Characteristics of ex-racing greyhounds in New Zealand and their impact on rehoming

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Abstract (250 words)

A small proportion of greyhounds surplus to the racing industry are entered into specialist rehoming organisations to be re-purposed as pets. Records of 835 greyhounds, from New Zealand Greyhounds as Pets (GAP), were used to investigate whether pre-adoption characteristics (age, sex, racing record, reason entered) and management factors (temperament test result, foster and trainer effects) had a bearing on rehoming success, and comparisons were made with shelter studies. Rehoming greyhounds as pets is very successful with 85.5% ultimately successfully rehomed. Only 2.9% fail as a result of failed adoptions, 11.6% fail the initial temperament test. Greyhounds were more likely than shelter dogs to pass an initial temperament test and be adopted, and less likely to be returned after 1 month. However, adopted greyhounds were just as likely as shelter dogs to be returned after 6 months. Logistic regression revealed the youngest age group (< 24 months old) were more likely to pass the initial temperament test than older greyhounds. This age effect was not detectable when the adoption success of dogs subsequently available for rehoming was considered, but a sex effect was evident with females more likely to be successfully adopted than males. Whether or not a dog had raced had no significant effect on the likelihood of successful rehoming.

Greyhounds passing the temperament test with a basic pass, were less likely to be successfully rehomed than greyhounds scoring a higher pass indicative of lower prey drive. Further investigation of the validity and reliablity of the temperament test is warranted.

Introduction

The greyhound racing industry produces substantial numbers of dogs that are not needed or suitable for racing (Colgan *et al* 2013). Acceptance of the the sport is changing as concern and awareness about the scale and method of destruction of surplus animals and the risk of injury arising from the sport, grow (Atkinson & Young 2005; as reported in Colgan *et al* 2013 p 28; Madden 2010). Greyhounds have a life expectancy of 10-12 years (Fogle 2000), but an average racing career spans just 1.5 years with the average age of retirement in New Zealand being 3.37 years (Colgan *et al* 2013). This potentially allows an ex-racing greyhound to spend more than 8 years another role, and the rehoming of retired and surplus racing greyhounds as pets has increased in popularity (Lord *et al* 2007). The New Zealand Greyhounds As Pets (GAP) charity was established by the New Zealand Greyhound Racing Authority (NZGRA) in 2006 and aims to rehome greyhounds put forward by trainers and breeders in the industry.

The success of greyhound adoptions through the GAP programme in Australia and New Zealand, was evaluated by Elliott *et al* (2010) one-month post-adoption. Most adoptions were successful (237/245) with a high proportion of owners (91.1%) scoring 'very satisfied' in terms of the greyhound fulfilling their expectations as a pet. A

significant association between 'realistic owner expectations' and decreased likelihood a dog would be returned after adoption, has been reported for dogs rehomed from shelters (Marston *et al* 2005).

The primary reason dogs are returned to adoption agencies is reported to be problem behaviour, accounting for between 58.6% (Diesel *et al* 2008b) and 89.7% (Wells & Hepper 2000) of returns to shelters. Although based on a small number of failed adoptions, Elliott *et al* (2010) similarly reported most greyhounds were returned due to behaviour related problems.

Behavioural problems most likely to put adoptions at risk are related to aggression, separation anxiety, hyperactivity, noisiness and incompatibility with other pets (Diesel *et al* 2008b; Elliott *et al* 2010; Marston & Bennett 2003). Previous studies have shown associations between the development of particular behaviour problems and a dog's breed (Duffy *et al* 2008) age, sex, background (McGreevey & Masters 2008; Wells & Hepper 2000) early experiences (McMillan *et al* 2011) and training methods (Blackwell *et al* 2008; Thompson *et al* 2010).

