13.4
	0	58	22.2
	-1	60	23.0
	-2	42	16.1
	-3	26	10.0
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q7			
		Frequency	Percent
Valid	0	2	.8
	+3	88	33.7
	+2	84	32.2
	+1	52	19.9
	0	20	7.7
	-1	7	2.7
	-2	4	1.5
	-3	2	.8
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q8			
		Frequency	Percent
Valid	0	2	.8
	+3	41	15.7
	+2	65	24.9
	+1	58	22.2
	0	53	20.3
	-1	16	6.1
	-2	13	5.0
	-3	11	4.2
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q9			
		Frequency	Percent
Valid	0	3	1.1
	+3	6	2.3
	+2	5	1.9
	+1	22	8.4
	0	50	19.2
	-1	53	20.3
	-2	47	18.0
	-3	73	28.0
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q10			
		Frequency	Percent
Valid	+3	21	8.0
	+2	32	12.3
	+1	42	16.1
	0	70	26.8
	-1	35	13.4
	-2	37	14.2
	-3	22	8.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q11			
		Frequency	Percent
Valid	0	2	.8
	+3	90	34.5
	+2	65	24.9
	+1	61	23.4
	0	26	10.0
	-1	2	.8
	-2	2	.8
	-3	11	4.2
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q12			
		Frequency	Percent
Valid	0	2	.8
	+3	5	1.9
	+2	2	.8
	+1	3	1.1
	0	14	5.4
	-1	33	12.6
	-2	69	26.4
	-3	131	50.2
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q13			
		Frequency	Percent
Valid	0	3	1.1
	+3	7	2.7
	+2	8	3.1
	+1	39	14.9
	0	39	14.9
	-1	52	19.9
	-2	63	24.1
	-3	48	18.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q14			
		Frequency	Percent
Valid	0	3	1.1
	+3	49	18.8
	+2	55	21.1
	+1	65	24.9
	0	41	15.7
	-1	25	9.6
	-2	15	5.7
	-3	6	2.3
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q15			
		Frequency	Percent
Valid	0	1	.4
	+2	9	3.4
	+1	12	4.6
	0	21	8.0
	-1	41	15.7
	-2	84	32.2
	-3	91	34.9
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q16			
		Frequency	Percent
Valid	0	14	5.4
	+3	87	33.3
	+2	67	25.7
	+1	44	16.9
	0	26	10.0
	-1	10	3.8
	-2	7	2.7
	-3	4	1.5
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q17			
		Frequency	Percent
Valid	0	3	1.1
	+3	1	.4
	+2	1	.4
	+1	1	.4
	0	6	2.3
	-1	4	1.5
	-2	24	9.2
	-3	219	83.9
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

Q18			
		Frequency	Percent
Valid	0	1	.4
	+3	51	19.5
	+2	45	17.2
	+1	46	17.6
	0	45	17.2
	-1	30	11.5
	-2	27	10.3
	-3	14	5.4
	Total	259	99.2
Missing	System	2	.8
Total		261	100.0

APPENDIX THREE

Appendix 3.1 Contents of the questionnaire booklet

Human-Canine interaction and the effects of handler attitude on canine behaviour.

INFORMATION SHEET FOR PARTICIPANTS

About the researchers

This study is being organized by Rebecca Hean from the Veterinary Department of Massey University as part of a Masters in Veterinary Studies. Dr. Kevin Stafford of the Veterinary Department and Dr. Ross Flett of the Psychology Department are supervising the study at Massey University.

The question the study is looking at

"Does the attitude of the veterinary student influence the behaviour of the dog during handling?"

What participants will be asked to do

Participants will be asked to complete two procedures. In the first part of the study the participants are asked to fill in a questionnaire to enable an assessment of attitude, experience and knowledge of dogs. In the second part of the study the participants are asked to complete a simple maneuver with two dogs whilst being videoed. This is to allow assessment of the dog's behaviour with the student. None of this study will be used for assessment in any part of the participants' veterinary degree. All responses and videos are confidential. Questionnaires will be coded with the videos to allow reference between, but there is no link between the participants name and their responses.

Expected length of time

It is expected that the research will take about approximately one hour.

As a participant you...

- Are welcome to ask any questions about the research or the researcher and have them answered and discussed with you
- Have the right to refuse to answer any questions
- Are providing information that will be used only for the purpose of the research and is confidential to the researcher.
- Are free to pull out of the research at any point

Consent Form

I have read the information sheet and had the study explained to me. I had my questions answered and concerns discussed. I understand that I have the right to ask questions at any point in the study and the right to decline answers or withdrawal at any stage in the study.

