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Analysis of Factors Relating to Companion Rabbits Relinquished to Two United Kingdom Rehoming Centers

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ABSTRACT

Rabbits are a common companion animal in the United Kingdom, and some reports have suggested that large numbers are relinquished to rehoming centers each year. This study aimed to investigate the characteristics of rabbits relinquished to 2 UK rehoming centers and explore reasons given for relinquishment. The centers contributed data for all rabbits who entered their center during 2013 ($n = 205$). Most rabbits (59.5%) were relinquished by a guardian. Similar numbers of males and females were relinquished, and a larger number of rabbits were not neutered (72.4%) and adults (56%). Most rabbits were healthy on arrival (61.5%). The most common reasons for relinquishment were: “too many rabbits/unplanned litters” (30.3%) and “housing problems” (23.8%). Rabbit-related reasons accounted for 12.2% of rabbits relinquished. Reasons for relinquishment were associated with 1 of the recorded rabbit characteristics. Further detailed studies are needed to explore the dynamics of companion rabbit ownership and factors that affect the breakdown of rabbit-guardian relationships in the United Kingdom.

KEYWORDS

Rabbit; *Oryctolagus cuniculus*; relinquishment; rehoming center; shelter

Rehoming centers, also referred to as sanctuaries and shelters, take in companion animals to help find new homes for them. These rehoming centers, hereafter referred to as centers, vary in size from large chain organizations to smaller, home-based operations in the United Kingdom. The latter may be more common for smaller companion animals such as rabbits, with the Internet and social media potentially contributing to the ability of home-based centers to advertise the nonhuman animals and find new homes.

An estimated 800,000 domestic rabbits (*Oryctolagus cuniculus cuniculus*) are currently kept as companion animals in 2% of households in the United Kingdom, making them the third most commonly kept companion animal after dogs and cats (24% and 17% of households, respectively; Pet Food Manufacturing Association [PFMA], 2016). The Rabbit Welfare Association and Fund (RWAF) estimates that 67,000 rabbits are passing through these centers in the United Kingdom each year (RWAF, 2012). In addition to the financial burden high numbers of companion rabbit relinquishments may put on the centers—which provide shelter, food, and veterinary treatment for these animals—there may also be welfare implications for the animals as a result of the changing environment as they are moved between home and the center (Rooney, Gaines, & Bradshaw, 2007; Stavisky, Brennan, Downes, & Dean 2012) and then potentially to a second home.

Three studies have directly investigated the reasons for relinquishing companion rabbits in different settings to centers in the United States (Cook & McCobb, 2012) and Canada (Ledger, 2010) and through online advertisements in Sweden (Ulfsdotter, Lundberg, & Andersson, 2016). Data showed that the most common reasons guardians gave for relinquishing rabbits in the United States and Sweden were an inability to care for companion rabbits and a lack of interest in doing so (Cook & McCobb, 2012;

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Ulfsdotter et al., 2016). Housing issues and having too many rabbits also resulted in a large number of rabbits being relinquished to four U.S. centers during a 6-year period, with just 3.38% being relinquished for rabbit-related reasons (Cook & McCobb, 2012). In a study of 30 Canadian centers, 94.7% of 2,466 rabbits relinquished were given up due to the guardian's circumstances, rather than rabbit-related factors (Ledger, 2010).

Additionally, Ulfsdotter et al. (2016) concluded that as the mean age (17.6 months) of rabbits being advertised for adoption through Internet sites was quite low, it is possible that some guardians have unrealistic expectations of the rabbits when obtained. However, Wenstrup and Dowidchuk (1999) identified that factors linked to relinquishment of companion animals to 186 U.S. centers varied locally and emphasized the importance of understanding local issues to enable the centers to address the problem of companion animal relinquishment. Therefore, further research is needed to investigate rabbit and companion animal guardian factors related to the relinquishment of companion rabbits in the United Kingdom, so that local issues can be understood and any areas of concern can be addressed.

The aim of the current study was to investigate the breakdown of companion rabbit ownership by examining characteristics of relinquished rabbits and reasons for relinquishment provided by rabbit guardians to UK centers.