Investigating the rehoming of ex-racing greyhounds, provides a unique opportunity to research factors associated with known pre-adoption histories of individuals from a single breed, not bred or held primarily as companion animals. We characterise descriptively the attributes and history of dogs entering the programme and investigate whether there is a significant association between selected pre-adoption factors (including age, sex, racing record, reason for entry, trainer and temperament test result) and the likelihood of successfully rehoming greyhounds bred specifically for racing.

Methods

Details of all greyhounds entering the New Zealand GAP programme between 01 April 2010 and 31 March 2014 were used unless there was no reported outcome by 01 September 2014 (i.e. the dog was still waiting to be assessed or adopted).

Dogs entered the GAP programme either via a trainer or welfare admission. Greyhounds entered under a welfare admission had either been removed from the owner by GRNZ, or surrendered to, or removed by an animal welfare organisation.

Information was extracted from the New Zealand GAP database including the reported reason for entering the dog into GAP, the dog's age, sex, health/injury status, temperament test result, racing history, foster record, and rehoming outcome. The entry reasons given were grouped into 5 categories, and reported injuries and health issues were attributed to one of 8 categories (Table 1). Dogs were allocated to one of three age groups: 'young' (5 – 24 months old), 'adult' (25 -66 months old), and 'senior' (67 – 146 months old) (Table 1).

A temperament test administered to all greyhounds entering GAP determined whether the dog was made available for adoption. ~~The GAP New Zealand temperament test is based on the Australian Greyhound Behavioural Assessment.~~ The test is performed no sooner than the third day after arrival at the rehoming kennels and comprises assessments of the dog's behaviour (including fearfulness, anxiety, arousal levels, affiliative/aggressive behaviours, shyness/boldness, leash manners, sociability and noisiness), in relation to eight assessment items (Table 8). Each element of the assessment item is scored out of three, one is a pass, two requires reassessment and/or

time in a foster home, and three is a fail. A dog must score a one for every element of the assessment item to be considered for adoption, with the exception of the 'reaction to cat' element, whereby a score of one results in a 'pass with cats' (TTP+) and a score of two results in a basic pass (TTP). Scores for each assessment element have corresponding behaviours, for example a score of 'one' for the 'reaction to cat' element includes "tail relaxed or wagging, dog solicits polite interaction, dog easily distrated by handler"; a score of 'three' includes "signs of high prey drive – shaking, trembling, fixed stare, lunges towards cat, barking, salivating, cannot be distracted despite multiple attempts".

Dogs were assessed as acceptable for homing with humans and other dogs (including small dogs) if they passed the temperament test at the basic level (TTP). Greyhounds that passed with a (TTP+) were considered potentially suitable for a home that included cats. A TTP+ was considered to be indicative of lower prey drive (i.e. the innate disposition of a canid to locate, chase and capture prey) relative to a TTP.

All dogs that passed the temperament test were desexed prior to being fostered or adopted.Some greyhounds were fostered by GAP volunteers before being adopted, allowing the organisation to further assess and prepare dogs for adoption. The duration of each foster placement was not consistently reported in the GAP database, hence only the number of foster placements (if any) was recorded for each dog. In some cases greyhounds were recorded as being 'fostered to adopt'. This designation was used when volunteers were unsure about the suitability of a greyhound, or when volunteers provided a foster home for GAP dogs with an intention of possibly adopting that dog. If the GAP database reported 'foster to adopt', and the person fostered and subsequently

adopted the dog, the date of adoption was recorded as the 'foster to adopt' date. If the greyhound was returned to the GAP kennel and was subsequently rehomed to a different person, the record was counted as a normal foster placement rather than a failed adoption.

Greyhounds that passed the temperament test and were adopted were considered successfully rehomed. If a dog was subsequently returned but successfully readopted, the rehoming was still considered 'ultimately successful'. Greyhounds could 'fail' at two stages during the rehoming process: 1) prior to being made available for adoption, either as a result of the temperament test outcome, or displaying unacceptable behaviour in a foster home; or 2) if returned after being adopted. Dogs that 'failed' at stage 1 and those deemed unsuitable for re-adoption after being returned (stage 2) were humanely destroyed by a veterinarian.