I know that my responses on the questionnaire will be coded to allow comparison to the behavioural section of the study. I understand and consent for the behavioural section of the study to be videoed. I know I have the right to ask for the video to be stopped at any point in the study. I understand that both the questionnaire and the video are confidential to the research and the researcher.

I agree to take part in this research as stated in the information sheet.

Signed .....

Name .....

Date .....

Identification number: .

Instructions

Thank you for taking part in this research. There are two stages to the study.

Questionnaire section

- Please read the information sheet and ask any questions you have about the study.
- Please read and sign the consent form once you are satisfied that your questions have been answered.
- On the top of this page is a number, this is your identification number to allow comparison between your questionnaires and the videoed behavioural section.
- Please fill out the first page of the questionnaire with the general questions.
- Then continue and fill out the psychological dog attitude test.
- Once you have filled in the questionnaire you will be asked one at a time to come into the arena for the behavioural section of the study.

Behavioural section

- In this section you will be videoed.
- Please firstly hold up the board with your identification number on it to the video.
- Throughout this section you are asked **NOT** to talk to the dog .
- Walk up to the dog in cage **one** and hold your hands out for the dog to smell for 10 seconds.
- Take the dog out of the cage and hold onto the **END** of the lead, do not shorten or gather up the lead.
- Walk the dog round the markers on the ground.
- Place the dog back into the cage.
- Repeat with the dog in cage **two**, remembering to allow the dog to smell you first and not talking to the dog.
- We are looking at the dogs placement and reaction to you, not at your control of the dog, so if the dog tries to move round you do not be concerned and allow it to.
- At any point in this study you have the right not to answer any question or to withdraw from the study.

Please answer all questions where appropriate

1.	Sex					Female	Male			
2.	Age					<20	20-34	35-49	50-65	>65
3.	Year of Veterinary undergraduate study					1	2	3	4	5
4.	Does your family own a dog					Yes	No			
5.	How many dogs does your family currently own?					1	2-3	4-5	6-10	>10
6.	Have you owned a dog?					Yes	No			
7.	Have you had the responsibility for a dog?					Yes	No			
8.	Has your dog bitten anyone or another animal?					Yes	No			
9.	Who has your dog bitten?					Member of household	Visitor	An intruder	Another dog	Another animal
10.	I consider my dog to be dangerous to members of the household (mark on scale were appropriate, 1= strongly agree, 5= strongly disagree)					1	2	3	4	5
11.	I consider my dog to be dangerous to visitors					1	2	3	4	5
12.	I consider my dog to be dangerous to other dogs					1	2	3	4	5
13.	How many dogs have you trained?					0	1	2-5	6-10	>10
14.	What did you train the dog for?	Tricks	Obedience			Agility	Working (sheep)	Hunting and gun work	Other (please state)	
15.	Have you trained your dog for competition?					Yes	No			
16.	How long have you been training/handling dogs?					<1 yr	1-5 yr	5-10 yr	>10yr	
17.	Have you attended dog training/handling classes?					Yes	No			
18.	Have you read books on training/handling dogs?					Yes	No			
19.	How many dog training books have your read?					1	2	2-5	5-10	>10
20.	Do you feel confident handling dogs?					Yes	No			
21.	Have you worked with dogs for more than 2 weeks?					Yes	No			
22.	In what context?	Kennels	Veterinary Practice	Grooming parlour		Sheepdog work	Hunting pack	Gundog work	Other	(please state)
23.	Have you worked for greater that two weeks with one of the following animals?					Horses	Cattle	Deer	Sheep	Pigs
24.	Have you ever required professional medical treatment for a dog bite?					Yes	No			
25.	How many times have you required treatment?					1	2	3	4-5	>5

