

*Characteristics of ex-racing greyhounds and their impact on rehoming***1 Characteristics of ex-racing greyhounds in New Zealand and their impact on
2 rehoming****3 JB Thomas^{1, 2*}, NJ Adams¹ and MJ Farnworth^{1, 3}****4 1 Animal Welfare and Biodiversity Research Group, Environmental and Animal Sciences, Unitec Institute of
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8 United Kingdom****9 *Contact for correspondence and requests for reprints: Julia@foxx.co.nz****10 Abstract (250 words)**

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

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

31

32

Introduction

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

46

47

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

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

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

60

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

68

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

76

77

Methods

78 Details of all greyhounds entering the New Zealand GAP programme between 01 April

79 2010 and 31 March 2014 were used unless there was no reported outcome by 01

80 September 2014 (i.e. the dog was still waiting to be assessed or adopted).

81

82 Dogs entered the GAP programme either via a trainer or welfare admission.

83 Greyhounds entered under a welfare admission had either been removed from the

84 owner by GRNZ, or surrendered to, or removed by an animal welfare organisation.

85

86 Information was extracted from the New Zealand GAP database including the reported

87 reason for entering the dog into GAP, the dog's age, sex, health/injury status,

88 temperament test result, racing history, foster record, and rehoming outcome. The entry

89 reasons given were grouped into 5 categories, and reported injuries and health issues

90 were attributed to one of 8 categories (Table 1). Dogs were allocated to one of three

91 age groups: 'young' (5 – 24 months old), 'adult' (25 -66 months old), and 'senior' (67

92 – 146 months old) (Table 1).

93

94 A temperament test administered to all greyhounds entering GAP determined whether

95 the dog was made available for adoption. ~~The GAP New Zealand temperament test is~~

96 ~~based on the Australian Greyhound Behavioural Assessment.~~ The test is performed no

97 sooner than the third day after arrival at the rehoming kennels and comprises

98 assessments of the dog's behaviour (including fearfulness, anxiety, arousal levels,

99 affiliative/aggressive behaviours, shyness/boldness, leash manners, sociability and

100 noisiness), in relation to eight assessment items (Table 8). Each element of the

101 assessment item is scored out of three, one is a pass, two requires reassessment and/or

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

111

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

117

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

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

131

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

140

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

150

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

160

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

172

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

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

178

179 **Results**

180 **Descriptive statistics**

181 The annual number of greyhounds entering GAP New Zealand increased by 23.9%
182 between 2011 (n = 197) and 2014 (n = 244). A total of 835 greyhounds entered the
183 GAP programme between April 2010 and March 2014, of which 714 (85.5%) were
184 successfully rehomed. A total of 605 (72.5%) were successful the first time they were
185 adopted and a further 109 (13.0%) were successfully re-adopted after being returned
186 (Figure 1). Of the 14.5% (121/835) of dogs that ultimately failed to be rehomed 11.6%
187 (97/835) failed the initial temperament test, and 2.9% (24/835) were destroyed
188 following return from adoption or foster (Figure 1).

189

190 Of the 738 (88.4%) dogs that passed the initial temperament test 264 (35.8%) were
191 initially fostered, after which 9 dogs failed, leaving 729 dogs available for adoption. A
192 total of 349 (47.9%) of these dogs were homed between one and two months of entering
193 GAP and 659 (90.4%) within four months. Median length of stay in rehoming kennels
194 (between entry and first adoption) was 27 days (range 0 to 378 days). A total of 124
195 (17%) dogs were returned after their first adoption, mostly (70 dogs, 56.5%) within
196 four months of initial adoption (Figure 2). The median number of days between
197 adoption and return was 89 days (range 0 to 1137 days).

198

199 Median age at entry to the GAP programme was 44 months (range 5 – 146 months, 25th
200 - 75th percentile: 31 - 54 months respectively). A total of 77.4% of dogs were classified

201 as adults of 25 to 66 months of age (Table 1). There was a suggestion that young dogs
202 (< 25 months old) were more likely to pass the temperament test than adults and/or
203 seniors (Table 2) (see analysis below).

