



Satisfaction and satisfaction affecting problem behavior in different types of adopted dogs

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ABSTRACT. Many dogs are relinquished worldwide, so it is important to enhance adoptions' success. We aimed at investigating factors associated with owners' satisfaction with adopted dogs, both in general and focusing on *galgos*. Data on 392 dogs (191 *galgos*) were gathered using an online survey, investigating dogs' and owners' demographics, satisfaction with the adopted dog and post-adoption behavior. Satisfaction was affected by different variables in *galgos*' owners as compared to non-sighthound non-*podenco* dogs' ones, with only the presence of disobedience on walks negatively affecting satisfaction in both samples. Depending on dogs' type, the presence of some behavioral problems was associated with decreased satisfaction with the dog (e.g., destructiveness for *galgos*, or separation problems for non-sighthound non-*podenco* dogs), whereas that of others increased it (e.g., not being interested in social interactions with dogs for *galgos*, and shadowing for non-sighthound non-*podenco* dogs). The variables most often being predictors of the behaviors influencing satisfaction were dog type, with being a *galgo* as a negative predictor, and dog's age, with being older as a negative predictor. Further studies on dog adopters' satisfaction are needed.

KEY WORDS: animal behavior, behavioral complaint, *galgo*, online questionnaire survey, sighthound

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Dogs have been associating with humans for a long time [21] and are present in millions of household worldwide [22]. The relationship between people and dogs is not always successful and many dogs are relinquished and/or destroyed [15, 25], with negative consequences both for the dog and for the human part of the family involved in it [26]. Moreover, the unwanted pet overpopulation problem can have negative societal and environmental effects [6, 7, 20]. Therefore, it is important to investigate what are the factors linked with satisfaction with the dog and retention of him/her in the family as opposed to those linked to his/her relinquishment [22], both in the dogs' general population and in specific sub-populations. The reasons given by owners when asked upon relinquishing dogs are often independent from the dog and his/her behavior (e.g., house moving, lack of resources). When comparing situations in which the dog is retained to those in which he/she is relinquished, the main relinquishment risk factors are the owner expecting dog ownership to be less demanding than it resulted to be [22] and the dog showing behavioral problems [3, 4, 19, 22, 30]. Even if the dog is not relinquished, behavioral problems can decrease owners' satisfaction with it [29]. In this respect, dogs adopted from associations/shelters can be more at risk, as the stressful experience of relinquishment/impoundment can affect later behavior and predispose to behavioral problems [28].

However, left on their own, people tend to choose dogs on characteristics that do not correspond to those linked to satisfaction and retention of the dog after adoption, often prioritizing physical characteristics over temperament/behavior [14, 22]. Given the complexity of the issue, it is important to increase the number and the scope of the dedicated scientific studies, keeping in mind that there may be difference due both to geographical area (country and region [31]) and to the type of adopted dog. A relevant fairly recent phenomenon is the adoption of sighthounds, such as ex-racer greyhounds [1, 5, 9, 27] or rescued ex-hunting *galgos* from Spain [23]. Sighthounds, including *galgos*, have been found to differ in some physiology variables from non-sighthounds [17]. Ex-racer greyhounds were found to differ also behavior-wise [5, 10] from local adopted dogs, whereas, to our knowledge, nothing has been published about *galgos*' , although the mass relinquishment of *galgos* in Spain and the action of international

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rescue organizations is making them more common as pets in some European countries [23].

Therefore, the aim of the present study was to contribute to the knowledge about factors associated with owners' satisfaction with their dogs both in general and as related to a specific sub-group of adopted dogs, i.e., rescued *galgos* adopted from Spain.