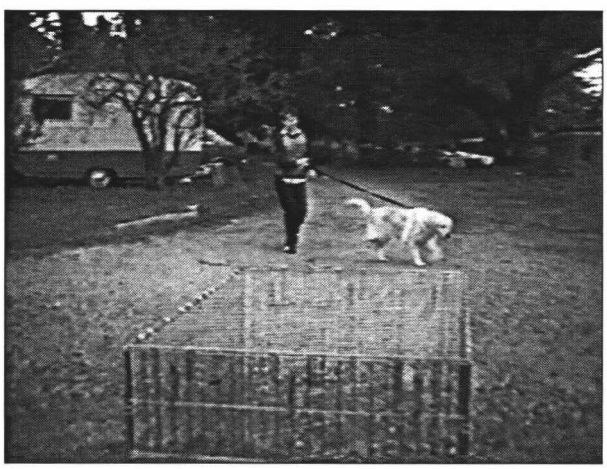
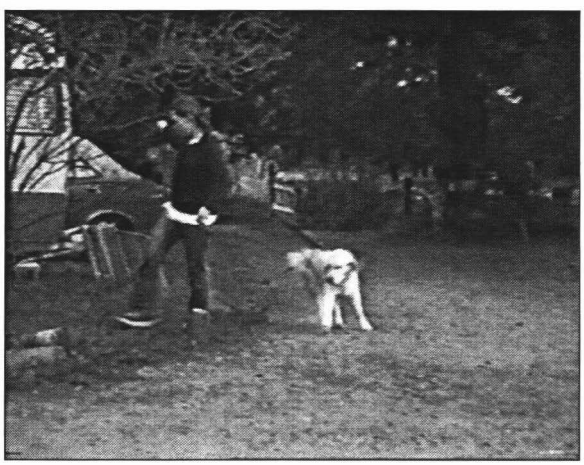
	Strongly agree						Strongly disagree
26. I consider dogs to be dangerous.	1	2	3	4	5	6	7
27. I am confident to handle any breed of dog.	1	2	3	4	5	6	7
28. My experiences with dogs have been pleasant.	1	2	3	4	5	6	7
29. I am afraid of some breeds of dogs.	1	2	3	4	5	6	7
30. I am fearful of unknown dogs.	1	2	3	4	5	6	7
31. I enjoy handling strange dogs.	1	2	3	4	5	6	7

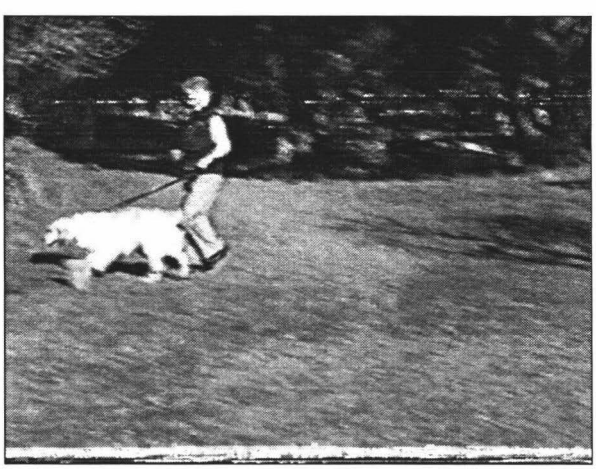
DOG ATTITUDE TEST

Questions	Strongly agree						Strongly disagree
1. I really like seeing dogs enjoy their food.	1	2	3	4	5	6	7
2. My dog means more to me than any of my friends.	1	2	3	4	5	6	7
3. I would like a dog in my home.	1	2	3	4	5	6	7
4. Having dogs is a waste of money.	1	2	3	4	5	6	7
5. Housedogs add happiness to my life (or would if i had one).	1	2	3	4	5	6	7
6. I feel that dogs should always be kept outside.	1	2	3	4	5	6	7
7. I spend time every day playing with my dog (or i would if i had one).	1	2	3	4	5	6	7
8. I have occasionally communicated with a dog and understood what it was trying to express.	1	2	3	4	5	6	7
9. The world would be a better place if people would stop spending so much time caring for their dogs and started caring more for other human beings instead.	1	2	3	4	5	6	7
10. I like to feed dogs out of my hand.	1	2	3	4	5	6	7
11. I love dogs.	1	2	3	4	5	6	7
12. Animals belong in the wild or in zoos, but not in the home.	1	2	3	4	5	6	7
13. If you keep dogs in the house you can expect a lot of damage to furniture.	1	2	3	4	5	6	7
14. I like housedogs.	1	2	3	4	5	6	7
15. Dogs are fun but it's not worth the trouble of owning one.	1	2	3	4	5	6	7
16. I frequently talk to my dog.	1	2	3	4	5	6	7
17. I hate dogs.	1	2	3	4	5	6	7
18. You should treat your housedogs with as much respect as you would a human member of your family.	1	2	3	4	5	6	7