Materials and methods

Participants

Centers were located based on 17 randomly selected starting points across the United Kingdom using a rabbit rescue search website (www.rabbitrehome.org.uk). Forty-six centers were contacted, and six agreed to contribute data. Ultimately, two centers contributed data. Data were collected using an online form (Google Docs, Google Inc.) for consistency, which enabled center staff to input data for each rabbit who entered their centers from January 1, 2013, to December 31, 2013. Site 1, based in Yorkshire, England, is a family-run center that takes in small mammals and is not open to the public. Site 2, located in Northern Ireland, also takes in cats and dogs and is open to the public.

Questionnaire design

To enable quick and easy input of data and to generate quantitative data, predominantly closed-ended, multiple-choice questions were used. The form contained 11 questions: 3 open-ended (animal identifier [i.e., name], date of arrival, and date of departure, if appropriate), 4 multiple-choice, and 4 multiple-choice with an option to add "other."

The date that each rabbit entered the center was recorded, and an "intake category" was allocated as given up by guardian, stray/abandoned, confiscated (by the authorities), from another center, born on site, or other. The remaining questions were only for rabbits who had been relinquished by their guardians, as information relating to guardians' reasons for relinquishment would not be available for other intake categories. Rabbit characteristic data included sex, neutered status on arrival, age category (determined by rabbit life stages), coat color, and health status on arrival. Lifestyles were determined based on the majority of breeds reach breeding age by 5 months (McNitt, Lukefahr, Cheeke, & Patton, 2013), and so to allow for breed variations, rabbits younger than 6 months were categorized as "young" and those aged "6 months and over but less than 5 years" were considered to be adults. Lennox (2010) suggested starting rabbit geriatric veterinary investigations, such as blood work, at 5 years of age, and so 5 years was selected for the "geriatric" starting point.

Participants could select all options that applied for reasons that the rabbit was relinquished out of 10 predetermined options, and an open field box was provided for other reasons. If the animal was no longer at the site, date of departure and a destination were requested (options included rehomed, euthanasia, other center, and other open response option).

Data analysis

All statistical analyses were conducted in Microsoft Excel and IBM Statistical Package for the Social Sciences Statistics (Version 20). The Fisher's exact test of independence or the chi-squared test was used to determine associations between reasons for relinquishment (where the first reason given for that animal was used) and the site relinquished to as well as rabbit characteristics of sex, neutered status, and health status on arrival. One-way analyses of variance (ANOVAs) were conducted to compare the length of stay (LOS) between the two sites. Due to the low numbers in some categories, it was not possible to test the "color" or "age" data for any association with reason for relinquishment, as the low expected counts would have violated the assumptions of the Fisher's exact or chi-squared test.

Results

Overview

During 2013, 205 rabbits entered the two centers, and 122 (59.5%) of them had been relinquished by their guardians. Other intake categories included 27.3% stray/abandoned, 7.3% born on site, 4.4% from another center, and 1.5% confiscated by authorities (Table 1). A monthly mean of 10.2 (± 1.7 SE) rabbits were taken in across both sites (Site 1, 7.6 ± 1.2 SE; Site 2, 2.6 ± 0.9 SE; Figure 1).

Reasons for relinquishment

Of the 122 rabbits relinquished by guardians, the majority of guardians (111; 91%) provided one reason for relinquishing their rabbits and 9% gave multiple reasons. The most commonly cited reasons were "too

Table 1. Intake categories for all rabbits ($n = 205$) taken in during 2013 for two UK rabbit rehoming centers.

	Site 1	Site 2	Total
All rabbits taken in	153	52	205
Born on site	8 (5.2%)	7 (13.5%)	15 (7.3%)
Stray/abandoned	44 (28.7%)	12 (23%)	56 (27.3%)
Confiscated	3 (2%)	0	3 (1.5%)
From another center	7 (4.6%)	2 (3.8%)	9 (4.4%)
Relinquished by guardian	91 (59.5%)	31 (59.7%)	122 (59.5%)

