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**Ex-racing greyhounds (*canis familiaris*) - Racing to Retirement.
A comparison of owner satisfaction and behaviour between
greyhounds adopted through Greyhound Adoption Programs and
Independent Rescues.**

BSc Canine Behaviour and Training

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Abstract

Numerous welfare issues are cited by opponents of greyhound racing. (Royal Society for the Prevention of Cruelty to Animals(RSPCA), 2015; New South Wales (NSW) Department of Justice, Special Commission of Inquiry into the Greyhound Racing Industry, 2015; Animals Australia, 2016). Oversupply leading to the lack of acceptable endpoint options is perhaps the most contentious, potentially affecting outcomes for many greyhounds (Lewis, 2008; McHugh, 2015).

Concern for low rehoming rates of the industry-underwritten Greyhound Adoption Programs™ and Greyhound As Pets (GAP) programs, (Animals Australia 2015; RSPCA, 2016) has led to the formation of numerous independent groups that rehome ex-racing greyhounds.

An online survey of owners of greyhounds adopted from all-intake independent rescues who do not perform a temperament test was conducted from October 2015 to February 2016 to compare owner satisfaction rates and frequencies of behaviour between dogs adopted through GAP and dogs adopted through non-GAP groups.

91.3% ($n=154$) of adopters from independent rescue v 91.1% ($n=193$) from GAP (Elliot *et al.*, 2010) were 'very satisfied with how well their greyhound fulfilled their expectations as a companion animal'. Answers to a series of questions regarding frequencies of behaviours were analysed using SPSS and compared to data on GAP greyhounds. Statistically significant differences were shown in frequencies of separation anxiety (31.5% of non-GAP dogs versus 42.6% of GAP dogs, $p=.007$), health/dietary issues (49.3% non-GAP v 24.5% GAP dogs, $p<.001$) noisiness (non-GAP 9.8% v 18.9% of GAP dogs ($1, n=14$) = 27.15, $p<.001$) and destructiveness in the yard (non-GAP 34.3% v 46.8% GAP dogs ($1, n=49$) =10.42, $p=.001$).

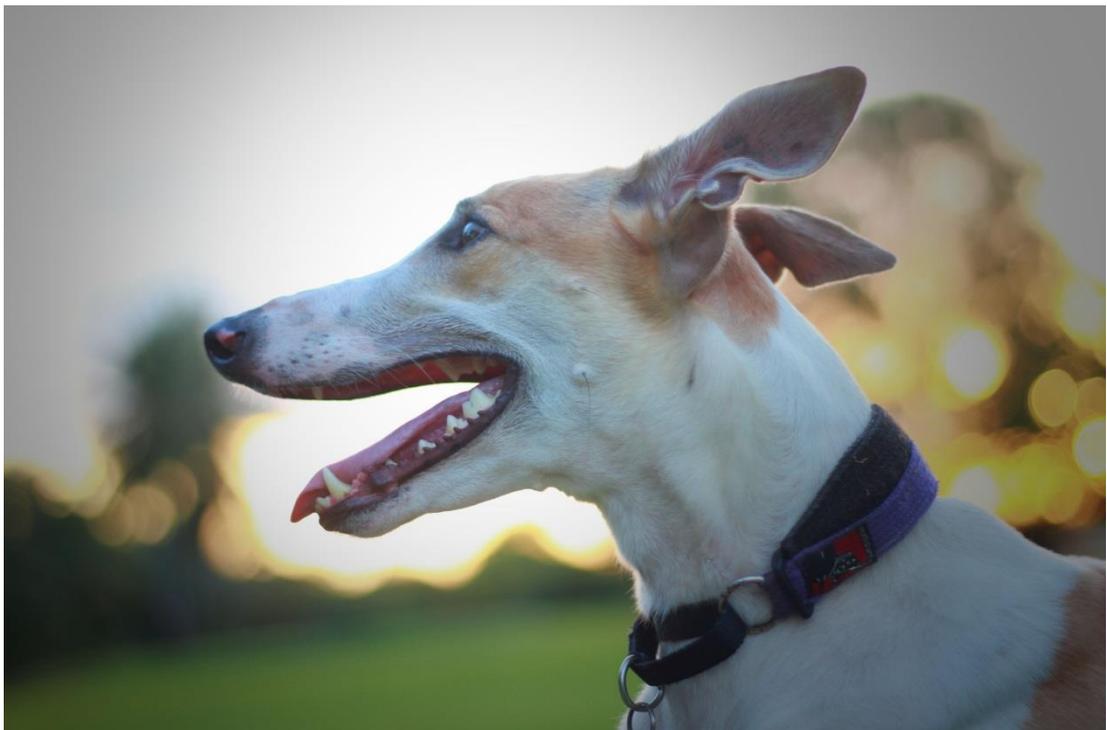
There were no statistically significant differences between frequencies of predatory behaviour towards small dogs (GAP 25.8% v non-GAP 25.4%, $p=.92$) large dogs (GAP 9.6% v non-GAP 10.8%, $p=.65$) or cats GAP 54.2% v non-GAP 55% $p=.72$).

It is suggested that despite the application of the Greyhound Adoption Program National Temperament Test, the Greyhound Adoption Program may be no more accurate at selecting suitable dogs than the all intake rehoming groups that do not temperament test.

Acknowledgements

I'd like to dedicate this to the 'wastage' of the greyhound racing industry who do not get the chance to become anyone's pets and the dedicated people who are out there trying to change this.

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1. INTRODUCTION

Every year in Australia and New Zealand, it is estimated around 17,000 healthy greyhounds (*canis familiaris*) are killed (Lewis, 2008; Animals Australia, 2014; RSPCA, 2015; NSW Department of Justice, Special Commission of Inquiry into the Greyhound Racing Industry, 2015; Greyhounds Australasia, 2016). One of the main welfare problems within the greyhound racing industry is the lack of acceptable retirement and endpoint options for greyhounds that are not competitive (NSW Parliamentary Enquiry into Greyhound Racing, 2013). Public concern regarding the fate of surplus dogs has led to the racing boards in New Zealand and six of Australia's seven States and Territories setting up not-for-profit (nfp) rehoming adjuncts to rehome ex-racing greyhounds. Funded by levies from industry, charitable donations and State government money, these programs are known as either Greyhound Adoption Program (GAP™) or Greyhounds as Pets (GAP) (from this point on, all the industry rehoming groups will be referred to collectively as GAP and non-industry groups will be collectively, non-GAP). To be accepted into the scheme, greyhounds must go through a process of behavioural assessment or temperament testing, using the Greyhound Adoption Program National Temperament Test (GAPNTT, Appendix 3). The test is 'aimed at providing an unemotional, consistent, repeatable test for Greyhound suitability for re-homing' (Greyhound Racing Victoria (GRV), 2014 p. 1). It is estimated that 1,000 dogs are rehomed annually through GAP (Animals Australia, 2015) and that only 3% of greyhounds born go on to live out their lives as pets (Lewis, 2008).

Concern for the historically poor rehoming rates of the industry-sponsored programs (Lewis, 2008; McEwan and Skandakumar 2013; NSW Parliamentary Enquiry into Greyhound Racing, 2013) has led numerous individuals to form independent nfp and charitable rehoming groups for the purpose of placing surplus greyhounds bred for racing into pet homes. Usually run by volunteers, few of these groups have formal assessment procedures and many are all-intake, taking greyhounds from trainers, impound facilities, veterinary clinics, university facilities and online

advertising (for example Gumtree or Craigslist) regardless of age, temperament, or health (Amazing Greys 2011; Greyhound Rescue NSW, 2009).

Currently there is very little research available regarding the behaviour of ex-racing greyhounds and their transition to life as pets (Elliot *et al.*, 2010) and no research has been done regarding behaviour of greyhounds adopted through non-GAP programs. This study will attempt to address the lack of data. .

In light of the conflicting research regarding temperament tests as predictors of future behaviour (Jones and Gosling, 2005; Deiderich and Giffoy, 2006; Christensen *et al.*, 2007; Mornement *et al.*, 2010; 2014; 2015; Marder *et al.*, 2013; Rayment *et al.*, 2015) this study was devised to explore the accuracy of the GAPNTT to 'identify dogs with a temperament suited for placement in an average pet home, and for suitability for exemption from muzzling' (Anon, Greyhound Behavioural Assessment, GAP NSW, undated p. 1) over independent rehoming groups who do not temperament test. This will be done by comparing owner satisfaction rates and incidences of behaviour that been previously identified as putting adopted dogs at risk of return post adoption (Wells and Hepper, 2000; Diesel *et al.*, 2008). This will give an indication as to whether GAPNTT is a valid construct, or whether in fact it is a final terminal hurdle placed in the path of many greyhounds racing to retirement.

2.0 LITERATURE REVIEW

2.1 The Australian Greyhound Racing Industry 2016

Australia reportedly has the second largest racing industry in the world, recently overtaking the United States (McEwan and Skandakumar, 2013), with estimates of 8,000 (Animals Australia, 2014; Greyhounds Australasia, 2016) to 125,000 (Corbett, 2012) greyhounds born annually. The wide range in the estimated numbers reflects the failure of the industry to either collect or disseminate accurate information, it being acknowledged that many greyhound births are never recorded (McHugh, 2015). In February 2015 the Australian current affairs program, Four Corners (Meldrum-Hanna and Clark, 2015), aired hidden camera footage of the illegal practice of live baiting. Also known as 'blooding', live baiting is the use of live animals tied to lures or otherwise constrained for the dogs to chase or kill in the belief that it will increase the desire to chase (RSPCA, 2015). The footage led to national and international public outcry against greyhound racing (Casey, 2015). In four Australian states inquiries were launched (Newman, 2015) and three state racing boards were stood down or resigned (Pengilly, 2015). Renewed scrutiny of industry practices has brought to public attention the numbers of greyhounds that are killed every year as 'wastage' (GRNSW Joint Working Group Draft Report, 2015 p. 24) with an estimated 40%-50% of greyhounds born never competing in racing (RSPCA, 2015) and an estimated 10,000 'retiring' every year (Animals Australia, no date (n.d.)). In insisting on a non-validated temperament test prior to acceptance for rehoming, it is questionable as to whether the industry is truly 'putting animal welfare at the heart of everything we do' (Greyhounds Australasia, n.d.).

2.2 Chronology of the Greyhound Adoption Program

The first GAP was set up in Victoria in 1996 to find homes for greyhounds who were not suitable for racing. It was taken over by Greyhound Racing Victoria in 1998 and other states followed (Anon, 2015), with all states currently running industry funded rehoming programs except the Northern Territory.

Table 1

Names of adoption programs, states/territories/countries they operate in and abbreviations used.