In addition to information held by GAP, racing records for individual greyhounds (i.e. number of race starts and podium finishes) were retrieved from the GRNZ public website (www.thedogs.co.nz). A performance score was calculated by determining the total number of podium finishes (firsts, seconds and thirds) as a percentage of the total number of race starts for each dog. Dog's performance scores were sorted into low, medium and high performance groups, and the number of races raced per dog was similarly sorted into low, medium and high categories, based on percentiles of the distribution of results (Table 1). We classified a greyhound as 'unraced' when recorded as unraced in the GAP database and having no racing record on the GRNZ web site.

We used binary logistic regression to examine the main effects of year of entry, age group, sex, entry reason, racing history (raced or unraced) on whether dogs passed or failed the temperament test and therefore whether they were considered for adoption. This analysis was completed on all 825 dogs entering the GAP programme. All analyses were performed using a backward stepwise elimination of non-significant independent variables. To manage the number of independent factors or variables, we did not consider specific racing performance, possible trainer or foster effects or the specific injury or health issues associated with particular dogs in this analysis. These data are presented descriptively.

We then completed a similar analysis for dogs that initially passed the temperament test (n = 738). This allowed us to explore the possible effect of temperament test (either basic pass (TTP) or 'pass with cats' (TTP+)), along with year of entry, sex, entry reason, and racing history (raced or unraced), on ultimate adoption success. We repeated this analysis on a slightly smaller group that excluded nine dogs (n = 729 dogs) that passed the temperament test, but were initially fostered but then not put up for adoption because of unresolved behavioural issues. We followed this by exploring the same main effects, but in regard of whether dogs were successfully adopted at the first attempt at rehoming or not. As previously we ran these analyses for all dogs that initially passed the temperament test (n = 738) or the slightly smaller group (n = 729) (see above).

We also conducted a binomial logistic regression to explore the possible association of trainer, age group, sex, racing history and year of entry, on temperament test outcome (fail or pass). A total of 145 different trainers entered dogs into GAP, so we restricted

our analysis to those dogs from trainers that entered 25 dogs or more into the GAP programme.

Results

Descriptive statistics

The annual number of greyhounds entering GAP New Zealand increased by 23.9% between 2011 (n = 197) and 2014 (n = 244). A total of 835 greyhounds entered the GAP programme between April 2010 and March 2014, of which 714 (85.5%) were successfully rehomed. A total of 605 (72.5%) were successful the first time they were adopted and a further 109 (13.0%) were successfully re-adopted after being returned (Figure 1). Of the 14.5% (121/835) of dogs that ultimately failed to be rehomed 11.6% (97/835) failed the initial temperament test, and 2.9% (24/835) were destroyed following return from adoption or foster (Figure 1).

Of the 738 (88.4%) dogs that passed the initial temperament test 264 (35.8%) were initially fostered, after which 9 dogs failed, leaving 729 dogs available for adoption. A total of 349 (47.9%) of these dogs were homed between one and two months of entering GAP and 659 (90.4%) within four months. Median length of stay in rehoming kennels (between entry and first adoption) was 27 days (range 0 to 378 days). A total of 124 (17%) dogs were returned after their first adoption, mostly (70 dogs, 56.5%) within four months of initial adoption (Figure 2). The median number of days between adoption and return was 89 days (range 0 to 1137 days).

Median age at entry to the GAP programme was 44 months (range 5 – 146 months, 25th - 75th percentile: 31 - 54 months respectively). A total of 77.4% of dogs were classified

as adults of 25 to 66 months of age (Table 1). There was a suggestion that young dogs (< 25 months old) were more likely to pass the temperament test than adults and/or seniors (Table 2) (see analysis below).