Appendix 3.2 Pictures taken from the pilot study

The golden retriever

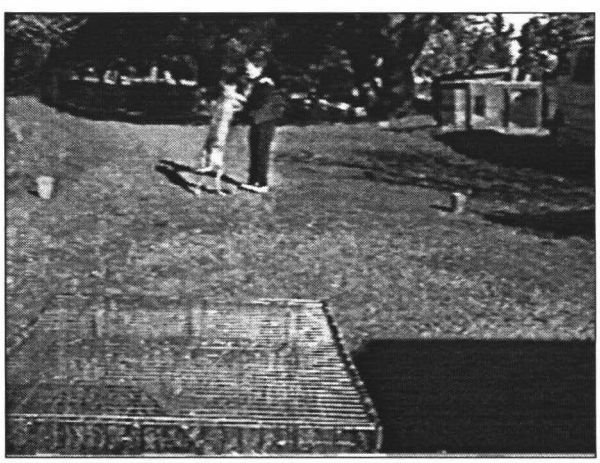
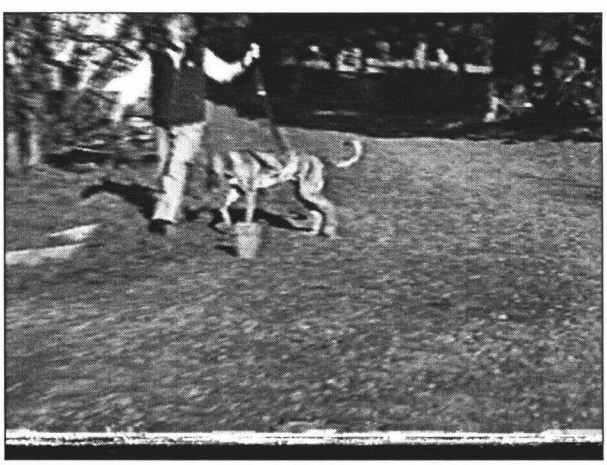