204

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

217

218 A minority (18.2%) of greyhounds entering GAP were unraced (Table 1). There was a
219 suggestion that unraced dogs were more likely to pass the temperament test than raced
220 dogs (Table 2) but this effect was not significant (see regression analysis below). A
221 total of 81.8% (n = 683) of greyhounds entering GAP had raced 1 or more times
222 (median: 47 starts per dog, range 1 – 177 race starts, 25th and 75th percentiles 25 and 76
223 starts respectively, Table 1). The median performance of raced greyhounds, expressed
224 as the percentage of podium finishes to total number of race starts was 35.6% (range
225 0% -100%, 25th - 75th percentile: 25% - 44%, Table 1).

226

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

232

233 Of the dogs that passed their initial temperament test 35.8% (n = 264) were fostered at
234 least once before being adopted the first time (Table 1). A total of 46.8% (n = 58) of
235 returned dogs were fostered before being rehomed a second time. The percentage of
236 fostered dogs that were not made available for a first or second adoption (i.e. were
237 destroyed following their foster placement) was 3.4% (n = 9) and 3.4% (n = 2)
238 respectively. Of the dogs that were not fostered, 18.1% (86/474) were returned after
239 their first adoption and of these 2.1% were not re-adopted (i.e. were destroyed). Of the
240 dogs that were fostered, 14.4% (38/264) were returned after their first adoption and
241 2.0% of these were destroyed. A total of 56.1% (148/264) of fostered dogs had passed
242 the temperament test with a TTP result compared with 38.8% (184/474) of dogs that
243 were not fostered. Overall, 94.7% of greyhounds fostered before their first adoption
244 were successfully rehomed, compared with 97.9% of dogs that were not fostered first
245 (Table 3).

246

247 Five of 125 trainers (2.8%) entered 25 dogs or more into the GAP programme. Two of
248 these trainers (labelled B and D, Table 4) entered substantially more younger dogs
249 (39.3% and 60.0% respectively) than the other three (trainer A: 5.1%, trainer C: 2.4%
250 and trainer E: 0%). The sex, racing history and entry reason profiles of dogs entered,

251 also varied among trainers (Table 4). Trainers B and D had 3.3% of their dogs fail the
252 temperament test, compared with trainers A, C and E whom had 12.8%, 19.5% and
253 24% of their dogs fail respectively (Table 4), but these differences were not significant
254 (see below).

255

256 **Factors affecting temperament test pass or fail**

257

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

265

266 The binomial logistic regression performed to ascertain the main effects of trainer (with
267 25 dogs or more entered into GAP programme), age group, sex, racing history (raced
268 or unraced) and year of entry on temperament test outcome, showed no significant main
269 effects.

270

271 **Factors affecting ultimate adoption success**

272

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

276 pass type, sex of dog and year of entry proved to be significant main effects. Dogs
277 passing at the basic level temperament test (TTP) were less likely to successfully
278 rehome than those passing the higher test (TTP+) (Odds ratio: 0.328, 95 % CI: 0.131-
279 0.820), females were more likely to be successfully adopted than males (Odds ratio:
280 2.895, 95 % CI: 1.117-7.503), dogs entering the programme in 2014 were marginally
281 less likely to be successfully rehomed than dogs entering in 2011 (0.177, 95% CI:
282 0.039-0.799) (Table 6). When we repeated the analysis on our slightly smaller group of
283 dogs that were considered for adoption (n = 729 after nine dogs destroyed following
284 their initial foster placement were removed) the model remained significant ($\chi^2 =$
285 20.069, df = 4, $P < 0.001$), with sex ($P = 0.01$) and year of entry ($P = 0.028$) effects
286 remaining, however the effect of temperament test pass disappeared.

287

288 **Factors affecting success at first adoption**

289

290 Models based on the sample of 738 dogs that passed the initial temperament test ($\chi^2 =$
291 9.644, df = 1, $P = 0.002$) or 729 dogs (after nine dogs destroyed following their initial
292 foster placement were removed) ($\chi^2 = 7.359$, df = 1, $P = 0.007$) were significant.
293 Success at first adoption was related only to the outcome of the temperament test for
294 both the model utilizing 738 dogs (Table 7) or that based on the slightly smaller sample
295 (n = 729 dogs) ($P = 0.007$).