The number of male and female greyhounds entering GAP was similar (Table 1). However slightly more female dogs (88.1%) were successfully adopted compared with males (83.1%) (Table 3). Entry reasons were recorded for 738 of 835 (88.4%) admissions. The most prevalent reason for entering a dog into the GAP programme was the category 'age, retirement, end of racing career' (41.7 %, Table 1). Although dogs were uniquely allocated to an entry reason category, classifications were not mutually exclusive. A total of 14.1% of admissions were reported as being due to injury or health concerns. However this is an underestimate as dogs from other 'entry reason' categories (e.g. welfare) also had injuries and health issues. Records of the actual nature of injuries indicated 196 of 835 (23.5%) greyhounds entering the GAP programme had health and/or injury issues (Table 1). The most prevalent identified injuries were to the foot and hock followed by gracilis injuries (Table 1).

A minority (18.2%) of greyhounds entering GAP were unraced (Table 1). There was a suggestion that unraced dogs were more likely to pass the temperament test than raced dogs (Table 2) but this effect was not significant (see regression analysis below). A total of 81.8% (n = 683) of greyhounds entering GAP had raced 1 or more times (median: 47 starts per dog, range 1 – 177 race starts, 25^{th} and 75^{th} percentiles 25 and 76 starts respectively, Table 1). The median performance of raced greyhounds, expressed as the percentage of podium finishes to total number of race starts was 35.6% (range 0% -100%, 25^{th} - 75^{th} percentile: 25% - 44%, Table 1).

A total of 88.4% (Table 2) of greyhounds passed the initial temperament test with more dogs passing with a TTP+ result (55%) than a TTP (45%). A total of 98.8% of TTP+ dogs were ultimately successfully rehomed compared with 96.9% of dogs with TTP, and fewer TTP+ dogs were returned after their first adoption than dogs with a TTP result (13.6% and 21.2% respectively, Table 3).

Of the dogs that passed their initial temperament test 35.8% (n = 264) were fostered at least once before being adopted the first time (Table 1). A total of 46.8% (n = 58) of returned dogs were fostered before being rehomed a second time. The percentage of fostered dogs that were not made available for a first or second adoption (i.e. were destroyed following their foster placement) was 3.4% (n = 9) and 3.4% (n = 2) respectively. Of the dogs that were not fostered, 18.1% (86/474) were returned after their first adoption and of these 2.1% were not re-adopted (i.e. were destroyed). Of the dogs that were fostered, 14.4% (38/264) were returned after their first adoption and 2.0% of these were destroyed. A total of 56.1% (148/264) of fostered dogs had passed the temperament test with a TTP result compared with 38.8% (184/474) of dogs that were not fostered. Overall, 94.7% of greyhounds fostered before their first adoption were successfully rehomed, compared with 97.9% of dogs that were not fostered first (Table 3).

Five of 125 trainers (2.8%) entered 25 dogs or more into the GAP programme. Two of these trainers (labelled B and D, Table 4) entered substantially more younger dogs (39.3% and 60.0% respectively) than the other three (trainer A: 5.1%, trainer C: 2.4% and trainer E: 0%). The sex, racing history and entry reason profiles of dogs entered,

also varied among trainers (Table 4). Trainers B and D had 3.3% of their dogs fail the temperament test, compared with trainers A, C and E whom had 12.8%, 19.5% and 24% of their dogs fail respectively (Table 4), but these differences were not significant (see below).

Factors affecting temperament test pass or fail

Our binary logistic regression performed to ascertain the main effects of year of entry, age group, sex, entry reason and racing history (raced or unraced), on whether dogs passed the temperament test and were considered for adoption, was statistically significant ($\chi^2 = 23.468$, df = 5, $P < 0.001$). Of the five independent variables, only age proved statistically significant (Table 5). Indicated by an odds ratio of less than 1, adult and senior dogs were both significantly less likely to pass the temperament test compared to young dogs (Table 5).