The Shetland sheepdog

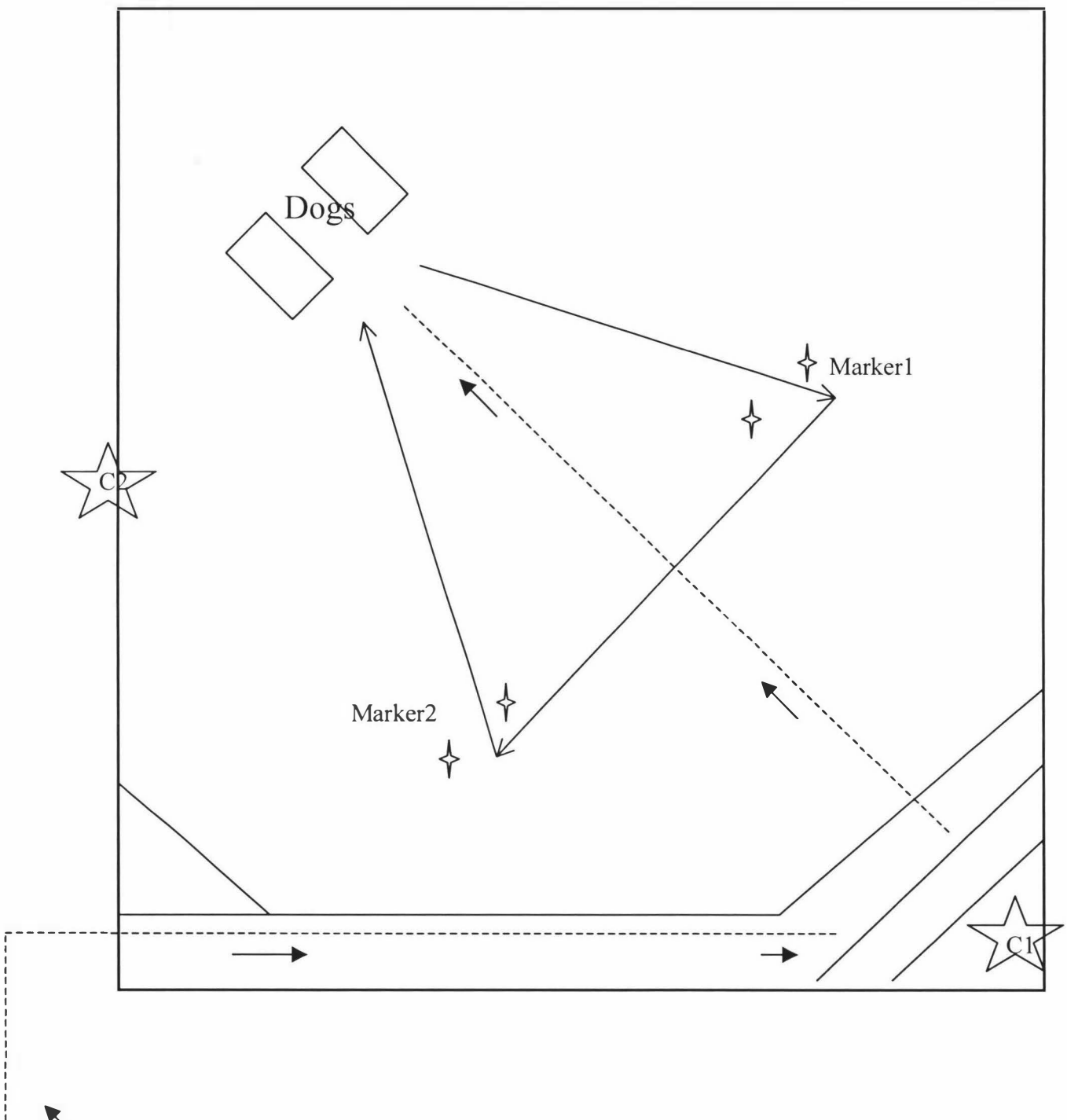


The Greyhound

The German shepherd

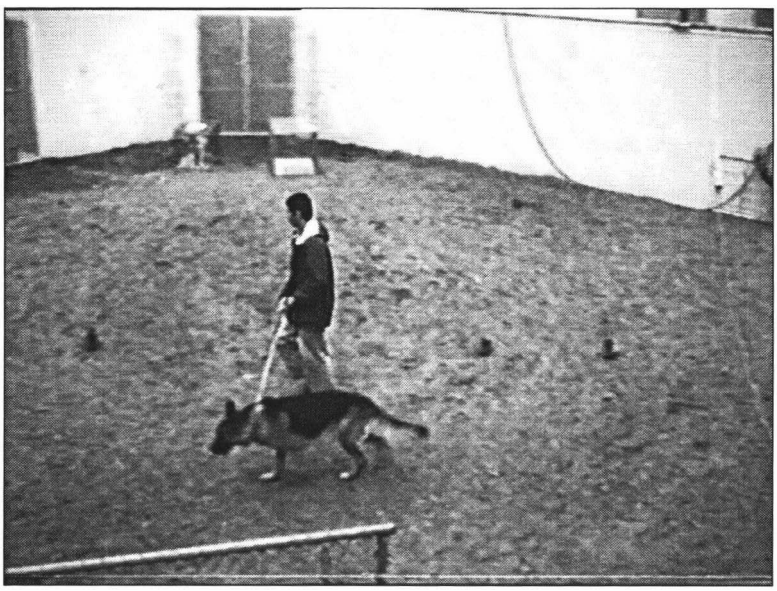
Appendix 3.3 Diagram arena used for practical exercise and outline to direction participants were asked to take



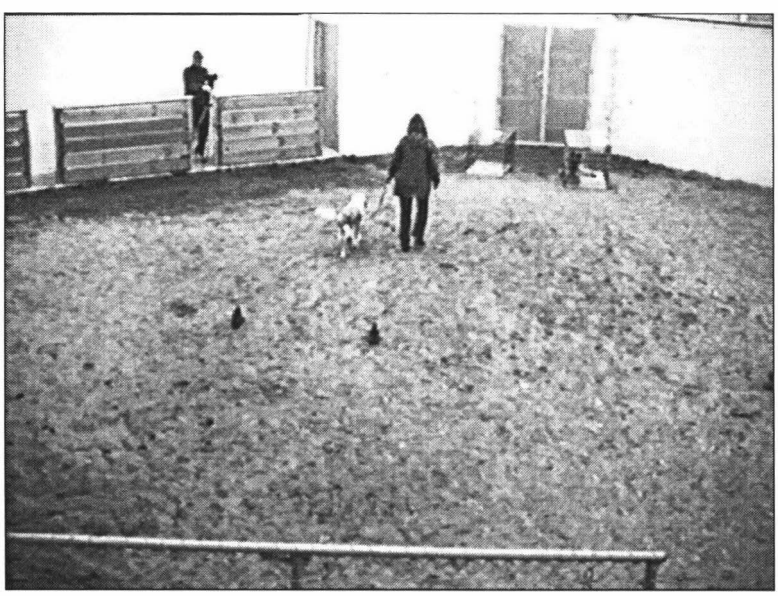
Appendix 3.4 Pictures taken from the video recording taken by Camera 1 – at distance

Participant mid section 3. Dog in front of handler, pulling on the lead.

Participant just entering section 5. Dog behind handler, pulling on the lead.