Name of Program	Country/State
Greyhounds As Pets	Western Australia (GAPWA)
	New South Wales (GAPNSW)
	Australian Capital Territory (GAPNSW)
	New Zealand (GAPNZ)
Greyhound Adoption Program (GAP™)	Victoria (GAPVIC)
	South Australia (GAPSA)
	Tasmania (GAPTAS)
	Queensland (GAPQLD)

There has been much criticism of the small number of dogs rehomed by the schemes with around 1,000 being rehomed in 2014 (Animals Australasia, 2015; RSPCA, 2014; RSPCA, 2015). Industry participants cite long waiting lists to enter dogs into programs which are often oversubscribed (GAPSA, n.d.). A search for peer reviewed literature on the validity of GAPNTT turned up no information. Emails sent to the groups listed in Table 1 failed to elicit specifically what test was currently used, the training of the personnel who applied it, and exactly what constituted a pass or fail. There have however been numerous published studies on temperament tests in both the shelter and working dog environment which can illustrate the limitations and the serious welfare implications of using a pass/fail model and the reliability and validity shortfalls of such tests. (Jones and Gosling, 2005; Deiderich and Giffoy, 2006).

2.3 Requirements for entry into GAP

To enter dogs into GAP, trainers fill in an application. The greyhounds undergo a behavioural assessment (Elliot *et al.*, 2010; GRV GAP, 2014; GAP QLD, n.d.; Greenhounds NSW, n.d.), known as the Greyhound Adoption Program National Temperament Test and must pass the test for entry into the scheme.

Currently in all Australian states (the legislation is under review in Victoria) excluding the NT and some areas of QLD, greyhounds are required by law to be muzzled in public and/or on leash at all times, including off-leash parks (Greyhound Equality Society, n.d.). Upon rehoming through GAP programs, dogs are awarded a specially numbered green collar and granted exemption from wearing a muzzle (Greenhounds NSW, n.d.; GRV 2014). This exemption is unique to dogs adopted through GAP programs. Greyhounds adopted through non-GAP programs are charged a testing fee to undergo the GAPNTT allowing them 'green collar' status and to be muzzle free in public. The process for this is not uniform, at state level GAPs require different assessments, some require a three day kennel stay, others assessment by a qualified dog trainer or veterinary surgeon and some are unclear as to what the requirements are (GRV, n.d.; GAPWA, n.d.; Greenhounds NSW, n.d.). Non-GAP dogs that fail the GAPNTT return to their owners and continue to wear a muzzle in public. Anecdotally, owners of greyhounds wearing muzzles feel marginalized, and it is seen as a barrier to adoption (Greyhound Equality Society, n.d.).

The industry-sponsored adoption programs which aims to 'identify dogs with a temperament suited for placement in an average pet home, and for suitability for exemption from muzzling was developed here in Victoria and has now been adopted by GAP in all states and the Green-hounds program in NSW'. (Anon, Greyhound Behavioural Assessment, GRVIC, 2014 p. 1). However due to a paucity of published statistics, it is difficult to assess whether the testing procedure is (i) identifying suitable dogs for an average pet home (which is not defined) (ii) the dogs are suitable for exemption from muzzling; (iii) GAPNTT is achieving its stated aim. The temperament test is 'aimed at providing an unemotional, consistent, repeatable test for Greyhound suitability for re-homing' (GRV, 2014 p. 1). The GAPNTT consists of a series of nine subtests which are broken down into component parts with a series of three tick boxes (Table 2; Full test description available in Appendix 3). After passing GAPNTT, GAP dogs are either kennelled or fostered depending on circumstances, and await adoption (GRV GAP, 2014).

It is unknown how many dogs are submitted for testing Australia wide or what proportion of dogs presented are accepted for rehoming. Without this evidence it is difficult to state whether GAPTT is an accurate selection tool. Greyhound Racing QLD replied in a comment to the Australian Broadcasting Commission (ABC) that it had adopted 96 dogs in 2014 and 42 dogs had failed the temperament test (ABC, 2015).

Table 2

Subtests in the Greyhound Adoption Program National Temperament Test

Test Number	Test Name
TEST 1	Assessment of prior history
TEST 2	General Observations by Kennel Staff during holding period
TEST 3	Approach Whilst In Kennel and response to attaching Lead and Collar
TEST 4	Leash Manners
TEST 5 - Part A) – General Sociability	Sociability to People
TEST 6 – Physical Examination	Physical Examination +/- Veterinary Examination
TEST 7 – Reaction to Novelty	Part A) – Reaction to Loud Noises
TEST 8 – Resource Guarding	Part A) – Toy Test Part B) – Normal food Part C) – High Ranking Food
TEST 9 –Prey Drive Test - Small Dog	Part A) – Approach and first sight of small dog Part B) – On Leash Reaction Part C) – Reaction to Small dog off leash and moving quickly

Not all GAPs publish their adoption figures but it is thought that around 1,000 greyhounds are adopted annually (Animals Australia, 2015), with the longest running GAP (GAPVIC) having placed 6,100 dogs in 20 years (Greyhound Racing Victoria, n.d.). There is also no published data concerning unsuccessful dogs, whether they are resubmitted, rehomed privately or killed. The number of dogs discarded by the Greyhound industry is morally unacceptable to many people (Lewis 2008; NSW Parliamentary Enquiry into Greyhound Racing, 2013; McEwan and Skandakumar 2013; Rushton 2015). Comparing the racing dog sector to other animal production industries leads

to very unfavourable comparisons in terms of economics and animal welfare (Cobb *et al.*, 2014). An industry that fails to get 50% of its product to the market place would not be considered viable or acceptable in many other realms (Broome, 2010).

Also unknown is how many greyhounds are surrendered to and placed by independent groups annually, but there are currently 16 individual greyhound specific rehoming groups registered as nfp/charities in Australia and New Zealand. A selection of mission statements and program aims include:

Greyhound Rescue is based in Sydney, Australia and was set up to find homes for the many greyhounds surplus to requirements of the Racing Industry. In that time we have found homes for more than 600 greyhounds which otherwise would not have had a life after finishing their racing career or failing to start one. (Greyhound Rescue, 2011)

Our aim is to rescue, rehabilitate and rehome as many greyhounds as we can. (Amazing Greys, 2011)

We take surrendered and rescue ex racing Greyhounds, rehabilitate and re-home them. (Greyhound Rescue Victoria, 2010)

2.4 Testing, assessment and personality, a search for consistency.

2.4.1 History

According to Jones and Gosling, (2005) the history of defining canine dispositions goes back to Pavlov and the beginning of the twentieth century. Little further research into dog temperament occurred for the following 50 years until breed groups and working dog associations began to develop tests as a prerequisite for breeding approval (Fuchs *et al.*, 2005). Since then, a range of organisations and individuals have attempted to create a test that will enable accurate assessment of desired canine characteristics and the predictability of those characteristics. The ability to identify the perfect dog would be highly advantageous to many (Jones and Gosling, 2005; Taylor and Mills, 2006) in terms of saving money and time training dogs not suitable for future jobs. It would also in potentially reduce attrition rates for

unsuccessful animals by identifying them early on when they are younger and easier to rehome.

Researchers in the field of temperament testing and personality assessment come from many different disciplines, including, but not limited to animal welfare, behaviour, psychology, behavioural ecology and veterinary medicine (Jones and Gosling, 2005). A search through the literature identifies numerous motivations and highlights the different aspects of behaviour studied and tested, emphasising the potential challenges in analysing and comparing the accuracy of the results (Jones and Gosling, 2005; Diederich and Giffoy, 2006; Taylor and Mills, 2006, Mornement *et al.*, 2010; 2014; 2015; Gartner, 2015). Historically, research on temperament testing has been broadly divided into groups such as guide dogs for the blind, (Pfaffenberger *et al.*, 1976; Serpell and Hsu, 2001; Duffy and Serpell, 2012) military and police dogs, (Rooney and Bradshaw, 2004; Rooney *et al.*, 2007; Sinn *et al.*, 2010; Foyer *et al.*, 2015; Roczniak *et al.*, 2015) breed clubs, (Fuchs *et al.*, 2005; Duffy *et al.*, 2008b; Paroz *et al.*, 2008; Schalke *et al.*, 2008) pet dogs, (De Meester *et al.*, 2011; Bennett *et al.*, 2012; Klausz *et al.*, 2014) and shelter dogs (Ledger and Baxter 1997; Mornement *et al.*, 2010; 2014; 2015; Dowling-Guyer *et al.*, 2011; Valsecchi *et al.*, 2011 and Bennett *et al.*, 2015). One of the difficulties in comparing results, is the diverse functions of the 'ideal' dog that the groups are seeking to identify.

2.4.2 Definitions

Problems with comparisons in the literature arise from the lack of consistency in the use and meanings of words. In human psychology, one of the most frequently referenced definitions of temperament is how an individual reacts to taxing situations (Valsecchi *et al.*, 2011). In terms of testing dogs, Diederich and Giffoy (2006) defined temperament as the individual differences in behaviour that are reliably exhibited when subjects are tested and retested under similar circumstances. Various, the terms temperament, trait, personality, character and behaviour among others have been used to describe the same observations leading to confusion over what was actually being described. Gosling (2008) makes a compelling argument for using the term personality, namely it is already in accepted use in study of

human psychology allowing researchers to connect with the large body of work and states that there is no convincing reason to create new terms such as behavioural syndrome. Using language such as 'temperament' for animals 'entails a priori assumptions (e.g., about traits being inherited and appearing early) that are almost certainly not true' and as in humans, differences in animal behaviour are a product of both genetics and environment (Gosling, 2008, p 1). However other researchers resist the use of the term personality describing it as too anthropomorphic (Gosling, 2001).

Valsecchi *et al.*, (2011) suggested that traits have temporal constancy, reliability and vary less within an individual than between individuals. Wilson and Sinn (2012 p 159) suggest that personality can be defined as 'correlated suites of behaviors, whereby the correlations between observed behaviors occur through time, across different functional contexts, or some combination of the two'. If we hold this to be true, then only in observation over time will a dog's true personality be discovered. This leads inevitably to questioning the ethics of relying on models of temperament testing that use a 'snapshot' of behaviour at a moment in time as a pass or fail, with a fail leading to possible euthanasia.

In the literature, the descriptions 'Temperament Test' and 'Behavioural Assessment' are often used interchangeably to describe a set of criteria for evaluation (Jones and Gosling, 2006) and this is true of the GAPNTT which uses both terms. Rayment *et al.*, (2015) suggests that the tendency to use the latter term more widely in recent studies is a reflection of the problems identified with using a one off pass/fail behavioural picture that is implied in the concept of a 'test' (Rayment *et al.*, 2015). The wide variation in the way behaviourable variables are recorded and how they are recorded also leads to difficulties making comparisons (Taylor and Mills, 2006).

Ill-defined and interchangeable terminology complicates matters (Diederich and Giffoy, 2006). Within overarching concepts of personality and temperament, further subdivision into areas such as traits, compounds the complications. Carter (2013) points out that the term 'trait' means very different things to ecologists and psychologists; ecologists take a reductionist

view, defining trait as a measurable, repeatable aspect of an individual's behaviour, while psychologists tend to take a more abstract holistic approach. The use of the term 'boldness' illustrates this. Boldness is identified as one of the most frequently recorded personality traits in all animals (Gosling, 2001), but also one of the most disputed in terms of definitions, occurrence and measurement (Carter, 2013).