The binomial logistic regression performed to ascertain the main effects of trainer (with 25 dogs or more entered into GAP programme), age group, sex, racing history (raced or unraced) and year of entry on temperament test outcome, showed no significant main effects.

Factors affecting ultimate adoption success

The analysis to ascertain the main effects of temperament test, year of entry, age group, sex, entry reason and racing history (raced or unraced), on ultimate adoption success was also statistically significant ($\chi^2 = 27.523$, df = 5, $P < 0.001$). Temperament test

pass type, sex of dog and year of entry proved to be significant main effects. Dogs passing at the basic level temperament test (TTP) were less likely to successfully rehome than those passing the higher test (TTP+) (Odds ratio: 0.328, 95 % CI: 0.131-0.820), females were more likely to be successfully adopted than males (Odds ratio: 2.895, 95 % CI: 1.117-7.503), dogs entering the programme in 2014 were marginally less likely to be successfully rehomed than dogs entering in 2011 (0.177, 95% CI: 0.039-0.799) (Table 6). When we repeated the analysis on our slightly smaller group of dogs that were considered for adoption (n = 729 after nine dogs destroyed following their initial foster placement were removed) the model remained significant (χ^2 = 20.069, df = 4, $P < 0.001$), with sex (P = 0.01) and year of entry (P = 0.028) effects remaining, however the effect of temperament test pass disappeared.

Factors affecting success at first adoption

Models based on the sample of 738 dogs that passed the initial temperament test (χ^2 = 9.644, df = 1, $P = 0.002$) or 729 dogs (after nine dogs destroyed following their initial foster placement were removed) (χ^2 = 7.359, df = 1, $P = 0.007$) were significant. Success at first adoption was related only to the outcome of the temperament test for both the model utilizing 738 dogs (Table 7) or that based on the slightly smaller sample (n = 729 dogs) (P = 0.007).

Discussion

Most greyhounds (87.3 %) entering the GAP programme pass an initial temperament test and are rehomed. Shelter studies, which also include an initial temperament test,

generally report a much lower initial rehoming rate (e.g. 21.3% Marston *et al* (2004); 27% Mornement *et al* (2010)). This is even when these figures are corrected for animals reclaimed by owners, euthanised for health or welfare reasons or destroyed as a 'prohibited breed type' (e.g. 49.4% calculated from Marston *et al* (2004)). This relatively high success rate of the GAP programme is carried over into re-adoption success of greyhounds returned to the programme after an initial failed adoption. Only 12.1% of returned greyhounds were destroyed, compared to between 40% (Marston *et al* 2004) and 50% (Patronek *et al* 1995) of returned shelter dogs.

Although greyhounds have a similar average length of stay in rehoming kennels prior to adoption (median 27 days) compared to shelter dogs (e.g. 28 days Diesel *et al* 2007; 23 days Zak *et al* 2015), most companion dogs will not have previously spent extensive periods in a high-density kennel environment (Taylor & Mills, 2007; Wells 2004). Greyhounds on the other hand, have generally spent all their pre-adoption lives in kennels. High density kennel housing of dogs has the potential to cause considerable stress, and contribute to the development of behaviour problems (Diesel *et al* 2008b; Marston *et al* 2004; Taylor & Mills, 2007; Wells 2004) before and after adoption. Dogs that are preconditioned to kennelling show decreased physiological signs of stress compared with dogs that have not had prior habituation to a kennelled environment (Rooney *et al* 2007). The fact that most greyhounds have been pre-conditioned to kennelling, might contribute to their relatively high rehoming success compared with dogs from shelters.

However, owners' attitudes cannot be discounted. Although they were not a component of this work, evidence suggests that people are more likely to accommodate behaviours

associated with a particular purebred dog (Coren 2000). For example, new owners are likely to be more tolerant of a terrier that digs (or a greyhound that chases things), if they specifically want that type of dog. Whereas new owners of shelter dogs might not be as accepting of potentially undesirable behaviours.