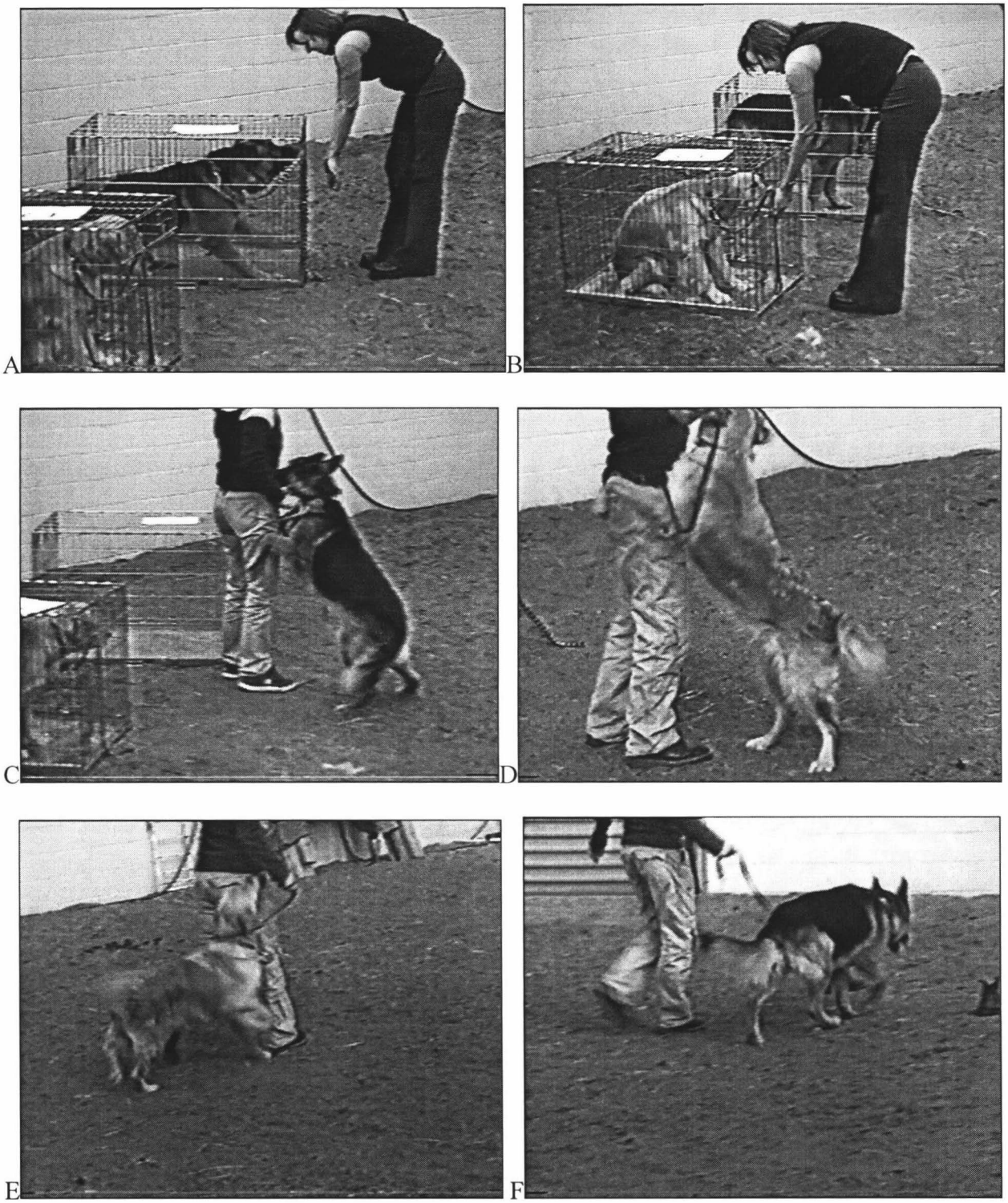


Participant mid section 4. Dog beside handler, pulling on the lead.

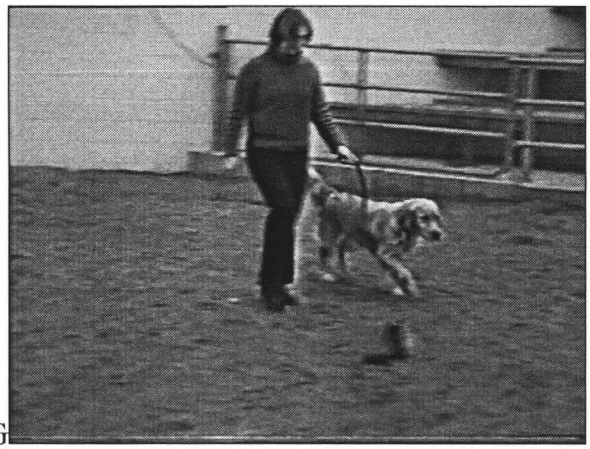


Participant mid section 5. Dog beside handler, loose lead.