Despite the many challenges in compiling accurate definitions, it is generally accepted that temperament is a concept used to explain the behavioural differences between individuals and breeds that are observed when testing animals, including dogs, (Goodloe, 1996) that can be elicited by particular stimuli, and are relatively stable over time (Jones and Gosling, 2006).

Nevertheless, it is also recognized and widely acknowledged, that in understanding the concept of temperament many factors come into play, including genetics, experience, learning, rearing and prenatal environment (Cloninger, 1994; Lindsay, 2001; Caspi and Caspi, 2005; Correa, *et al.*, 2013; Crews *et al.*, 2012; Beaver, 2009 and Carter *et al.*, 2013). As will be discussed next, the lack of standardisation of definitions is also compounded by the lack of standard methodology.

2.4.3 Testing methodology

Taylor and Mills found in their 2006 review of temperament tests for adult dogs that many published tests lacked statistical evidence to support their claims. As well as a need for scientific integrity, temperament tests, especially in the rehoming, shelter and pet dog world, have the potential to severely affect the welfare of the animal being tested (Mornement *et al.*, 2010), an issue directly relevant to GAP greyhounds, where failure of the GAPNTT leaves them with very limited options. Problem behaviour in pet dogs can lead to punishment, (which is recognised as detrimental to optimum welfare (Hsu and Serpell, 2003)) euthanasia, (Mornemont *et al.*, 2010) and relinquishment to shelters (Patronek *et al.*, 1996; Salman *et al.*, 1998), so failure to detect it can lead to negative outcomes for dogs placed in pet homes.

The quality of a good behavioural test requires that three measures: reliability, validity and feasibility, be met to determine whether a test is a good measure, the right measure and a useful measure (Martin and Bateson, 2007). Reliability includes consistency of results across tests, between observers (inter-rater reliability) as does test/re-test reliability where the same dog is tested on two or more occasions, and predictive validity. The latter is of particular importance as behavioural tests are typically used to make predictions of how the dogs will behave once adopted (Mornemont *et al.*, 2014). To date, no published research has been made available for the reliability or validity of the GAPNTT, however Elliot *et al.* (2010) identified that despite some reported problem behaviours, GAPNTT tested dogs compared favourably with adopted shelter dogs for adopter satisfaction.

Measuring validity means ensuring that temperament tests are actually measuring the traits they say they are. According to Taylor and Mills (2006) as behaviour is complex, it is impossible to test every single reaction to every circumstance, which affects the validity of testing. A valid test should be able to predict the likelihood of a behaviour appearing above that of chance alone, and the more thorough the test the more opportunity to elicit the behaviour. However a long complicated test is unlikely to be carried out accurately or reliably in a shelter situation due to constraints such as time, lack of trained staff and other practicalities (Taylor and Mills, 2006; Mornemont *et al.*, 2010) thus making it unfeasible to use in many settings..

Other confounding variables that interfere with assessing temperament test accuracy are the diversity of motivations and different research questions asked (Jones and Gosling 2005; Gartner 2015). Historically, the test subjects (dogs) have all come from very different backgrounds (Christensen *et al.*, 2007; Bram *et al.*, 2008; Haverbeke *et al.*, 2009; Duffy and Serpell 2012; Foyer *et al.*, 2015). As mentioned previously, working dogs such as military and police dogs were the focus of early research and specific though often ill-defined traits such as 'courage' and 'drive' were tested. Identifying a working dog that is emotionally resilient in the face of fearful stimuli is important to the dog's welfare and working capacity (Foyer *et al.*, 2015). However, it is debatable whether an animal destined to be a pet needs it's

'sharpness' or 'courage' tested. Gartner (2015) notes that researchers have recognised this and in the last ten years or so the demographics in studies on canine temperament testing have changed.

In their 2006 review, Jones and Gosling assessed 51 publications, of which only 17 were on pet dogs, 85% of the dogs assessed were purebred and most dogs were under four years of age and unneutered. Gartner identified 44 relevant studies between 2006 and 2014, of which 26 were on pets or potential pets e.g. shelter dogs and breeding dogs, of which 50% were purebred. Although breed has been identified as influencing personality the range of variation within breeds make it inappropriate to predict aggressive tendencies based on breed (Svartberg and Forkman, 2002). A combination of methods of measurement were used by researchers, often within the same studies, including behavioural batteries, observation, owner report and expert ratings. Gartner (2015) recognised there is now more interest among canine scientists in studying pet dog behaviour in shelters and in the home and that more studies are reporting reliability and inter-observer agreement statistics, than in Jones and Gosling's (2005) review. Convergent validity was also reported in a large percentage of the 44 studies Gartner (2015) compared, with aggression and then fearfulness being the most studied trait in dogs. However, considering that pet dogs fulfil a completely different purpose than working dogs, the appropriateness of many temperament tests that have evolved from testing working dogs could be questioned.

It is worth noting that Gartner (2015) like Diederich and Giffoy (2006) previously, found that due to the different parameters such as sex, age, breed, terminology, testing environment and researcher's methods, standardisation is still needed to make comparisons of tests easier. Based on the results analysed, it was concluded that personality can be measured and is relatively stable over time, especially in older dogs, but no comment was made on the reliability of such measurements for predicting future behaviour (Gartner, 2015).

2.4.4 Limitations of testing

Discussed earlier were the welfare outcomes of test failure for the animal being tested (Diesel *et al.*, 2010; Mornement *et al.*, 2010). Many of these limitations apply to racing greyhounds. A general limitation of many shelter and working dog tests that is often cited is that the test is performed in a novel space by an unfamiliar tester (Mornement *et al.*, 2010; Dowling-Guyer *et al.*, 2011; Bennett *et al.*, 2012). This is known to be highly stressful to dogs and to affect their interactions with unknown humans (Barrera *et al.*, 2010). GAPVIC's recently introduced policy of moving their testing procedure away from kennels to several different venues around the state for the convenience of trainers wishing to enter their dogs in GAP (GRV, 2015) may well have seriously adverse effects on the outcome for many greyhounds.

It may be that because of the unique way greyhounds are reared, tests designed for shelter dogs are not going to measure greyhound behaviour accurately. In a report commissioned by Greyhound Racing NSW in 2015, Cobb *et al.*, (2015) drew attention to the lack of systematic socialisation of young greyhounds, something that is widely acknowledged as contrary to production of a dog that is capable of meeting society's perception of a good pet (Lyndsay, 2001; King *et al.*, 2009). The report noted that industry participant knowledge regarding the impact of lack of socialisation was very limited, and resistance to coupling education to licensing was widespread. This lack of education regarding the importance of early socialisation and the consequent lack of controlled exposure to novel stimuli including humans, is likely to significantly impact on performance in a temperament test where a pass or fail depends on being judged as 'friendly, approachable and manageable' (Anon, p. 1 Greyhound Behavioural Assessment). Rayment (p. 3, 2015) suggests that it very difficult to assess personality in a 'one-time assessment performed in a single-context environment' and that even though there has been a sizeable amount of study devoted to temperament testing in dogs, many studies ignore significant evidence from other fields such as psychology and ethology. The paper further highlights the limitations of tests that do not take into account the valence, arousal and motivation of the

animal being tested, which can change over time. The point is made that emotion, i.e. how the dogs feels, how it assimilates information and how it responds all have the potential to affect the reliability and validity of tests. Chronic stressors such as high levels of noise in the environment and social isolation have been documented as affecting the emotional states of dogs in shelters; these are conditions that many greyhounds live in, as was highlighted in the Cobb *et al.*, (2015) report. Rayment (2015) goes on to say

Positive and negative emotional states most likely affect behavioural test results differently based on context (for example a 'pessimistic' dog may be less likely to engage in play under test conditions than an 'optimistic' conspecific....highlighting a need to investigate the interaction between affective state and test results before any specific conclusions are drawn. (Rayment, 2015 p. 11)

It is also worth noting, that many tests or assessments rely on blatant or 'gross' responses to fearful stimuli, such as attempts to flee, growling, lunging and attempts to bite. These tests assume that passive behaviour is an indication that the individual is not stressed; to the contrary, a highly stressed individual may well have their behaviour suppressed, and thus the predictability of the test will be seriously affected (Rayment *et al.*, 2015). Learned helplessness, a phenomenon where an animal ceases to react to stimuli as it has learned it cannot influence the outcome, is well-documented in dogs (Seligman, 1972) and other animals (Vollmayr and Henn, 2001). A plausible explanation for 25.4% of dogs in the Elliot *et al.*,(2010) study exhibiting predatory behaviour toward small dogs 'some of the time' or more often despite presumably passing the small dog component part of the GAPNTT, could be they are exhibiting learned helplessness. There is some research to show that tests that rely on the incidence (or not) of gross reactions have lower levels of predictive validity for behaviours related to aggression and fear (Bennett *et al.*, 2012; Mornement *et al.*, 2014; 2015) than those that record more subtle 'stress' behaviours such as yawning, lip licking, gaze aversion that are held to be indicative of fear/discomfort (Barnard *et al.*, 2012; Kuhne *et al.*, 2014). It is, however acknowledged that

the time and expertise necessary to record the high level of detail required in examining all pertinent behaviours makes these sorts of tests unfeasible in many shelter environments, thus there will always be issues with reliability and validity to a degree (Rayment *et al.*, 2015).

It is suggested by Kuhne (2015) and Rayment (2015) that a distinction should be made between the observed behavioural responses related to fear and anxiety (which show most validity in shelter tests (Mornement *et al.*, 2013; Rayment, 2015)) and the level of arousal experienced, which is best measured by physiological tests such as heart rate and circulating glucocorticoids. This could help reduce subjectivity (Rayment *et al.*, 2015). Marder *et al.*, (2013) suggests that a combination of assessment by people in the shelter who interact daily with the dog and who can collect important behavioural information about an animal that is often not available in a test situation, as well a test battery, is more indicative of the true temperament of a dog. Of course, this is only possible if the dog in question actually gets as far as the shelter to be assessed. A test that assesses greyhounds as a pass or fail in a novel environment that may well mimic a race meeting (lots of other greyhounds, dog trailers and trainers) is unlikely to solicit accurate behaviour. And the behaviour that is solicited is not necessarily going to be the behaviour that will be displayed after a period of socialisation and habituation in foster. In a culture that is moving towards 'zero kill' in shelter environments it may be that greyhound racing has 'run its course'. (McEwan A., Skandakumar K., 2013) and that the public are no longer willing to accept the death of thousands of greyhounds as a by-product of racing.

3.0 AIMS AND HYPOTHESES

The aims of this research project are to investigate whether there is a statistically significant difference in satisfaction rates between two groups of adopters; one group who adopted their greyhounds through GAP and a group that adopted their greyhounds through independent rescue. The research also aims to explore whether there is any statistically significant differences in frequencies of post adoption behaviours between GAP greyhounds and non-GAP greyhounds. The reasons for adopting a greyhound will also be thematically explored.