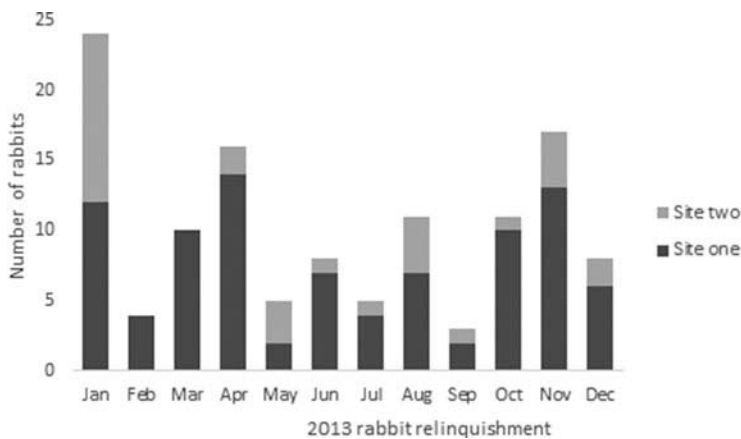


Figure 1. Annual trend of the number of companion rabbits relinquished by their guardians to two UK rehoming centers during 2013 ($n = 122$). Monthly mean = 10.2, SE = 1.7 for both sites combined (Site 1 = 7.6, SE = 1.2; Site 2 = 2.6, SE = 0.9).

Table 2. Reasons given for relinquishment of 122 pet rabbits by their guardians to two UK rehoming centers during 2013.

Reasons for relinquishment	Site 1* (% of 91 rabbits)	Site 2* (% of 31 rabbits)	Total relinquished for this reason* (% of 122 rabbits)
All rabbit-related	14 (9.9%)	1 (3.2%)	15 (12.2%)
Behavior toward adult in home	4 (4.4%)	0	4 (3.3%)
Behavior toward child in home	3 (3.3%)	0	3 (2.7%)
Behavior toward another companion animal	5 (5.5%)	1 (3.2%)	6 (4.9%)
Other behavior	2 (2.2%)	0	2 (1.6%)
Human-related	87 (95.6%)	30 (96.8%)	117 (96%)
Child no longer interested	13 (14.3%)	3 (9.7%)	16 (13.1%)
Financial	11 (12%)	0	11 (9%)
Housing	21 (23.1%)	8 (25.8%)	29 (23.8%)
Personal/health reasons	15 (16.5%)	4 (12.9%)	19 (15.6%)
Too many rabbits/unplanned litter	22 (24.2%)	15 (48.4%)	37 (30.3%)
Other [^]	5 (5.5%)	0	5 (4%)

*Response was multiple-choice. [^]Other reasons included being too busy (4) and no longer wanting the rabbit when he/she became ill (1).

many rabbits/unplanned litter” (30.3%), “housing problems” (23.7%), and “child no longer interested” (13.1%); all were classed as “human reasons” that were associated with guardian circumstance, lifestyle, or choice/decisions (Table 1). Rabbit-related reasons accounted for 12.2% of the reasons for relinquishing rabbits and were all behavior-related (Table 2). There was no significant association between the reasons the rabbits were relinquished and the site to which they were relinquished ($p > .05$). More males than females were relinquished for behavior reasons (7 males, 3 females), and only males (2) were relinquished for “other behavior issues (not social).”

Rabbit characteristics

Of the rabbits relinquished by their guardians, males and females were relinquished in relatively equal numbers (52.3% males, 47.5% females). Rabbit sex was not found to be associated with reasons for relinquishment ($p > .05$).

Most rabbits (72.4%) had not been neutered prior to relinquishment. Neutered status was highly significantly associated with reasons for relinquishment ($p < .001$). No neutered rabbits were relinquished because there were too many rabbits or an unplanned litter or because of financial reasons (Figure 2).

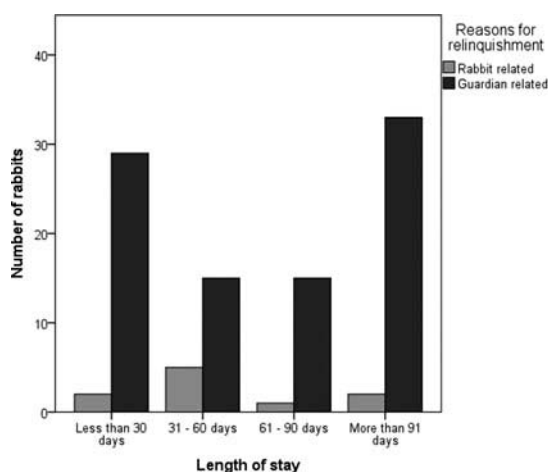


Figure 2. Reasons for relinquishment of neutered versus non-neutered rabbits to two UK rehoming centers during 2013 ($n = 122$). There was a significant difference in reasons given for relinquishing neutered and non-neutered rabbits ($p < .001$ Fisher's exact).