Appendix 3.5 Pictures of observed behaviours from the video recording taken from Camera 2 – close up



A &B – Smelling of hands, open hands by side of cage while standing
C &D – Dog distance, jumping
E - Dog licking handler
F - Dog on loose lead, in front of handler


G


H


I


J


K


L


M


N

G-J – the dog is on a loose lead and beside the handler
K – the dog is pulling on the lead and is beside the handler
L-M – the dog is pulling on the lead and is in front of the handler
N – the dog is pulling on the end of the lead to the side of the handler

Appendix 3.6 The data collection forms used for recording observations from the video recordings of Camera 1&2

	Dog 1:	Dog 2:		ID number of student:											
				1	2	3	4	5	6	1	2	3	4	5	6
1. Barking															
Yes/No Barking															
			1. Checked/pulled dog (section 2-6)												
2. Time handler gave for smelling hands															
			Yes/no Checked the dog												
1 0															
2 0-5			**2. Handler interest** (section 1-6)												
3 5-10															
4 10-20			Yes/no Looking at dog												
5 >20															
			3. Distance of dog (Points 1-6)												
3. Handler hand/body posture while smelling															
			Yes/no Jumping up at handler												
1 Open hands on side of cage while kneeling			Yes/no Lead loose												
2 Open hands on side of cage while standing			Yes/no Pulling at end of the lead												
3 Open hands on top of cage while standing															
4 Closed hands by side of cage while standing			**4. Placement of dog** (Points 1-6)												
5 Closed hands by side of cage while kneeling															
			1 Beside												
4. Subjective evaluation of handler's confidence, fear and roughness (overall)			2 Behind												
			3 In front												
1 Not at all															
2 Slightly			**5. Direction of dog's head** (Points 1-6)												
3 Somewhat															
4 Very			Yes/no Towards the handler												
5 Extremely															
			6. Tail position (section 2-6)												
Rate **A** Confidence															
1-5 **B** Fear			1 Up above line of back												
C roughness			2 Line of back												
			3 45° down from line of back												
5. Time			4 At edge of back legs												
			5 Between back legs												
Total time for all 6 sections															
			7. Licking of handler (section 2-6)												
			Yes/no Licked handler												

Appendix 3.7 Reliability Test of observed behaviours

As was explained in the Chapter Three method, a reliability test was conducted on the researchers observed results from the practical exercise section.

Method:

- Ten participant ids were randomly selected. The videos of the first dog they completed the practical exercise with were arranged for observation.
- Six people filled in the appropriate data collection forms independently of each other and out of sight from the researcher.

a. The videos were paused by the researcher at each point and at the end of each section for the six testers to record their observations.

b. They were asked to record the observed behaviours that the researcher believed there may be concern about reliability, this included the subjective evaluations. The reliability test did not test total time.

c. They were given a full run through from each angle at the end of the observation of each participant to allow for their subjective evaluations.

Results:

- The results were entered into a spreadsheet and a summation of differences, when compared to the researchers observations, were calculated.
- A percentage error was calculated for each of the 10 id numbers tested.
- These were then averaged.
- The total average error from the observed behaviours, when reliability was tested by 6 individuals, looking a 10 randomly chosen ids, was 0.81%.
- The full data is included on the raw data CD.

Discussion:

The researcher stopped the video at each point, thus this did not test the reliability of selecting the correct instant to sample and record the data. It did however allow for checking the reliability of the decisions made to decide the position of the dog, the distance from the handler and the existence of particular behaviours in the given sections. It also allowed for testing of the subjective evaluations. There were not as many variations on these three measures as was expected, given their subjective nature. This has been attributed to the explanation and examples shown to the six testers prior to the reliability testing. If this test were done without the training of the testers in this way, it would be expected that there would be greater variance in these subjective measures.