Pet dogs relinquished to shelters are also likely to have existing behaviour problems (Diesel *et al* 2008b; Marston *et al* 2004; Wells & Hepper 2000), whereas greyhounds entered into the GAP rehoming programme are potentially pre-selected for desirable attributes. Only a small proportion (15.5% (calculated from Colgan *et al* 2013)) of surplus racing industry greyhounds are entered into the GAP programme. Although the precise criteria used by trainers to select dogs to enter the programme is unknown and appears to vary among trainers (Table 4), greyhound trainers pay a fee to enter dogs into the rehoming programme and may elect not to submit dogs displaying undesirable behaviours that would result in dogs failing the initial temperament test. Consistent with this view, considerably fewer greyhounds failed the initial temperament test (11.6% (97/835)) compared with pet dogs entering rehoming shelters (29.3% (calculated from Marston *et al* 2004)). However, differences may also be explained in part by the different criteria used to evaluate temperament between the different studies.

There were a variety of reasons given for entering dogs into the GAP programme and a considerable age range. However, the most prevalent entry reason category was related to 'retirement from racing', explaining at least in part the age profile of dogs entered. The median age of dogs entered (3.7 years) was consistent with the reported average age of retirement (Colgan *et al* 2013).

Due to our study being an investigation of historical data, we were not able to examine the validity, repeatability or inter-rater reliability of the GAP temperament test. However, there was no significant effect of year of entry detected for temperament test outcome (pass/fail), which might suggest the GAP temperament test has been relatively consistent over time.

In this study, only dogs that passed the temperament test were actually placed for potential adoption. Accordingly the assessment of the impact of temperament testing on adoption rates could only be assessed for dogs that passed the temperament test, either as a TTP or TTP+. The emphasis on prey-drive in the GAP two-tier temperament test reflects the unique concerns associated with re-purposing ex-racing greyhounds that have been trained to strengthen the 'chase' component of the predatory hunting sequence. Dogs that passed the temperament test with TTP+, purportedly indicative of lower prey drive relative to TTP, were more likely to be successfully rehomed (ultimately). Further, greyhounds that achieved a TTP were more likely to be returned after being adopted (21.2% returned) than those that achieved TTP+ (13.6% returned). Although we can not confirm the validity of the temperament test's ability to determine the level of prey drive, our results support the suggestion that higher prey drive might be associated with increased risk of rehoming failure (Elliott *et al* 2010). However, given the lack of evidence to confirm temperament tests accurately predict stable behaviour over time (Bennett *et al* 2012), and the fact that 80% of greyhounds that fail to be successfully rehomed fail at the initial temperament test stage, it would be interesting to investigate the validity and reliability of the GAP temperament test.

For those dogs that passed the temperament test, there was a year of entry effect on ultimate rehoming success. Dogs returned in 2011, after their first adoption, were more likely to be successfully readopted (only 1.2% failed) than dogs returned in 2014 (6.5% failed). The reason(s) the GAP programme was less likely to successfully re-adopt dogs in 2014, than it did in 2011 is not known. It could be associated with limited funding and an increased target for the number of greyhounds rehomed each year (GAP 2014), effectively reducing resources (e.g. kennel space and time) able to be allocated to re-adoption of returned greyhounds.

The proportion of greyhounds returned at one-month post-adoption (2.7%) was similar to that reported by Elliott *et al* (2010) (3.3%), but somewhat less than shelter studies (6.5% in Northern Ireland (Wells & Hepper 2000); 12.9% in Melbourne shelters (Marston *et al* 2005)). Diesel *et al* (2008b) reported a six-month post-adoption return rate of 14.7% (662/4500) in the United Kingdom, which is similar to the 11.7% (85/729) of greyhounds returned within six months. This appears to suggest greyhounds are less likely to be returned within one month than dogs rehomed from a shelter, but that greyhounds have a similar six-month post-adoption return rate to shelter dogs.