The majority of rabbits fell in to the adult category (68; 56%), and a large number were younger than 6 months (36%). Just 10 (8%) were geriatric. Young adults were more likely to be given up due to the guardian having too many rabbits or an unplanned litter, while adult rabbits were given up due to housing and financial and personal/health reasons (Figure 3).

Black (29; 24%) and white (27; 22%) rabbits were the most common colored rabbits to be given up. Other common colors were grey (15%), mixed (14%), and brown (10%). It was not possible to complete inferential statistics on coat color data due to the number of categories reported, resulting in small sample sizes within each and the complicated nature of rabbit coat color making it unrealistic to cluster responses.

Although the majority of relinquished rabbits were healthy (75; 61.5%), 38.5% were relinquished with health issues, including dental health problems, being underweight or overweight, viral infections, and parasite infestations. Multiple health issues were reported in 13% of rabbits. Health status on arrival was not found to be associated with reasons for relinquishment ($p > .05$).

Length of stay

The majority of rabbits were rehomed (102; 83.6%), 5 (4.1%) died or were euthanized due to health reasons, and 15 (12.3%) were still on site at the time of data collection. The mean LOS across both sites was 73.3 days ($SE = 5.6$; median = 60 days; range = 9–288 days) for the 102 rabbits rehomed during the time of the study. At Site 1, the mean LOS was 69.5 days ($SE = 6.4$; median = 41 days; range = 11–288 days), and at Site 2, the mean LOS was 86.2 days ($SE = 11.3$; median = 88 days; range = 9–214 days). A one-Way ANOVA revealed no significant difference in LOS between the two sites ($p > .05$). When considering the two categories for reasons for relinquishment, rabbit-related and guardian-related, there was no obvious difference in LOS for rabbits relinquished for different reasons (Figure 4).

Discussion

The two centers that took part in the study provided all data requested for each rabbit, demonstrating that detailed records were kept when the rabbits were relinquished. During 2013, the two centers took in a combined 205 rabbits, with 122 of them having been relinquished by their guardians.

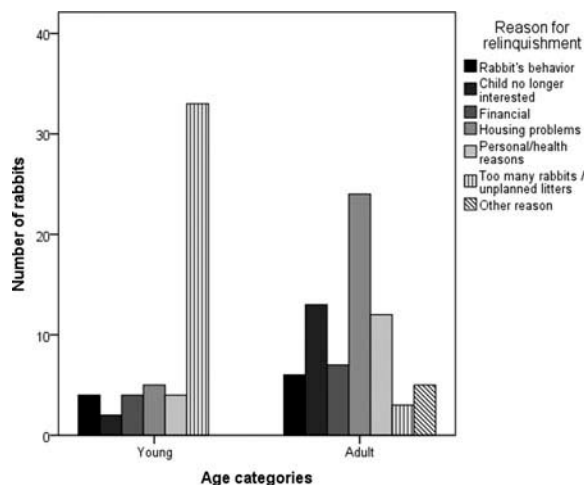


Figure 3. Reasons for guardian relinquishment of rabbits categorized as “young” (younger than 6 months; McNitt et al., 2013) and “adult” (including geriatric; all rabbits older than 6 months) to two UK rehoming centers during 2013 ($n = 122$).

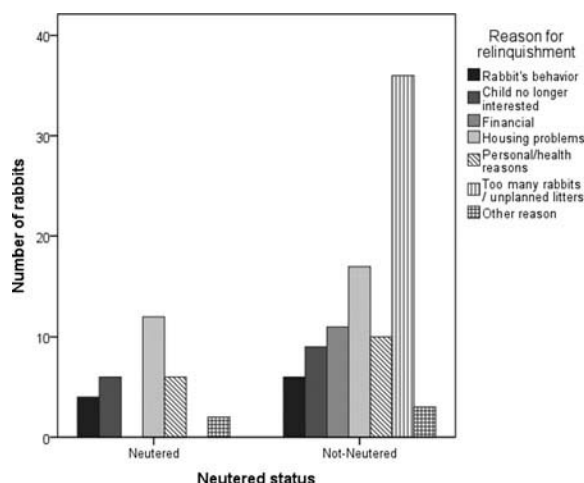


Figure 4. Length of stay for 102 rabbits at two UK rehoming centers during 2013, grouped by reasons for relinquishment.