3.1 Hypotheses: Owner Satisfaction post adoption

H₀ - There is no statistically significant difference in owner satisfaction post adoption between greyhounds adopted via the Greyhound Adoption Program and greyhounds adopted through rehoming groups that do not temperament test

H₁ - There is a statistically significant difference in owner satisfaction post adoption between greyhounds adopted via the Greyhound Adoption Program and greyhounds adopted through rehoming groups that do not temperament test

Frequencies of various behaviours including fearfulness, aggression and other behaviours will be compared between the two sample groups to explore whether selection by temperament testing leads to dogs that exhibit less incidences of reported behaviours that have been reported as leading to risk of return post-adoption.

A brief examination of people's reasons for adopting greyhounds will primarily be descriptive and not based on a specific hypotheses. There will also be some thematic analysis of reasons for adoption and exploration of owners' remarks about their dogs in relation to their satisfaction levels.

4.0 MATERIALS AND METHODS

4.1 Subjects

A self-selection sample of 224 responses was received from owners of ex racing greyhounds, primarily through social media. Self-selection sampling is an appropriate method to identify specific populations (Coolican, 2004). Subjects also needed to have enough interest in greyhound adoption to complete a 20 -25 minute survey asking detailed questions about their dog's behaviour and their personal opinions. Owner completed questionnaires are relatively common for recording dog behaviour though there are still some reservations over reliability and validity (Merkham and Wynne, 2014; Gartner, 2015) Social media has shown that despite potential sample bias, it is an effective method that allows a large 'elusive' population to be contacted in a timely, inexpensive manner and Facebook is particularly well suited due its large number of users linked to friends and access to group membership (Baltar, 2012; Brickman Bhutta, 2012; Denscombe, 2014). After incomplete questionnaires were excluded ($n = 70$) the final sample size was 154. The age of the subject greyhounds (at time of completing the questionnaire) ranged from 1 year to 12 years old (mean 5.5). Both genders were represented with male $n = 62$ and female $n = 92$.

4.2 Data collection

Data collection was undertaken through an online survey, using non-probability sampling. Participation was limited to adopters of dogs in Australia or New Zealand only, to compare results with figures previously published on greyhounds adopted through GAP In these two countries. Permission was sought from nfp groups to post study details onto their Facebook pages. The survey was made available through Qualtrics (www.qualtrics.com) from October 2015 to February 2016. Owners were asked to complete the Greyhound Adoption Satisfaction Survey (Appendix 4) which was adapted from the Elliot *et al.* (2010) 'Greyhounds As Pets' questionnaire (Appendix 1). Open-ended and forced choice questions were used to gather the data. The inclusion of open-ended questions will allow further analyses in future research. According to Reinharz (1992) open-ended questions reduce the possibility that participants feel alienated from

research. Forced choice format included a four point scale for observation of behaviours of (1) Always/Almost always (2) Most of the time (3) Some of the time (4) Rarely/Never, with the lack of a midpoint thus negating possible respondent bias towards the central option (Foddy, 1993).

4.3 Information collected

4.3.1 Household details and management practices

Owners were asked a series of questions on household members, other pets, management practices such as where the dog slept, details of exercise and training, how much time was spent with the dog, proportion of time dog spent indoors or outdoors.

4.3.2 Owner satisfaction

Owners were asked their reasons for adopting, any health or dietary problems and their satisfaction with their dogs based on a four point scale rating ('very satisfied', 'somewhat satisfied', 'somewhat dissatisfied', 'very dissatisfied'). This scale was adapted by Elliot *et al.*, (2010) from two previous studies, Leichardt and Boyd (2002) and Marston *et al.* (2005). Using an adapted questionnaire facilitates comparisons to previous studies. Elliot *et al.* (2010) compared greyhound post adoptive behaviours to general shelter dog and pet population, this study compared GAP and non-GAP adopted greyhounds. It was felt that for authenticity, the questionnaire should be reproduced in its entirety, apart from the final section regarding satisfaction with GAP services which was not relevant and therefore excluded. Chi-squared goodness-of-fit test were run to compare results of this study with the Elliot *et al.*, 2010 results.

4.3.3 Greyhound behaviour details

Owners were asked to rate the frequency of specific behaviours in their adopted greyhounds using a four point scale ('always/almost always', 'most of the time', 'some of the time', or 'rarely/never') adapted from Marston *et al.*, (2005). The behaviours listed included the most common behaviours exhibited by shelter dogs (Marston *et al.*, 2005) with some behaviours 'specifically relevant to greyhounds, such as predatory behaviour and

specific fears' (Elliot *et al.*, 2010 p 123). The categories of behaviour were split into aggression and/or fear towards as per Figure 1.

4.4 Procedure and analysis

Bishop Burton College through the University of Hull Human Research Ethics Committee granted approval for this study. All questionnaire data was entered into IBM SPSS® Version 22 for statistical analyses. Charts were constructed using Microsoft Excel. Results were considered to be statistically significant when $p.05$ or less (Pallant, 2013).

4.4.1 Descriptive analysis

Percentages for categorical variables were calculated and the mean, median, percentiles and range for continuous variables to provide a detailed description for each greyhound, its behaviour and owner household.

4.4.2 Comparative analysis

Chi-squared goodness-of-fit tests were conducted to identify any statistically significant difference in the frequency of reported behaviours in the greyhounds in this study group (non-GAP) and the greyhounds in the Elliot *et al.*, (2010) study group (GAP).

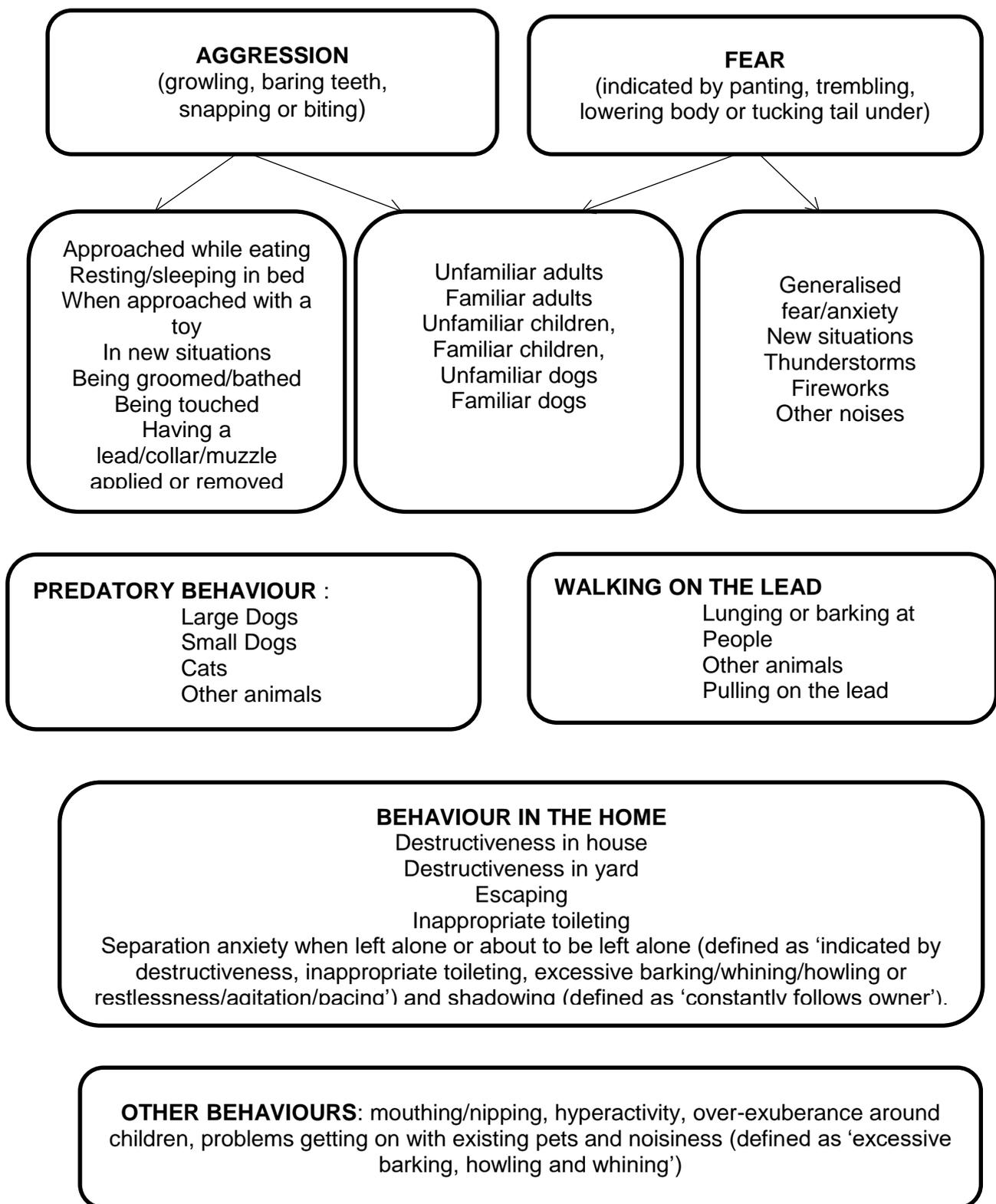


Figure 1. Behaviours recorded by frequency 'always/almost always', 'most of the time', 'some of the time', 'rarely/never').

5.0 RESULTS

5.1 Demographic information

The 154 greyhounds consisted of 62 castrated males and 92 spayed females (Figure 2) with a mean age of 5.51 years (median of 5 and range from 1-12 years of age). The 154 adopting households consisted of an average of two adults (median 2, range 1-6) with children living in 29.4% of the households ($n=153$). Of the households that included children, 8 households had children 0 – 3 years, 20 households had children 4-10 years and 28 households had children 11-17 years. Most adopters had owned a dog before (95.4% $n=153$) and 75.3% of adopters owned other pets ($n= 116$) and were asked to list all pets living in the household by species, sex, age and breed. Cats were 24.1% ($n=28$) of the first pets listed, and 40.2% ($n=45$) of the first breed of dog listed were greyhounds. (Appendix 2, Table 1)

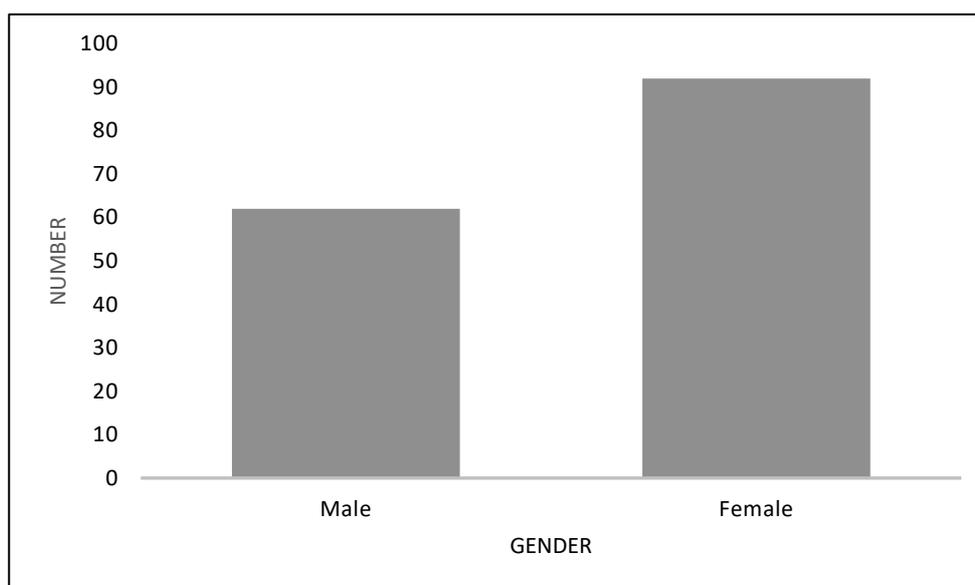


Figure 2. Distribution of male and female greyhounds

5.2 Dog management practices

The majority of greyhounds slept indoors, 93.3% ($n=139$) and 71.2% ($n= 109$) were walked daily. The owners of 29 dogs were currently undertaking obedience training with their dogs (19%, $n= 153$) though 54.9% had no intention of undertaking training (Table 3).