MATERIALS AND METHODS

Survey

A convenience sample of respondents was recruited using an on-line questionnaire, consisting of four sections. The target population of the survey consisted in all the dogs who had been rescued and rehomed through shelters and associations (i.e., not dogs rehomed from private family to private family). The first section included name of the dog, date of adoption, association from which the dog was adopted, why he/she was adopted, and gender and age of respondent. The second asked the type of dog, sex, reproductive state, (estimated) age, dog's health problems, housing conditions, previous fostering, expressions of frustration by the dog, advice given upon adoption, satisfaction with the dog. The section also included a part designed as a pilot study on the feasibility of using Kano Model questions [11] in investigating dog owners' satisfaction. Due to their preliminary nature, the results of the abovementioned part will not be discussed in the present paper. The options for type of dog were: *galgos* from Spain, other sighthounds, *podencos* (i.e., a group of primitive-type non-sighthound Spanish hound breeds [8], who are rescued and placed for adoption in a similar way as *galgos* are) and other dogs (i.e., dogs which were neither sighthounds nor *podencos*, adopted mainly from local shelters, called hereafter Non-Sighthound Non-*Podenco*-NSNP-dogs). The third section concerned the presence of possibly problematic behaviors (called "behavioral problems"—BP—hereafter) shown by the dog at the moment the questionnaire was completed (i.e., "at present") and some more information on post-adoption behavior which was slightly different depending on length of time from adoption. This created three versions of the questionnaire: one regarding dogs who had been adopted approximately four weeks before the filling in of the questionnaire ("short term" version, ST), one regarding dogs who had been adopted between 4 weeks and 6 months before the filling in of the questionnaire ("medium term" version, MT), and one regarding dogs who had been adopted more than six months before the filling in of the questionnaire ("long term" version, LT). The main difference among the versions was that ST and MT included a more detailed subsection regarding the behavior of the dog during the first four weeks after adoption, and, for MT, between the fifth week and 6 months. Thirty-five BPs, most of which similar to those investigated in other surveys [5, 10, 16], were included in section three, and concerned aggression to different targets, fear of different kind of people, animals and situations, predatory behavior and miscellaneous other problems (please see the English translation of the questionnaire in the supplement material for more detail). As aggression and disobedience have been found to affect satisfaction with the dog and relinquishment [22, 29], three further composite behavioral items (CBIs), aggressive behavior toward people, (a composition of aggressive behavior toward familiar and unfamiliar adults, plus aggressive behavior toward familiar and unfamiliar children), harmful behavior towards other animals (a composition of aggressive behavior toward familiar dogs, unfamiliar dogs, other animals and predatory behavior toward small dogs, cats, other animals) and disobedience on walks (a composition of inadequate behavior on the leash and unreliable recall) were created to be used in the analyses. Only dogs who were reported as not showing any of the component PBs were considered as not showing the related CBI. The fourth section investigated management of the dog.

Data collection lasted from May 2019, to May 2020, and was run in Italian speaking countries and recruitment was done as shown in Fig. 1. Findings pertaining satisfaction and factors affecting it will be presented in the present paper.

Statistical analysis

Linear Models were run in order to assess factors affecting owners' satisfaction with their adopted dog using the software R (<https://www.r-project.org/>), both on the overall sample, and on *galgos* and NSNP dogs separately. Due to its distribution, the dependent variable's results was grouped into three classes: up to 8; equal to 9; equal to 10. The factors included in the initial model were dog's type (*galgo*, NSNP dog, other sighthounds, *podencos*, included only in the analysis done on the overall sample), dog's sex (intact male, castrated male, intact female, spayed female), dog's age, owner's gender (man, woman), owner's age, length of adoption (in days), presence of children in the household, the dog having a chronic health problem, and the presence of aggressive behavior toward people, harmful behavior towards other animals and disobedience on walks. Although there were only three intact females and one intact male in the *galgos*' sample, we decided to keep the variable dog's sex on four possible levels in order not to differ from what done for the other two samples, and to eliminate the intact male from the dataset in the analysis pertaining satisfaction in *galgos*. However, when interpreting any results regarding sex of the dog in the *galgos*' sample, it is important to keep in mind that there were also few intact females in the sample.

Moreover, in order to assess whether the presence of any of the 35 PBs included in the study was associated with increased or decreased declared satisfaction, data pertaining satisfaction were checked for normality and then analysed using U-Mann Whitney tests, using the Statistica software (Statistica ver. 13, StatSoft, Hamburg, Germany). The aforementioned analysis was run both on the overall sample and on *galgos* and NSNP dogs separately.

Given the dichotomous distribution of the variable (presence/absence) a logistic regression was run using the software R (<https://www.r-project.org/>) for each BP associated with increased or decreased satisfaction in the overall sample in order to assess the factors' significance and contribution to predictivity. The initial model's factors were: dog's type (*galgo*, NSNP dog, other sighthounds, *podencos*), dog's sex (intact male, castrated male, intact female, spayed female), dog's age, owner's gender (man, woman), owner's age, and length of adoption (in days). Dogs missing one or more values in the independent variables (tot n° 28) were eliminated from the logistic regression.