Intake categories were remarkably similar for the two sites, specifically the percentage of rabbits who entered as strays and those relinquished by their guardians. A large number (56; 27.3%) entered the centers as stray/abandoned, much higher than the 16.3% in Cook and McCobb's (2012) U.S. study, which may be reflective of regional differences in the two studies. The number of stray rabbits entering centers warrants further investigation to explore the reasons that rabbits are abandoned or becoming stray in the United Kingdom.

Initiatives for promoting microchipping of companion rabbits may help guardians to relocate stray rabbits who may have escaped and may allow for guardians to be traced by the authorities where rabbits may have been abandoned. A study of lost and found dogs passing through animal protection organizations in Belgrade, Serbia, revealed that those with microchips were significantly more likely to be reunited with their guardians than were those who were not microchipped (Vučinić Radisavljević, Hammond-Seaman, & Ilieski, 2015), with similar findings for microchipped stray dogs in the United Kingdom (Dogs Trust, 2015). However, rabbits may be less likely to be microchipped than dogs, with a recent study showing that less than a quarter of rabbit guardians, responding to an online survey, had microchipped their rabbit(s) (Oxley Previti, Alibrandi, Briefer, & Passantino, 2015). Additionally, some issues have been highlighted regarding the use of microchip data being used to reunite companion animals with guardians, such as outdated or inaccurate information (Lancaster, Rand, Collecott, & Paterson, 2015). Nevertheless, some retailers, such as Pets at Home, are taking measures to ensure rabbits are microchipped prior to purchase (RWF, 2014).

The months with the highest intake at each center were April (Site 1) and January (Site 2), with high numbers taken in at both sites during November also. The monthly intake was different from that found by Cook and McCobb (2012), who reported February, May, June, and July as the highest months of intake for each of four centers during a 6-year study. The monthly intake difference between the two studies may be reflective of the present study only representing 1 year of data.

Reasons for relinquishment

The most common reasons guardians gave for relinquishing rabbits to the centers surveyed were too many rabbits/unplanned litter, followed by housing problems and a child no longer interested in the rabbit. These reasons may represent poor planning or preparation to have the rabbit for his/her natural life span. Housing problems were more commonly given for reasons to relinquish older rabbits older than 1 year (23 of 28 rabbits relinquished due to housing problems), and rabbits younger than 6 months

were more likely to be relinquished due to too many rabbits/unplanned litter. However, it is logical that guardians with accidental litters would try to rehome them while they are young.

Reasons that the rabbits were relinquished by their guardians were not significantly associated with the sites to which they were relinquished and were similar to findings from Cook and McCobb (2012), who identified housing issues and too many rabbits as commonly reported reasons. These findings indicate that issues affecting rabbit relinquishment to centers are similar in the United Kingdom and United States.

In an effort to address the number of rabbits relinquished for reasons of too many rabbits/unplanned litter, it may be beneficial for those invested in the purchase of companion rabbits (i.e., pet shops, breeders, and centers) and those involved in aftercare (i.e., veterinarians) to invest in education for guardians about the potential implications of not neutering a rabbit. Efforts to prevent guardians from giving up rabbits due to housing issues may be more complex and not within the guardians' control. Marder and Duxbury (2008) proposed that veterinarians offer preadoption counseling to potential new guardians of dogs. Such a service may be of value to potential new guardians of rabbits also and may help to reduce the occurrence of welfare issues that are reported in rabbits (Mullan & Main, 2006; People's Dispensary for Sick Animals, 2013; Schepers, Koene, & Beerda, 2009).