Table 3. Comparison between GAP and non-GAP demographics (GAP N= 193; non-GAP N=154) (Appendix 2, Table 2)

	GAP	Non-GAP	Difference
Mean Age of greyhounds (years)	3.7	5.51	+ 2.2
Adopters had owned a dog before (%)	93.5	95.4	+ 1.9
Adopter owned other pets	65.6	75.3	+ 9.7
Greyhound slept indoors	86.3	93.3	+ 5.8
Greyhound walked daily	71.1	71.2	+ 0.1
Greyhound currently obedience training	47.1	19.0	-28.0
Owner 'very satisfied'	91.1	91.3	+ 0.2
Dogs with health/dietary problems	24.5	47.7	+23.2

The amount of work involved in caring for their dogs was reportedly overestimated or accurately estimated by 90.7% (137 dogs) of owners and underestimated by the owners of 9.3% (14 dogs $n=151$). Seventy two greyhounds (47.7% $n=151$) had health or dietary problems the most common being gastro-intestinal problems and dental disease.

5.3 Owners' satisfaction with their new greyhound

The owners of 137 dogs (91.3%) indicated that they were very satisfied with how well their greyhound fulfilled their expectations as a companion animal ($n=150$ dogs). One owner was very dissatisfied. (Appendix 2, Table 3)

5.4 Incidence of Behaviour

5.4.1 Fearful behaviours

Frequency data relating to fearful behaviours are presented in Table 4.

Table 4. Frequency of fearful behaviours reported (GAP N= 193; non-GAP N=154) (Appendix 2, Table 4)

Fearful behaviour	Always/Almost Always %		Most of the time %		Some of the Time %		Rarely/Never %	
	GAP	Non-GAP	GA P	Non-GAP	GAP	Non-GAP	GAP	Non-GAP
<i>Fearful behaviours in response to</i>								
Unfamiliar adults	3.2	1.4	4.3	3.4	13.4	17.9	79.0	77.2
Familiar adults	1.1	0.0	0.0	1.4	7.0	5.6	91.9	93.1
Unfamiliar children,	4.4	2.1	1.7	1.4	12.2	11.1	81.7	85.4
Familiar children,	1.1	1.4	0.6	0.0	7.4	4.9	90.9	93.7
Unfamiliar dogs	3.3	5.6	1.6	2.1	24.5	19.4	70.7	72.9
Familiar dogs	1.7	2.8	1.1	0.7	5.0	5.6	92.3	90.8
Generalised fear/anxiety	2.7	3.5	2.2	2.1	23.5	33.1	71.6	61.3
New situations	2.8	4.2	3.3	3.5	35.4	30.3	58.6	62.0

5.4.2 Predatory behaviours

Incidences of predatory behaviour towards large dogs, small dogs and cats were reported as illustrated in Table 5.

Table 5 Frequency of predatory behaviour reported (GAP N = 193; non-GAP N=154) (Appendix 2, Table 5)

Predatory behaviour	Always/Almost Always %		Most of the time %		Some of the Time %		Rarely/Never %	
	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP
Towards large dogs	2.4	1.5	3.0	3.8	4.2	5.4	90.3	89.2
Towards small dogs	3.5	5.3	4.0	5.3	17.9	15.2	74.6	74.2
Towards cats	15.1	18.6	12.7	11.4	26.5	25.7	45.8	44.3

5.4.3 Aggressive behaviours

Frequency data relating to aggressive behaviours are presented in Table 6.

Table 6. Frequency of aggressive behaviours reported (GAP N= 193; non-GAP N=154) (Appendix 2, Table 6)

Aggressive behaviour	Always/Almost Always %		Most of the time %		Some of the Time %		Rarely/Never %	
	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP
<i>Aggression towards others</i>								
Unfamiliar adults	1.1	0.0	0.0	0.0	2.1	2.7	96.8	97.3
Familiar adults	1.6	0.7	0.5	0.0	4.2	4.2	93.7	95.1
Unfamiliar children,	1.6	0.7	0.0	0.0	3.3	2.1	95.1	97.2
Familiar children,	1.7	0.0	0.6	0.0	6.1	2.8	91.7	97.2
Unfamiliar animals	2.6	6.9	1.6	2.8	23.0	28.3	72.8	62.1
Familiar animals	0.5	2.8	1.1	0.7	15.3	18.1	83.1	78.5
<i>Aggression in various situations</i>								
Approached while eating	1.1	0.7	0.0	0.7	3.7	9.7	95.3	89.0
Resting/sleeping in bed	1.6	2.8	0.5	2.8	13.7	22.2	84.2	72.2
In possession of a toy	1.1	0.0	0.0	0.7	3.8	9.7	95.2	89.6
In new situations	1.1	0.0	0.0	0.7	1.6	4.2	97.3	95.1
Being groomed/bathed	1.1	0.0	0.0	0.0	0.5	0.7	98.3	99.3
Being Touched	1.1	0.0	0.0	0.0	2.7	6.9	96.3	93.1
Lead/collar/muzzle applied or removed	1.1	0.0	0.0	0.0	0.0	1.4	98.6	98.6

5.4.4 Other behaviours

Frequency data relating to 'other' behaviours are presented in Table 7.

Table 7. Frequency of various 'other' behaviours reported (GAP N=193; non-GAP N=154) (Appendix 2, Table 7)

Behaviour	Always/Almost Always %		Most of the time %		Some of the Time %		Rarely/Never %	
	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP	GAP	Non-GAP
<i>Aggression towards others</i>								
Lunging or barking at other animals	0.5	5.5	2.2	3.4	15.7	17.9	81.6	73.1
Lunging or barking at people	0.0	1.4	0.0	0.0	2.2	2.8	97.8	95.8
Pulling on the lead	2.2	3.5	4.3	1.4	36.0	34.7	57.5	60.4
<i>In the home</i>								
Destructiveness in the house	0.0	0.0	0.0	0.7	17.8	20.1	82.2	79.2
Destructiveness in the yard	3.2	2.1	8.4	2.1	35.3	30.1	53.2	65.7
Escaping	0.5	0.0	0.0	0.7	40.7	0.7	94.7	98.6
Inappropriate toileting	1.0	0.7	2.1	2.8	26.6	26.9	70.3	69.7
Separation anxiety	6.8	2.8	5.3	3.5	30.5	25.2	57.4	68.5
Shadowing	13.6	8.3	23.0	17.2	37.2	42.1	26.2	32.4
<i>General demeanour</i>								
Mouthing/nipping	0.5	0.7	0.5	2.1	20.9	17.4	78.0	79.9
Hyperactivity	0.0	0.7	0.0	0.7	23.4	26.6	76.6	72.0
Over-exuberance around children	0.0	0.0	0.6	0.7	8.3	11.3	91.1	87.9
Problems getting on with existing pets	10.7	1.4	0.9	0.7	10.3	10.8	87.2	87.1
Noisiness	1.6	0.0	2.1	0.0	15.3	9.8	81.1	90.2

5.5 Comparative analysis

Chi-squared goodness of fit tests on frequency of behaviours reported in non-GAP and GAP greyhounds found the following results

5.5.1 Demographics

Examination of demographics of GAP and non-GAP dogs found the non-GAP dogs older by 2.2 years. There were no significant differences in previous ownership of dogs. Households were similar with an average of two adults. Statistically significant differences showed more non-GAP dogs slept indoors (93.3% v 86.3%, $p < 0.05$, $n=151$) and their owners were more likely to own other pets (75.3% v 65.6%, $p < 0.05$, $n=154$). GAP and non-GAP dogs had similar rates of being walked daily (71.1% v 71.2%, $p=.99$). (Table 9) (Appendix 2, Table 8)

More GAP owners were undertaking obedience training (47.1% v 19%, $p < 0.001$, $n=153$). Non-GAP dogs reported more health problems (24.5% v 47.7% $p < 0.001$, $n=151$).

Table 8. Chi-square test for goodness of fit Comparison between management of GAP and non-GAP dogs (GAP $N= 193$; Non GAP $N=154$)
(Appendix 2 Table 8)

	Results	%	
		GAP	Non-GAP
Adopters had owned a dog before	$\chi^2 (1, n=153) = .93, p=.33$	93.5	95.4
Adopter owned other pets	$\chi^2 (1, n=154) = 6.45, p=.01^*$	65.6	75.3
Greyhound slept indoors	$\chi^2 (1, n=149) = 6.15, p=.01^*$	86.3	93.3
Greyhound walked daily	$\chi^2 (1, n=153) = .00, p=.97$	71.1	71.2
Greyhound currently obedience training	$\chi^2 (1, n=153) = 48.64, p=.00^*$	47.1	19.0
Dogs with health/dietary problems	$\chi^2 (1, n=151) = 43.87, p=.00^*$	24.5	47.7