Appendix 3.8 Correlations with questions 26-31 about confidence and fear with different breeds of dogs

			did the dog bark	how many dogs have you trained	how long have been training/ handling dogs	i consider dogs to be dangerous	i am confident to handle any breed of dog	my experiences with dogs have been pleasant	i am afraid of some breeds of dogs	i am fearful of unknown dogs	i enjoy handling strange dogs
Spearman's rho	did the dog bark	Correlation Coefficient	1.000	-.114	-.137	.063	-.024	-.017	.016	.053	-.002
		Sig. (2-tailed)	.	.208	.127	.486	.792	.853	.856	.559	.983
		N	126	124	126	126	126	126	126	126	126
	how many dogs have you trained	Correlation Coefficient	-.114	1.000	.682(**)	.089	-.044	-.273(**)	.256(**)	.249(**)	-.099
		Sig. (2-tailed)	.208	.	.000	.324	.627	.002	.004	.005	.276
		N	124	124	124	124	124	124	124	124	124
	how long have been training/handling dogs	Correlation Coefficient	-.137	.682(**)	1.000	.095	-.157	-.295(**)	.295(**)	.182(*)	-.216(*)
		Sig. (2-tailed)	.127	.000	.	.288	.079	.001	.001	.041	.015
		N	126	124	126	126	126	126	126	126	126
	i consider dogs to be dangerous	Correlation Coefficient	.063	.089	.095	1.000	-.361(**)	-.444(**)	.389(**)	.384(**)	.018
		Sig. (2-tailed)	.486	.324	.288	.	.000	.000	.000	.000	.841
		N	126	124	126	126	126	126	126	126	126
	i am confident to handle any breed of dog	Correlation Coefficient	-.024	-.044	-.157	-.361(**)	1.000	.450(**)	-.415(**)	-.351(**)	.311(**)
		Sig. (2-tailed)	.792	.627	.079	.000	.	.000	.000	.000	.000
		N	126	124	126	126	126	126	126	126	126
	my experiences with dogs have been pleasant	Correlation Coefficient	-.017	-.273(**)	-.295(**)	-.444(**)	.450(**)	1.000	-.392(**)	-.256(**)	.295(**)
		Sig. (2-tailed)	.853	.002	.001	.000	.000	.	.000	.004	.001
		N	126	124	126	126	126	126	126	126	126
	i am afraid of some breeds of dogs	Correlation Coefficient	.016	.256(**)	.295(**)	.389(**)	-.415(**)	-.392(**)	1.000	.737(**)	-.364(**)
		Sig. (2-tailed)	.856	.004	.001	.000	.000	.000	.	.000	.000
		N	126	124	126	126	126	126	126	126	126
	i am fearful of unknown dogs	Correlation Coefficient	.053	.249(**)	.182(*)	.384(**)	-.351(**)	-.256(**)	.737(**)	1.000	-.349(**)
		Sig. (2-tailed)	.559	.005	.041	.000	.000	.004	.000	.	.000
		N	126	124	126	126	126	126	126	126	126
	i enjoy handling strange dogs	Correlation Coefficient	-.002	-.099	-.216(*)	.018	.311(**)	.295(**)	-.364(**)	-.349(**)	1.000
		Sig. (2-tailed)	.983	.276	.015	.841	.000	.001	.000	.000	.
		N	126	124	126	126	126	126	126	126	126

Appendix 3.9 *Mean submission results and t tests of significance for participants that had and had not worked for more than two weeks with each of the specified animals*

Horses

	has worked with horses for >2 wks	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	64	2.3	8.465	1.058
	yes	62	3.6	8.645	1.097

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	.130	.719	-.863	124	.390	-1.315	1.524	-4.332	1.701
	Equal variances not assumed			-.863	123.653	.390	-1.315	1.524	-4.333	1.702

Cattle

	has worked with cattle for >2 wks	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	86	2.8	8.036	.866
	yes	40	3.2	9.654	1.526

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	2.155	.145	-.198	124	.844	-.3244	1.641	-3.574	2.925
	Equal variances not assumed			-.185	65.090	.854	-.3244	1.755	-3.830	3.181

Sheep

	has worked with sheep for >2 wks	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	92	2.6	8.144	.849
	yes	34	3.9	9.604	1.647

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	1.843	.177	-.807	124	.421	-1.3868	1.717	-4.786	2.012
	Equal variances not assumed			-.748	51.553	.458	-1.3868	1.853	-5.106	2.332

Deer

	has worked with deer for >2 wks	N	Mean	Std. Deviation	Std. Error Mean
TOTSUB	no	124	2.9	8.526	.765
	yes	2	4.5	13.435	9.500

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTSUB	Equal variances assumed	.519	.473	-.261	124	.794	-1.596	6.114	-13.698	10.504
	Equal variances not assumed			-.168	1.013	.894	-1.596	9.530	-119.076	115.882

THERE IS NO END.

THERE IS NO BEGINNING.

THERE IS ONLY THE

INFINITE PASSION OF LIFE

-FEDERICO FELLINI