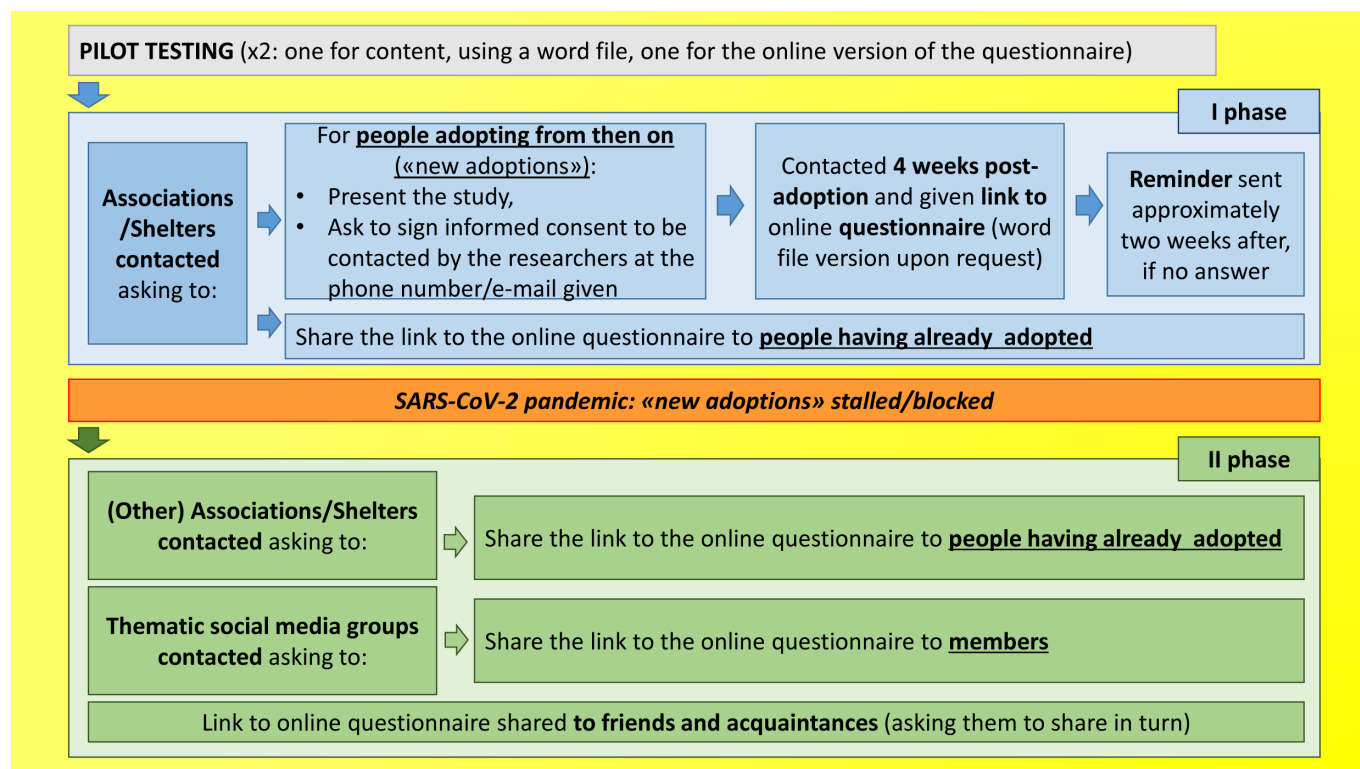


Fig. 1. Phases in the dissemination of the questionnaire.

RESULTS

Characteristic of respondents and dogs

The survey yielded viable answers for 392 dogs (134 castrated and 16 intact males, 226 spayed and 16 intact females), given by a convenience sample of 353 respondents, whose average age was 44.4 years (SD=11.6, median 47, interquartile 37–54). An overview of the sample is given in Table 1. Due to the small sample size, other sighthounds and *podencos* will not be further analyzed as a separate group.

Factors associated with increased or decreased declared satisfaction with the adopted dog

Declared satisfaction with the adopted dog was 10 (i.e., the maximum score) for more than 75% of the dogs (Table 2). In all three samples, the variables investigated only predicted a small proportion of the variance. Table 3 shows the factors influencing satisfaction in the overall, *galgos*' and NSNP dogs' samples. Satisfaction was affected by different variables in the different samples. The only factor being significant in all three samples was the CBI disobedience on walks, whose presence negatively affected satisfaction in all samples. In the NSNP dog's sample also aggression toward people negatively affected satisfaction (both alone and in interaction with the presence of children), whereas in the overall sample, it did only if in interaction with the presence of children.

Behavioral problems associated with increased or decreased satisfaction and factors affecting them

Also when the single BPs were analyzed, the presence of which BPs was associated to statistically either higher or lower declared satisfaction differed between samples (i.e., overall, *galgos*' and NSNP dogs' samples; Table 2). Among the 11 BPs decreasing satisfaction in the overall sample, fear of familiar adult people, fear of other dogs, inability to handle frustration and unreliable recall were not significantly affected by any of the variables included in the initial logistic regression model, so they were not analyzed further in that respect. Tables 4 and 5 show the results of the logistic regressions investigating possible predictors of the other BPs associated with increased or decreased satisfaction in the overall sample. Both owners' and dogs' related variables were found to be among the predictors of the BPs, with dog's (estimated) age and type being the most frequent predictor for the presence of the BPs influencing satisfaction. In all the cases in which with dog's (estimated) age and type were significant, being a *galgo* and being an older dog, were associated with decreased likelihood of showing the BP.