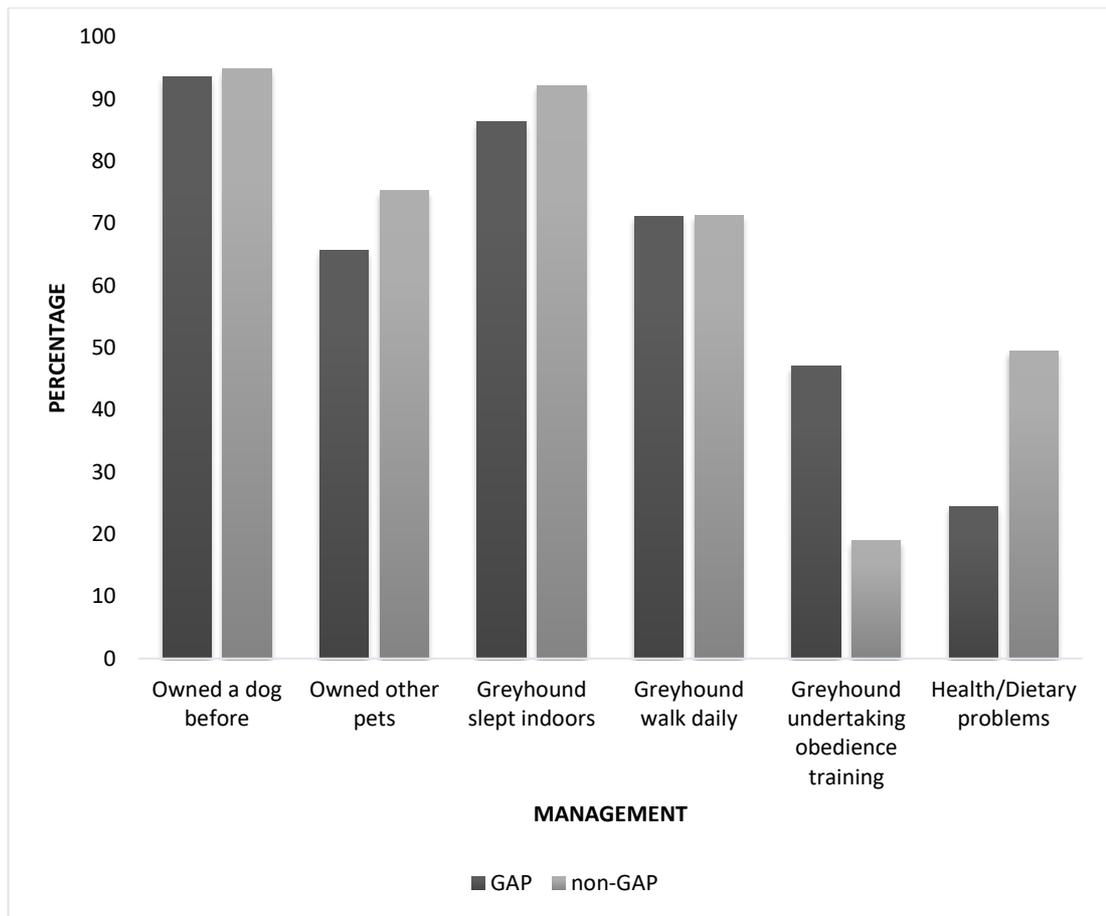


Figure 3. Differences in management between GAP and non-GAP dogs

5.5.2 Difference in aggressive behaviours (Appendix 2, Table 9)

Chi squared goodness of fit found that there was a significant difference between the incidence of aggression when resting/sleeping in bed some of the time or more often, GAP 15.8% v non-GAP 27.8%, $\chi^2(1, n=40) = 15.52$ $p < .001$ and aggression towards unfamiliar animals GAP 27.2% v non-GAP 37.8%, $\chi^2(1, n=55) = 8.43$ $p = .00$, and lunging at animals on the lead GAP % v non-GAP $\chi^2(1, n=39) = 6.97$ $p = .008$.

5.5.3 Difference in 'other' behaviours

There was a significant difference in the proportion of Non GAP dogs identified as being noisy some of the time or more often (9.8%) as compared to 18.9% of GAP dogs $\chi^2(1, n = 14) = 27.15$, $p < .001$).

Table 9. Chi square goodness of fit 'other' behaviours GAP and non-GAP dogs (Appendix 2 table 10).

Behaviour	Results	Percentage	
		GAP	Non-GAP
Hyperactivity	χ^2 (1, n=144) = 1.67, p = .19	23.4	28.0
Noisy	χ^2 (1, n=143) = .7.14, p = .000*	18.9	9.8
Destructive in yard	χ^2 (1, n=143) = 10.43, p = .001*	46.8	34.3
Inappropriate toileting	χ^2 (1, n=145) = .03, p = .86	29.7	30.3
Mouthing	χ^2 (1, n=144) = .002, p = .97	22.0	20.1
Escaping	χ^2 (1, n=143) = 4.34, p = .03*	5.3	1.4

There was a significant difference in the proportion of non-GAP dogs identified as being destructive in the yard some of the time or more often (34.3%) as compared to the value of 46.8% that was presented in the previous study (χ^2 (1, n = 49) = 10.42, p = .001) There was a significant difference in the proportion of non- GAP dogs identified as escaping some of the time or more often (1.4%) as compared to the value of 2.3% that was presented in the previous study (χ^2 (1, n = 2) = 4.34, p = .03).

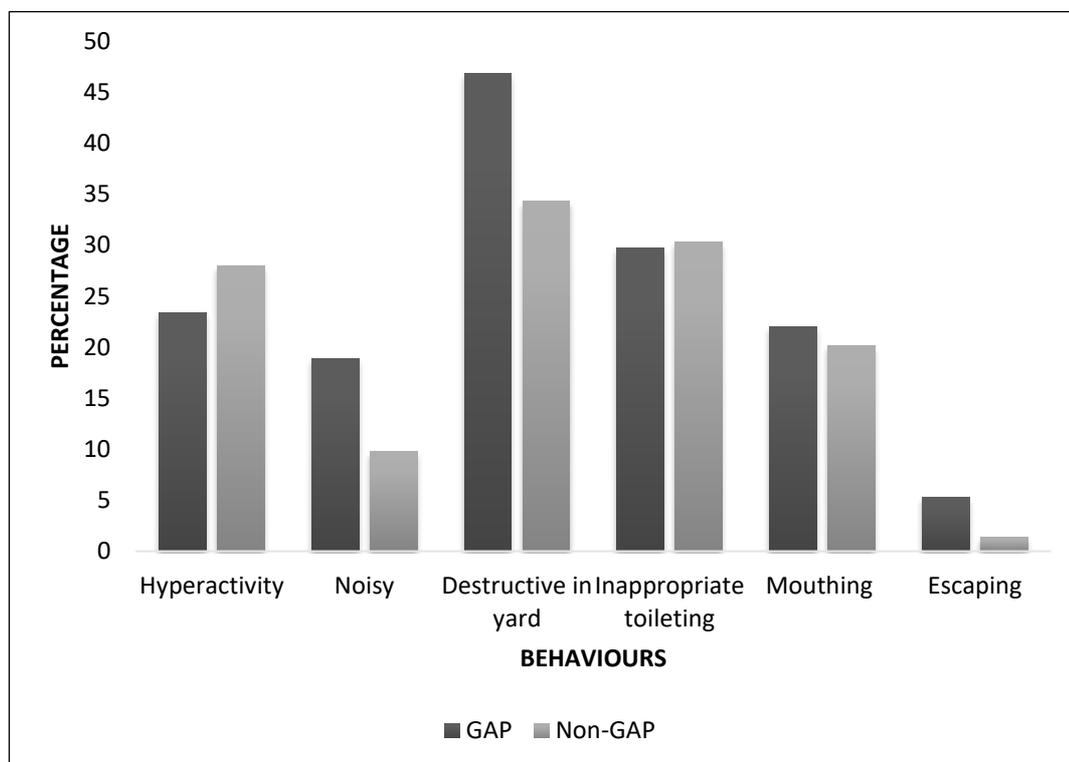


Figure 5. Difference in frequencies of other behaviours occurring some of the time or more often between GAP and non-GAP dogs

Comparison of other behaviours identified that there were no significant differences in the occurrences of the hyperactivity, inappropriate elimination/toileting or mouthing.

5.5.4. Owner satisfaction rates

In order to compare owner satisfaction with the previous study which stated ‘the owners of 175 dogs (91.1%) indicated they were ‘very satisfied’ with how well their greyhound fulfilled their expectation as a companion animal’ (Elliot *et al.*, 2010, p. 126) variables were collapsed in this paper from the four categories of *1 = I am very satisfied, 2 = I am somewhat satisfied, 3 = I am somewhat dissatisfied, 4 = I am very dissatisfied* to two categories *1 = I am very satisfied 2 = I am not satisfied*, with variables *3 (somewhat dissatisfied) and 4 (very dissatisfied) collapsed into 2 (I am not satisfied)*. This allowed comparison using chi-square test for goodness of fit. (Appendix 2, Table 11)

The chi-square goodness-of-fit test indicated that there was no significant difference in the proportion of very satisfied owners identified in the current sample (91.3%) as compared to the value of 91.1% that was obtained in a previous study, $\chi^2 (1, n = 150) = 0.02, p = .89$.

5.5.5 Difference in separation anxiety (SA)

SA was reported in 45 (31.5%) of dogs. Data was collapsed from four categories; *always/almost always, most of the time, some of time or rarely/never*, to two categories, *some of the time or more often or rarely/never* in order to compare the incidences of separation anxiety. $\chi^2 (1, n = 154) = 7.24, p = .007$. (Appendix 2, Table 12)

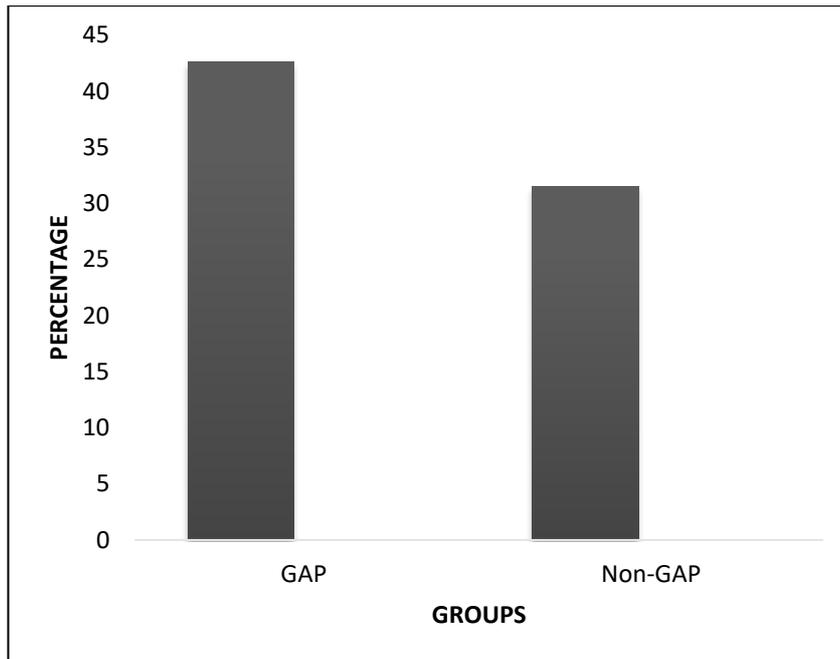


Figure 7 Comparison of frequency of separation anxiety reported in GAP and non-GPA dogs

5.5.6 Differences in reported predatory behaviour

Chi squared goodness of fit tests compared incidences between GAP and non-GAP dogs (Table 10). Data was collapsed from four categories; always/almost always, most of the time, some of time or rarely/never, to two categories, some of the time or more often or rarely/never in order to compare the incidences of predatory behaviour towards large dogs, small dogs and cats. $\chi^2 (1, n = 154) = 7.24, p = .007$.