Rabbit-related problems, including problem behavior, have been reported in previous studies (reasons that could be attributed to the individual rabbit, 5.3% in Ledger, 2010; 3.38% in Cook & McCobb, 2012; 4.4% in Ulfsdotter et al., 2016) but at a much lower frequency than was found at the two sites in the present study (12.2%). Rabbit-specific reasons for relinquishment have received little attention in previous studies, with no known research looking at behavioral issues affecting relinquishment in rabbits or methods to reduce the occurrence of behavioral issues that result in relinquishment. In contrast to reasons for relinquishing rabbits such as unplanned litters and housing problems, center staff may be in a position to provide advice about behavioral problems to help guardians overcome their problems and avoid relinquishment.

Behavior problems were only reported for a small number of rabbits in the present study, but interestingly, where behavior issues were reported, behavior toward humans and behavior toward other animals were never reported in the same rabbit. Aggression toward people was reported as a common behavior problem in rabbits (Normando & Gelli, 2011) and was seen in 6% of rabbits relinquished in the current study. A higher number of male rabbits were relinquished for behavioral reasons, and only males were relinquished for nonsocial behavior reasons. Crowell-Davis (2007) reported that male rabbits are more likely to show behavioral problems such as urine spraying and territorial behaviors. Cook and McCobb (2012) and Ulfsdotter et al. (2016) suggested that guardians may be reluctant to disclose information relating to the animal's behavior that may affect their chances of being rehomed. Reluctance to disclose information that could affect an animal's chances of being rehomed may have also been a factor in the present study.

It is difficult to make many comparisons between studies of the reasons companion animals are relinquished, as different terminology is used to categorize reasons given. For example, Ledger (2010, p. 37) stated guardian circumstances and behavioral reasons only, while Cook and McCobb (2012, p. 304) stated guardian-related problems but had additional categories of housing issues and inability to care for/lack of interest as separate categories, in addition to too many rabbits and rabbit-related problems. Neither study indicated how the reasons for relinquishment data were collected at each site. It is unclear if the centers were asked an open question, which was later coded to the categories cited, or if they were forced to select predetermined categories, as with the present study. Additionally, each center, including those sampled in the present study, was likely to use different forms of data collection at intake, and so the retrospective data available may be limited.

Rabbit factors

Previous studies have highlighted sex differences for the number of dogs and cats being relinquished to centers (Diesel, Brodbelt, & Pfeiffer, 2010; Lepper, Kass, & Hart, 2002; Salman et al., 1998), and

Ulfsdotter et al. (2016) also reported a 5.1% difference in the number of male and female rabbits being relinquished through online advertisements in Sweden, with more males being relinquished. Similar to the findings of Ulfsdotter et al., 4.8% more male rabbits were relinquished in the present study. However, the ratio of males to females relinquished may reflect the ratio of males to females kept as companion animals in the United Kingdom. As Rooney et al. (2014) found, 17.6% more males than females were reportedly kept by respondents to a UK survey. In the present study, neither sex was found to be more likely than the other to be relinquished for any specific reasons.

The majority of rabbits were not neutered (72.4%), as Cook and McCobb (2012) found in their study of U.S. centers where 81.5% of rabbits taken in were not neutered; however, this figure includes stray, returned, confiscated, and abandoned rabbits, in addition to those relinquished by guardians. Recent surveys of UK companion rabbit guardians suggest that a higher percentage of rabbits in the United Kingdom are neutered (42% neutered in Mullan & Main, 2006; 59.1% neutered in Rooney et al., 2014). The difference between the percentage of neutered rabbits relinquished to centers in the present study and those currently kept as companion animals in the United Kingdom could have been expected, as a large number of rabbits relinquished were younger than 6 months old and so may not yet have been neutered (recommended age for rabbit neutering is 3 to 9 months; McNitt et al., 2013) and had been relinquished for reasons of too many rabbits/unplanned litter.

Different reasons were given for relinquishing rabbits who were neutered, compared with those who were not neutered, in the present study. The significant association found between the reasons neutered and non-neutered rabbits were relinquished could be due to the samples in the two groups being skewed (3 times as many not neutered than neutered), and so the results should be interpreted cautiously. However, it is interesting to note that financial reasons and too many rabbits/unplanned litter reasons were never given as reasons for relinquishing neutered rabbits. These findings suggest that additional efforts to encourage guardians to neuter rabbits are likely to be beneficial in reducing the number of rabbits relinquished to centers in the United Kingdom. Emphasis could be placed on educating guardians about rabbit neutering at the point of purchase/adoption.