296

297

297 **Discussion**

298

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

301 generally report a much lower initial rehoming rate (e.g. 21.3% Marston *et al* (2004);
302 27% Mornement *et al* (2010)). This is even when these figures are corrected for animals
303 reclaimed by owners, euthanised for health or welfare reasons or destroyed as a
304 'prohibited breed type' (e.g. 49.4% calculated from Marston *et al* (2004)). This
305 relatively high success rate of the GAP programme is carried over into re-adoption
306 success of greyhounds returned to the programme after an initial failed adoption. Only
307 12.1% of returned greyhounds were destroyed, compared to between 40% (Marston *et*
308 *al* 2004) and 50% (Patronek *et al* 1995) of returned shelter dogs.

309

310 Although greyhounds have a similar average length of stay in rehoming kennels prior
311 to adoption (median 27 days) compared to shelter dogs (e.g. 28 days Diesel *et al* 2007;
312 23 days Zak *et al* 2015), most companion dogs will not have previously spent extensive
313 periods in a high-density kennel environment (Taylor & Mills, 2007; Wells 2004).
314 Greyhounds on the other hand, have generally spent all their pre-adoption lives in
315 kennels. High density kennel housing of dogs has the potential to cause considerable
316 stress, and contribute to the development of behaviour problems (Diesel *et al* 2008b;
317 Marston *et al* 2004; Taylor & Mills, 2007; Wells 2004) before and after adoption. Dogs
318 that are preconditioned to kennelling show decreased physiological signs of stress
319 compared with dogs that have not had prior habituation to a kennelled environment
320 (Rooney *et al* 2007). The fact that most greyhounds have been pre-conditioned to
321 kennelling, might contribute to their relatively high rehoming success compared with
322 dogs from shelters.

323

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

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

330

331 Pet dogs relinquished to shelters are also likely to have existing behaviour problems
332 (Diesel *et al* 2008b; Marston *et al* 2004; Wells & Hepper 2000), whereas greyhounds
333 entered into the GAP rehoming programme are potentially pre-selected for desirable
334 attributes. Only a small proportion (15.5% (calculated from Colgan *et al* 2013)) of
335 surplus racing industry greyhounds are entered into the GAP programme. Although the
336 precise criteria used by trainers to select dogs to enter the programme is unknown and
337 appears to vary among trainers (Table 4), greyhound trainers pay a fee to enter dogs
338 into the rehoming programme and may elect not to submit dogs displaying undesirable
339 behaviours that would result in dogs failing the initial temperament test. Consistent
340 with this view, considerably fewer greyhounds failed the initial temperament test
341 (11.6% (97/835)) compared with pet dogs entering rehoming shelters (29.3%
342 (calculated from Marston *et al* 2004)). However, differences may also be explained in
343 part by the different criteria used to evaluate temperament between the different studies.

344

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

350

351

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

357

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

375

376

377 For those dogs that passed the temperament test, there was a year of entry effect on
378 ultimate rehoming success. Dogs returned in 2011, after their first adoption, were more
379 likely to be successfully readopted (only 1.2% failed) than dogs returned in 2014 (6.5%
380 failed). The reason(s) the GAP programme was less likely to successfully re-adopt
381 dogs in 2014, than it did in 2011 is not known. It could be associated with limited
382 funding and an increased target for the number of greyhounds rehomed each year (GAP
383 2014), effectively reducing resources (e.g. kennel space and time) able to be allocated
384 to re-adoption of returned greyhounds.

385

386 The proportion of greyhounds returned at one-month post-adoption (2.7%) was similar
387 to that reported by Elliott *et al* (2010) (3.3%), but somewhat less than shelter studies
388 (6.5% in Northern Ireland (Wells & Hepper 2000); 12.9% in Melbourne shelters
389 (Marston *et al* 2005)). Diesel *et al* (2008b) reported a six-month post-adoption return
390 rate of 14.7% (662/4500) in the United Kingdom, which is similar to the 11.7%
391 (85/729) of greyhounds returned within six months. This appears to suggest
392 greyhounds are less likely to be returned within one month than dogs rehomed from a
393 shelter, but that greyhounds have a similar six-month post-adoption return rate to
394 shelter dogs.

395

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

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

502

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

513

514 **Animal welfare implications**

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

521

522

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