Incidences of predatory behaviour were not significantly different some of the time or more often in any of the categories. (Appendix 2, Table 13).

Table 10. Comparison of predatory behaviour

Predatory behaviour towards	Results	Percentage	
		GAP	Non-GAP
Small dogs	$\chi^2 1, (n = 130) = .01, p = .92$	25.8	25.4
Cats	$\chi^2 1, (n = 140) = .13, p = .72$	54.2	55.7
Large Dogs	$\chi^2 (1, n = 130) = .2, p = .65$	9.6	10.8

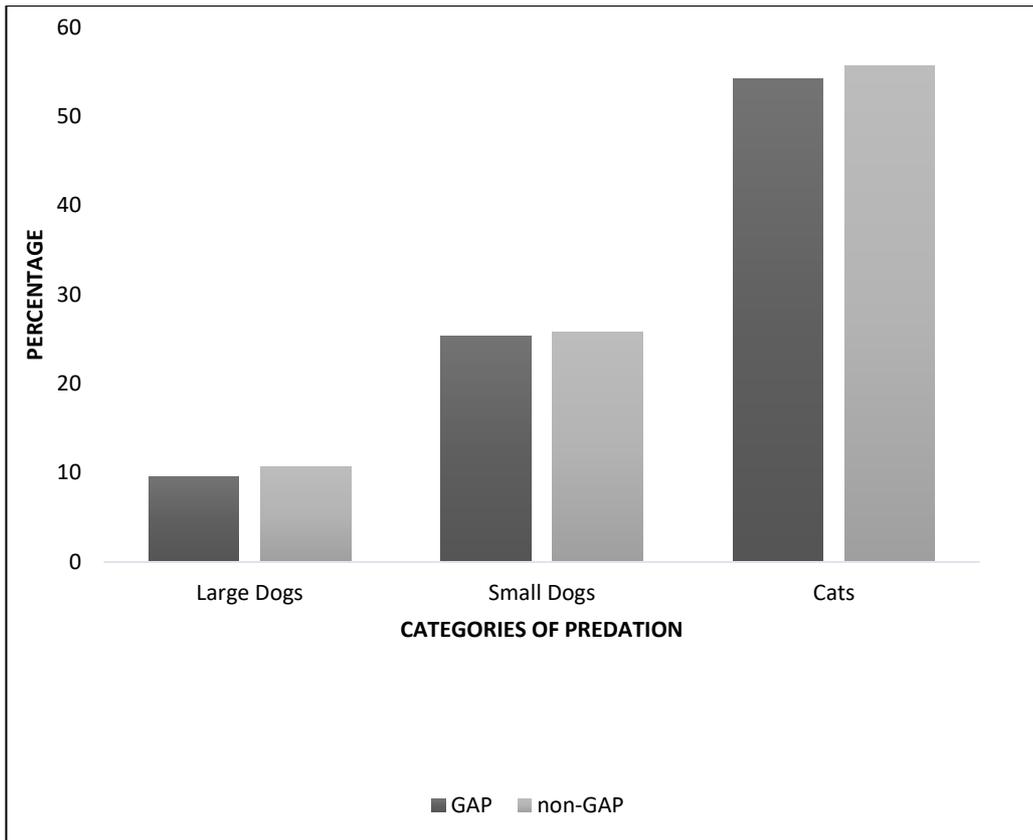


Figure 8. Comparison of incidences of predatory behaviour in GAP and non-GAP dogs

6.0 DISCUSSION

This thesis explored owner's satisfaction levels and the behaviour of a sample of greyhounds adopted from independent rescue organisations and compared them to greyhounds adopted from the racing industry sponsored Greyhound Adoption Programs in the first month after adoption. Suggestions will be made for further research and the limitations of the study will be discussed as well as the implications of these results for the Greyhound Adoption Program and non-GAP rehoming groups.

6.1 Differences in owner satisfaction rates

The null hypothesis that there is no statistically significant difference between owner satisfaction rates of the two groups is accepted in this study.

91.3% of non-GAP owners expressed themselves 'very satisfied' with how well their greyhound fulfilled their expectations as a companion animal compared to 91.1% of GAP owners questioned in a previous study (Elliot *et al.*, 2010). A qualitative examination of the comments section of the survey on 'reasons for adopting a greyhound' revealed many similar themes.

My relationship with my dog is one of the most important in my life. He has far exceeded my expectations.

Better than I could ever imagine. He is the best companion ever.

He is simply the most gentle and loving dog, he adores my partner, our other dog and myself. We couldn't ask for a better companion animal.

My greyhound is one of the best things in my life.

Tendency to chase can be challenging.

Easiest dog to incorporate into a busy life.

She made a large difference in our lives even though we almost got rid of her because she killed two of our pet birds the first month we got her.

She fits into our family perfectly! Gorgeous creature.

She is perfect. Beautiful temperament, well behaved and loves hanging out with us.

I love my dog but I'm having trouble house training him and he tries to attack my cat and other dogs when walking.

It is interesting to note that the adopters with behaviour problems including predation still expressed themselves 'very satisfied' with their pet as a companion animal, despite noting those behaviours as challenging. This agrees with the Elliot *et al.*, (2010) study which looked at reasons for risk of return in GAP dogs and did not find a link between predatory behaviour and risk of return. This study was unable to explore behaviours leading to risk of return, as no dogs in this study were returned. People who have returned a dog are perhaps less likely to be interested in completing a survey about that dog which could explain it; they would also be less likely to be on greyhound social media groups. Perhaps adopters from non-GAP programs are aware of the limited resources small rescues operate with and the strain a returned dog puts on resources, that's dog's spot in foster often having been filled by a new dog. Another possible explanation was that many of the adopters already owned other greyhounds and so were more familiar with the issues that they might face post adoption and were more prepared to accept them. It would be worth investigating whether adopters from non-GAP rescues receive more relevant behavioural advice and peer support when facing behavioural issues.

One of the objectives of GAPNNT and temperament testing generally, (though not obviously stated by GAPNTT but implied in the selection for a dog to be 'muzzle free in public), is exposing behaviour that poses a public safety risk. Dogs that exhibit perceived dangerous behaviours are not placed into the pool for adoption (GRV, n.d.). The incidences of aggression in the Elliot *et al.*, 2010 study found no significant differences in the frequencies of aggressive behaviour in greyhounds and shelter dogs in the first month after adoption. As dogs deemed to be aggressive or difficult to handle are unlikely to be successful racing dogs, it is doubtful they will enter the breeding pool and therefore indirectly human directed aggression is selectively bred out of racing greyhounds (Sullivan, 2009). It could be argued that the low levels of

human directed aggression in GAP dogs is indicative that the GAPNTT is successful in selecting out dogs that display this trait. However as there are no available failure rates and reasons, it is impossible to state whether GAPNTT is meeting it's implied aim, or is it a case of absence of evidence not being evidence on absence.

This study did find significant differences between incidences of aggression towards unfamiliar animals occurring some of the time or more often (non-GAP 37.9% v GAP 27.2%), lunging on the lead (non-GAP 26.9% v GAP 18.4%), and when approached while asleep or in bed (non-GAP 27.8% v GAP 15.8%). Lunging on the lead and incidence of aggression towards unfamiliar animals could be classified as the same etiology, why they are significantly higher incidences in non-GAP dogs is difficult to comment on without further exploration to quantify it is a manifestation of predatory aggression or dog aggression. The aggression when approached while in bed or sleeping, colloquially known as sleep startle or sleep aggression (Gumtree Greys, n.d.) and anecdotally reported to regularly occur in recently retired dogs, and is an area that would very much merit further research. There is much speculation as to reason for occurrences on greyhound knowledge forums, with explanations ranging from the dogs used to sleeping in crates (not so common in Australia) to being single housed, all of which have some merit, however recent research suggests that many animals can suffer the same mental states as humans, and that they can exhibit symptoms of post-traumatic stress disorder (Ferdowsian *et al.*, 2011; Nagasawa *et al.*, 2012) which include sleep startle and hypervigilance in humans, often seen in ex racing greyhounds. Follow up of these behaviours and whether they reduce over time without intervention or become more frequent would be interesting. Quantifying exactly when the behaviour occurs so that it can be separated from other explanations such as resource guarding would also be useful.

6.2 Demographics

The mean age of the greyhounds in this study was 5.5 years (Median 5, range 1-12) which was 2.2 years older than the dogs in the GAP study. This

could account for some differences in behaviour as studies have found previously that juvenile dogs tend to show more behaviours such as excessive activity and barking than puppies or adults, though more adults display aggression towards other dogs than juveniles or puppies (Wells and Hepper, 2000). Potentially, older dogs may display less of the behaviours that lead to owner dissatisfaction. This difference could also reflect the fact that GAP programs take dogs in soon after retirement whereas non-GAP programs accept retired brood dogs and ex blood bank dogs that are older. Puppies are rare in either GAP or non-GAP groups. The GAP study also followed up dogs one month post adoption, while in this study length of ownership was not a restriction on participation. Households were broadly similar in both studies, consisting of a median of 2 adults, though only 29.4% of households in this study included children v 39.3% in the Elliot *et al.*, 2010 study. Potentially there is the opportunity for under-socialised dogs exposed to more to children to display more incidences of fearful behaviour but this was not borne out by the results, which were not significantly different.

A look at the qualitative data in this survey reveals that the adopters indicated that many were opposed to greyhound racing and were aware of the many welfare issues within the industry. Mentioned were 'high kill rate' 'wanted to rescue' and awareness of 'number needing homes' along with 'suited our lifestyle' 'laid back' and 'temperament' among the reasons for adopting, indicating that the respondents had done some research before adopting their dogs.

There is the possibility of the response bias in the sample, as the reason for the existence of non-GAP groups is to rehome greyhounds at risk of death, therefore it is expected that this sample would be aware of the controversial issues in greyhound racing. It was beyond the scope of the present study to a full thematic analysis of all the reasons for adopting, but it would merit further research.

6.3 Separation Anxiety

Highlighted in the Elliot *et al.*, 2010 study was the prevalence of separation anxiety 'some of the time or more often' in GAP dogs. A statistically

significant difference was found with 42.6% of GAP dogs v 31.5% of non-GAP dogs reported as displaying SA. Elliot *et al.* (2010) identified several factors that could predispose ex racing greyhounds to display SA including hereditary, inadequate socialisation, 'hyper-attachment', the loss of a previous attachment figure, and the unique rearing/living arrangements of greyhounds. Anecdotally, and based on the author's experience as a GAP foster carer, previous practices in GAP programs involved rotating dogs through several foster homes for exposure to many new experiences. It is now thought that this can be a predisposing factor in the development of SA (Schwarz, 2003). It is not known whether this rotation through multiple foster homes still occurs, but in 2010 it may well have been an additional factor. As non-GAP groups rely nearly exclusively on foster carers due to the lack of funds for kennelling, dogs frequently stay with the same foster carers until adoption, it is suggested that this could be a protective factor in the development of SA. Or possibly non-GAP respondents had faulty recall. However, untreated SA very rarely spontaneously resolves itself and often worsens over time, (King *et al.*, 2000; Flannigan and Dodman, 2001) therefore it is suggested that owners would remember, as symptoms can often be severe (Lund and Jorgensen, 1999). Due to the highly regimented breeding, rearing, racing, handling and kennelling practices plus inbreeding the two samples possible share very similar genetics and background and are quite homogenous to compare, but despite this, there are some distinct differences in behaviour between the samples which will be discussed later in this thesis.