There was a spread of rabbit colors in the present study, but the two most common colors were black or white. Appearance has been found to be a factor that affects the adoption of dogs and cats (Diesel, Smith, & Pfeiffer, 2007; Lepper et al., 2002; Weiss, Miller, Mohan-Gibbons, & Vela, 2012), but appearance as a factor of companion rabbit adoption has not been explored and additional factors, such as breed, size, and coat type would need to be considered. Additionally, Edgar and Mullan (2011) reported that a rabbit's personality/friendliness was the most commonly reported factor affecting the purchase of the rabbit.

The majority of rabbits were healthy at the time of relinquishment; however, 47 were taken with health issues. It is not clear if guardians were aware of these health issues or if they were identified by center staff on arrival. Mullan and Main (2006) reported that dental health issues were likely to be unnoticed by rabbit guardians, and similar findings have been reported regarding guardians' perceptions of obese dogs (White et al., 2011).

Length of stay

Rabbits took longer to be adopted from the UK centers sampled than did rabbits at four U.S. centers (UK median = 60 days; U.S. median = 34 days or less; Cook & McCobb, 2012). When compared with other companion animals within the United Kingdom, rabbits appear to take longer to be adopted. The median LOS for cats in Gourkow and Fraser's (2006) study was 12.5 days or less, and Diesel et al. (2007) reported a median LOS of 28 days for dogs. Observed differences in LOS for these different species may be reflective of the popularity of rabbits as companion animals in the United Kingdom in comparison with dogs and cats (PFMA, 2016), or they could potentially highlight that there are more rabbits available at centers or through other sources (e.g., in pet shops and online advertisements) than there is demand for. Additionally, the longer LOS may reflect the types of centers sampled in the current study.

Future research

Although sampling centers is a common way of understanding the reasons people relinquish companion animals and factors related to relinquishment, it is suggested that guardians may not provide full details at the time of relinquishment for fear of affecting the animal's ability to be rehomed. Additionally, there may be challenges in achieving large sample sizes for rehoming center studies, which may be a limitation of the data presented.

Given the similar findings of the present study and Cook and McCobb's (2012) study related to the reasons that rabbits are relinquished, a wider study might further investigate the relationship between rabbit guardians and their companion animals to explore factors related to the companion animal-guardian bond outside of the rehoming center setting. A guardian no longer being interested in the animal was never a reported reason for dog or cat relinquishment in the United Kingdom in studies by Diesel et al. (2010) or and, Vandenbussche, Bradshaw, and Roberts (2009), respectively. Perceptions of different companion species by people in the United Kingdom have not been previously explored; however, González-Redondo and Contreras-Chacón (2012) found that Spanish students regarded rabbits less favorably as a companion species over dogs and cats, suggesting that some people may have reduced regard for the rabbit as a companion animal, although historical cultural differences in the use of rabbits across different countries should be considered.

Rabbits are understudied in comparison with other popular companion animals, and further research investigating their needs and the levels of their guardians' knowledge may be beneficial to highlight any potential welfare concerns.

Conclusions

The trends shown in the data are very similar to those found from Cook and McCobb's (2012) survey of rabbits entering centers in the United States, highlighting that rabbits tend to be relinquished for guardian factors more so than rabbit factors. There may be an issue in the United Kingdom with rabbits entering centers as strays or being abandoned, which warrants further investigation.

The majority of rabbits in the present study were relinquished due to the guardian having too many rabbits or an unplanned litter, which may be addressed with wider education campaigns about the benefits of neutering companion rabbits before they reach sexual maturity. Factors linked to the reasons the rabbits were relinquished suggest that educating guardians about the breeding age of rabbits and encouraging neutering may be beneficial to reduce the number of relinquished rabbits.

Rabbits at UK centers appear to stay on site longer than those in U.S. centers in previous studies and longer than other popular companion animal species in the United Kingdom. Further detailed studies are needed to explore the dynamics of companion rabbit guardianship and factors that affect the breakdown of such relationships and, additionally, to explore interventions that may reduce the number of companion rabbits entering centers.

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