Most greyhound returns occurred within four months of adoption, the first peak was around one month post-adoption (22% of returns), but a second peak occurred around three months post-adoption, with 33.1% of returns between one and six months post-adoption. In contrast, Shore (2005) reported the majority of shelter returns (56%) were within one month of adoption, and only 20% were between one and six months. Elliott

401 *et al* (2010) reported the types of behaviour problems, associated with increased risk of
402 greyhound adoption failure within one month, were similar (albeit at a lower incidence)
403 to those reported in shelter studies (i.e. separation anxiety, noisiness, aggression
404 towards children, problems with existing pets). Given the greyhound return rate
405 increases to match that of shelter studies at 6 months, it would be interesting to
406 investigate factors associated with increased risk of return as adoption time increases.
407
408 **Dog characteristics associated with rehoming success**
409
410 Our data show young greyhounds are more likely to pass the temperament test than
411 adult or senior dogs. When we considered the dogs that were potentially available for
412 adoption (i.e. had passed the temperament test) there was no detectable age effect on
413 rehoming success, either at first adoption, or ultimately (at second or subsequent
414 adoptions).
415
416 It would appear that although young greyhounds are less likely to fail the temperament
417 test, they are no less likely to be returned following adoption than older dogs. Because
418 the GAP temperamant test has not been scientifically tested for validity and reliability,
419 we cannot rule out the possibility the detected age effect is a result of bias within the
420 temperament test design or application. Although other studies have shown an
421 association between age, and the type and prevalence of problem behaviours in
422 rehomed dogs (Wells & Hepper 2000), there appears to be no association between age
423 and increased risk of failed adoption (Diesel *et al* 2008b, Elliott *et al* 2010, Wells &
424 Hepper 2000).
425

426

427 The literature suggests that younger dogs tend to show a greater number of problematic
428 behaviours than older dogs (Blackwell *et al* 2008), but the types of problems are
429 significantly different (Blackwell *et al* 2008; Wells & Hepper 2000). Younger dogs are
430 more likely to have control problems and display separation-related and attention
431 seeking behaviours, but are less likely than older dogs to show undesirable behaviours
432 associated with aggression, reactions to other dogs and unfamiliar people (Blackwell *et*
433 *al* 2008; Wells and Hepper 2000). Demonstrating aggressive reactions to other dogs or
434 unfamiliar people would cause a dog to fail the temperament test but attention seeking
435 or separation related behaviours may not. However, all of these behaviour problems are
436 associated with increased risk of failed adoptions (Diesel *et al* 2008b, Elliott *et al* 2010,
437 Wells & Hepper 2000), supporting our loss of an age effect post-adoption.

438

439 The other detectable influence on ultimate rehoming success was sex of dog, with male
440 dogs being less likely than females to be successfully rehomed. Although more females
441 passed the temperament test with a TTP+ than males, females were no more likely to
442 be successfully adopted at first adoption (i.e. no less likely to be returned) than males.
443 Although Wells & Hepper (2000) reported male dogs were more likely to demonstrate
444 behaviour problems associated with increased risk of failed adoption, most of the dogs
445 in their study were entire and it was suggested the reported behaviour problems
446 (aggression towards other dogs, sexual behaviours and straying) were likely to be under
447 hormonal control. In contrast, all greyhounds are desexed prior to rehoming. Elliott *et*
448 *al* (2010) identified differences in the type of behaviour problems likely to be displayed
449 by recently adopted male greyhounds compared with females (i.e. males more likely to
450 show aggression towards small dogs, cats and when approached on bed, cf. females