6.4 Management practices

Post adoption management proved relatively similar. More GAP owners were undertaking obedience training (47.1% v 19.0). The undertaking of training was listed in the Elliot *et al.* (2010) study as it has been identified by several researchers (Marston *et al.*, 2005; Deisel *et al.*, 2005) as a protective factor for retention post adoption, though obviously not in this study. Rates of dogs walked daily were very similar (GAP 71.1%.v non-GAP 71.2%) this despite many rehoming groups, both GAP and non-GAP market greyhounds as 'low maintenance couch potatoes' (GRV, 2016; Greyhound

Rescue n.d; Amazing Greys, n.d.) in a bid to counter what many involved in greyhound rehoming perceive as negative perceptions regarding exercise and space requirements. In the visual analysis of reasons for adopting by people who had researched the breed, low exercise requirements was cited as one of the reasons for adopting. 'Their energy levels match mine' (comment from the questionnaire). Temperament was also mentioned by many adopters. Further thematic analysis of the data could investigate this. More non-GAP owners owned other pets (75.3% v 65.6%) and their dogs slept indoors (92.2% v 86.3%). The difference between ownership of other pets could reflect an urban v rural demographic of ownership. That is, owners who live in a rural or semi rural environment with larger yards may own more pets. However access to the geographical demographic of the respondents of neither study is available and so it is impossible to speculate with any certainty,

6.5 Health and Dietary problems

There was a significant difference in the incidence of health and dietary problems, 24.5% of GAP dogs being listed as having had health/dietary problems as opposed to 49.3% of non-GAP dogs ($p = p < .001$). This is not unexpected when the independent rescues are all intake and do not discriminate on health issues, and in fact often make a point of taking in dogs that are injured or require veterinary treatment (Gumtree Greys, 2016). GAP dogs are specifically excluded on health as well as behavioural grounds (Elliot *et al.*, 2010) so any chronic issues in the breed such as pannus or caused by racing such as arthritis would prevent a greyhound entering GAP. Although Patronek *et al.*, (1996), Marston *et al* (2005) and Elliot *et al.*, (2010) all identified health issues soon after adoption as a reason for adoption returns, this data did not agree, possibly due to the demographic who adopt from non-GAP groups and are aware of the health issues of many ex-racers (Lord *et al.*, 2007). The issues listed in both studies were similar with gastric problems, periodontal disease and arthritis being the major concerns.

6.6 Other behaviours

Other behaviours that were compared found significant differences in 'destructive in yard' (GAP 46.8% v non-GAP 34.3%), 'noisy' (GAP 18.9% v non-GAP% 9.8%) and escaping (5.2% of GAP dogs escaped some of the time or more often v 1.4% of non-GAP dogs, but at just two dogs, the sample was considered too small to draw any conclusions from) with lower incidences reported in the dogs in this study. Noisiness (defined in the questionnaire as excessive barking, howling or whining) can be a symptom of SA (King *et al.*, 2000; Flannigan and Dodman, 2001; Appleby and Pluijmakers, 2003) as can destruction and escaping. If, as the literature suggests, there is an association between these behaviours, it is logical that a lower incidence of SA would have a correspondingly lower incidence of the behaviours associated with it. It is beyond the scope of this study to measure association between factors, but further research could investigate the data for such links. Other interpretations for lower incidences of the recorded behaviour could be owner interpretation e.g. some owners may consider digging holes normal behaviour and not destructive, where others would rate it as destructive.

6.7 Levels of predatory behaviour

As discussed previously, all dogs rehomed through GAP are assessed using the GAPNTT and only on passing this test are deemed suitable for 'exemption from muzzling' (Anon, Greyhound Behavioural Assessment, GAP NSW, undated p. 1). Elliott *et al.*, (2010) referred to 'high levels of predatory behaviour' in GAP dogs being expected in a 'hunting breed that chases prey by sight' (p. 130). There was no statistically significant difference in the percentage of dogs showing predatory behaviours in this study and the GAP sample (Predatory behaviour some of the time or more often: Cats GAP 54.2% v non-GAP 55.7%; Small dogs GAP 25.4% v non-GAP 25.8%; Large dogs GAP 9.60% v non-GAP 10.7%) despite testing with a framework designed to expose this behaviour. The 2010 study goes on to suggest that training practices that reinforce prey drive are likely to increase predatory behaviour, and that GAP needs to improve prey drive assessment while acknowledging that it is very difficult to simulate and assess (Christensen *et*

al., 2007). This is highly relevant in the light of the recent live baiting scandal (Rushton, 2015). An explanation for the failure to elicit predatory behaviour in GAP greyhounds during testing could be associated with higher levels of anxiety in GAP dogs reported in the Elliot *et al.*, 2010 study. That is, dogs that are predisposed to anxiety are likely to be too stressed during testing, especially as discussed earlier, in a novel environment with an unknown tester (Barrera *et al.*, 2010), to show predation. It is suggested that GAPNTT may be selecting for anxiety and inhibition during testing.

Dogs displaying predatory behaviour will fail the GAPNTT, but it has not been shown that adopters find this a significant issue. Another reason for failure is food aggression (FA), but again it is not linked by Elliot *et al.*, (2010) to risk of return. A small study that followed up shelter dogs displaying FA in standard shelter tests (involving wet and dry food, rawhide chews and an 'assess a hand'TM similar to the GAPNTT) asked owners about the dogs' behaviour post adoption (Marder *et al.*, 2013). Dogs that had a history of bites to humans were excluded from the study for safety reasons, so the most aggressive dogs have been removed from the sample which could account for the report from the study that when FA was displayed it was 'not severe'. 87% of adopters, even having witnessed aggressive behaviour around food, such as lip lifting and snarling, said that they would still adopt the same dog (Marder *et al.*, 2013) however if they had been bitten, they may have said otherwise. The study goes on to suggest that to ignore FA displayed during a provocative test would be unwise, however using it as a reason for euthanasia was not justified in the light of their results. Dogs that displayed food aggression in the home usually displayed it during testing, but a significant number of dogs that displayed FA during testing in the shelter did not display FA on adoption. When FA was displayed, it was not severe and owners did not think it a significant problem.

While food aggression and predation are obviously very different issues, it could be argued that both are normal, 'hard-wired' behaviours in a dog and to some degree both can be controlled with management, behaviour modification (Overall, 2013), and owner education and support post

adoption, and presence of either does not necessarily make the dog a public risk.

The Marder *et al.*, 2103 study although small, is an interesting insight into the perceptions of rehoming groups/shelters that test for food related aggression (as does GAP) and consider it a reason not to make dogs available for rehoming (often leading to euthanasia) and the reality of what adopters who rehome the dogs actually think. It would be worth exploring further how adopters feel about the predatory behaviour their dogs display in terms of risk to themselves and other animals, as anecdotally many greyhounds fail GAPNTT because they display it.

6.8 Limitations of the study

The main limitation of the study was the small data set of 154 dogs, so statistical power was reduced, limiting the opportunity to provide definitive evidence of associations that may be more evident in a larger data sample. At 34 questions, many with multiple components, the questionnaire may have been too long for some respondents, as 31% of respondents who accessed the questionnaire failed to complete it. If a future questionnaire was attempted greater power could be generated by using scales with seven or more categories which are considered more reliable (Foddy, 1993).

This study did not have any dogs that had been returned, so it was not possible to make comparisons on return rates and reasons, however, despite the lack of the original raw data, it was possible to compare published results of incidences of behaviours and also the central tenet of owner satisfaction. It was also not possible to target owners who had adopted within the last month (as per the Elliot *et al.*, 2010 study) as that would have required administrative work from non-GAP groups that this researcher did not want to burden them with. It is quite possible that adopters' memories are imperfect and that with the passage of time growing affection for their dogs has led to underestimation of behaviours of concern on the initial bonding process (Serpell, 1996). One of the limitations of a self-selection sample is bias (Dennison, 2014). The people that choose to respond often feel strongly

about an issue, as was illustrated in the comments section of the questionnaire.

Access to the lack of raw data from the original study precludes many other comparisons though limitations of time and resources mean that much of the data collected was beyond the scope of an undergraduate thesis. Another limitation is the lack of transparency within the industry, failure to track animals, record data and publish figures making estimates and comparisons difficult. Lack of published data on the behavioural characteristics of successful adoption placements or the fates of dogs rejected by GAP make assessments not possible at this time..

7.0 CONCLUSION

Greyhound racing is currently under the public spotlight in Australia (Cobb., *et al* 2015; Rushton, 2015) and to a lesser extent New Zealand. Much of the debate centres on whether racing can retain its 'social licence' in the light of recent public scandals (Cobb *et al.*, 2015; RSPCA, 2015). At the heart of this discussion is the estimated 17,000 dogs that are killed every year as 'wastage' by the industry (Animals Australia, 2014; Greyhounds Australasia, 2015). The efforts of industry rehoming groups are considered by many to be inadequate – 'a band-aid on an arterial bleed' (Cunnington, 2014).

It is suggested that suitable dogs may be getting adopted in spite of GAPNTT not because of it. As discussed in Elliot *et al.*, 2010, predation is an innate behaviour and the use of management and restraint rather than retraining alone is likely to be the most successful option for adopters. Desensitisation, habituation and counter conditioning could also be employed (Lyndsay, 2001). Although predatory behaviour is more highly selected for in sighthounds (Mehrkam and Wynne, 2014) current practices in racing are aimed at producing a racing dog and not a pet. The estimated 3% (Lewis, 2008) of greyhounds that go on to live out their lives as pets is not an indication of the lack of suitable dogs, rather an indictment of the lack of value the industry has traditionally placed on the dogs.

It is proposed that in order to assess the validity, reliability and accuracy of the GAPNTT, the racing industry needs to do follow up adopted dogs and to consider the following ; many experts in the field of canine science do not agree on the validity and reliability of temperament testing (Jones and Gosling, 2005; Deiderich and Giffoy, 2006; Christensen *et al.*, 2007; Mornement *et al.*, 2010; 2014; 2015; Marder *et al.*, 2013; Rayment *et al.*, 2015); GAPNTT has not been validated nor any data published regarding its accuracy as a tool for selecting more suitable dogs, indeed the results of this study suggest that GAPNTT may be selecting for a highly anxious dog whose predatory behaviour is suppressed during testing.

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