451 more likely to show destructivness in the yard), but, consistent with our study, did not
452 find sex a risk factor associated with post-adoption return. Other studies have found no
453 association between sex and risk of return, and either the type or prevalence of
454 behaviour problems in rehomed dogs (Blackwell *et al* 2008; Diesel *et al* 2008b).
455
456 The reasons greyhounds are fostered prior to adoption vary, but generally it is to
457 evaluate the dogs ability to transition to pet life whilst providing them with support to
458 overcome challenges often associated with socialisation deficits and long term
459 kennelling (Elliott *et al* 2010). These challenges include fear of unfamiliar
460 environments, sounds, people and animals. There is no standardised foster period or
461 process, but just over a third of greyhounds entering GAP are fostered prior to adoption.
462 Although there is no documented criteria for selecting dogs to foster, there is a
463 suggestion dogs displaying borderline behaviours upon entering GAP, or during their
464 temperament assessment, are more likely to be fostered. For example, the temperament
465 test (see methods) suggests dogs not reaching the adoption standard should be fostered
466 where their behaviour is borderline, and further, 56.1% of fostered dogs had passed the
467 temperament test with a basic TTP compared with 38.8% of dogs that were directly
468 adopted (a TTP result was shown to be associated with decreased likelihood of
469 successful adoption overall, compared to dogs achieving TTP+). Despite the potential
470 bias in selecting dogs for foster that might have more difficulty in being successfully
471 rehomed, 14.4% of fostered dogs were returned from adoption compared with 18.1%
472 of dogs that were not fostered first, suggesting that fostering contributes to rehoming
473 success. Investigation of the criteria, methods and effects of fostering would be
474 necessary to identify elements associated with adoption success and aid standardisation
475 of the process.

476

477 Trainers do not all raise, manage or train their dogs in the same way, and some authors
478 report on an extremely wide range of practices (Atkinson & Young 2005; Huggins
479 2007), which have the potential to impact on the adoptability of dogs. Our evaluation
480 of trainer effects is largely based on descriptive analysis due to the small subset of data
481 restricted to the five trainers entering 25 dogs or more into the GAP programme.
482 Because of this small subset, we were unable to explore trainer effects on rehoming
483 success of adopted dogs. From our descriptive analyses, there were observed
484 differences among trainers in entry reason, sex and age profile of dogs entered,
485 suggesting differences in the criteria used to select dogs to enter the adoption
486 programme. For example, two trainers entered considerably more younger dogs than
487 the others. Although our previous analysis showed younger dogs were more likely to
488 pass the temperament test than older dogs, our data show no significant effect of trainer
489 on temperament test outcome.

490

491

492 **Conclusion**

493 Greyhound adoption is very successful for those dogs entering the GAP programme.
494 Younger dogs were more likely to pass the temperament test, possibly due to having
495 more malleable temperaments, and having their predatory behaviour reinforced for less
496 time than older adults involved in training and racing for more than 2 years. However,
497 this observed age effect might also reflect an unjustified bias in either the design or
498 application of the temperament test, as the success of adopted dogs was not affected by
499 age. Sex (female) and temperament test outcome (TTP+) were factors associated with

increased adoption success and warrant further investigation in terms of the type and prevalence of behaviour problems that place greyhound adoptions at risk.

Further understanding of factors likely to impact greyhound adoption are likely to be obscured because most dogs do not enter the programme and, for those that do, there is a lack of clarity around the criteria used by trainers in their selection. While we appreciate the practical necessity of having the temperament test to assess the suitability of dogs for adoption, this additional removal of dogs from the adoption process provides another unavoidable bias in our sample population. Testing the range of effects on successful adoption is restricted to those dogs passing an as yet scientifically unvalidated temperament test. Although the GAP temperament test showed reliability over time, the programme would benefit from scientfic evaluation of the validity and reliability of the temperament test.

Animal welfare implications

Although a small percentage (14.5%) of greyhounds entering GAP fail to be successfully rehomed, the vast majority (80%) of those that fail, fail the entry temperament test, which is as yet scientifically unvalidated. The possibility of unjustified age bias in either the temperament test design or implementation could affect the number of adult dogs (> 24 months old) that are destroyed before being made available for adoption.

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