DISCUSSION

With the goal of contributing to increasing adoptions' success, the present study aimed to expand the knowledge about factors

Table 1. Main sample's characteristics

Feature	<i>Galgos</i>	Non-sighthound non- <i>podenco</i> dogs	Other sighthounds	<i>Podencos</i>	Overall ^a
Number of dogs (males–females)	191 (66–125)	146 (59–87)	36 (18–18)	17 (7–10)	392 (150–242)
Intact dogs	1 M, 3 F	13 M, 11 F	2 F	2 M	16 M, 16 F
(Estimated) dog's age (years, mean ± SD)	5.0 ± 2.5	4.9 ± 3.9	7.0 ± 3.1	4.4 ± 3.0	5.1 ± 3.2
N° of questionnaires filled in by men vs. by women	31 vs. 160	27 vs. 117 (1 other; 1 U)	7 vs. 29	2 vs. 15	67 vs. 323 (1 other; 1 U)
Length of adoption in days: median, range	298.5, 21–4,481 (1 U)	213, 2–4,868 (11 U)	881, 157–3,415 (1 U)	565, 28–1,931 (2 U)	376, 2–4,868 (15 U)
N° of dogs having chronic/recurrent health problems	17	25	5	3	50
N° of dogs said to have been in foster	27	27	16	8	79
N° dogs not with adopting family anymore	1 (dead)	7 (dead); 1 (returned to the association)	1 (dead)	1 (dead)	10 (dead); 1 (returned)
Prevalence % of aggressive behavior toward people	5.8	15.4	2.8	5.9	8.9
Most often reported behavioral problem (prevalence %)	Predatory behavior–cats (43.4)	Shadowing (41.4)	Predatory behavior–cats (69.4)	Fear of loud noises/fireworks/thunderstorms (52.9)	Predatory behavior–cats (41.2)

^aThe “overall” column includes also the two *galgos* cross dogs. F, female; M, male; U, unknown.

Table 2. Satisfaction and behaviors associated with increased or decreased satisfaction

Feature	<i>Galgos</i>	Non-sighthound non- <i>podenco</i> dogs	Overall ^a
% max satisfaction score	83.8	76.0	80.7
BPs whose presence at present associated with reduced satisfaction (Z, P)	Destructivity (not linked to be left alone) (Z=2.5, P=0.01)	Fear of familiar adult people (Z=2.0, P=0.048); Predatory behavior toward other animals (Z=2.0, P=0.048); Problems when left alone (Z=2.8, P=0.004); Unreliable recall (Z=2.5, P=0.01); Being always too active (Z=2.2, P=0.03)	Aggressive behavior toward unfamiliar dogs (Z=2.3, P=0.02); Fear of familiar adult people (Z=2.1, P=0.04); Fear of other dogs (Z=2.2, P=0.03); Predatory behavior toward small dogs (Z=2.4, P=0.01); Problems when left alone (Z=2.5, P=0.01); Inability to handle frustration (Z=2.1, P=0.04); Unreliable recall (Z=2.6, P=0.009); Destructivity (not linked to be left alone (Z=2.8, P=0.005); Inadequate behavior on the leash (Z=2.5, P=0.01); Being always too active (Z=3.3, P < 0.001); Eating inedible materials/objects (pica, Z=2.1, P=0.04)
BPs whose presence at present associated with increased satisfaction (Z, P)	Not interested in interactions with other dogs (Z=-2.4, P=0.02)	Shadowing (Z=-2.4, P=0.02)	Shadowing (Z=-2.6, P=0.009)

^aThe “overall” column includes also *podencos*, other sighthounds and *galgo* cross dogs.

associated with owners' satisfaction with their adopted dogs, both in general and as related to a specific sub-group of adopted dogs, i.e., rescued *galgos* from Spain, involving a convenience sample of respondents via an online questionnaire.

The fact that the investigated variables predicted only a small proportion of the variance, is not surprising as the relationship between each owner and their dog is unique in its many nuances and there are many variables which could influence it and, in turn, satisfaction [18]. This notwithstanding, some significant effects could be detected, and, interestingly, they were not the same in the three samples. The only factor having the same effect (i.e., decreasing satisfaction) in all samples was the presence of disobedience when on walks. It is unsurprising that a having a dog who shows unsuitable behavior on the leash, unreliable recall, and, therefore, also the composite behavior disobedience on walks, decreases satisfaction, as found also by van Herwijnen and collaborators [29] regarding disobedience in general. Similarly, King and collaborators [12] found that Australian participants included coming when called among their ideal dog characteristics. It is likewise unsurprising that satisfaction was decreased also when the dog was perceived as being destructive, as found by Diesel and collaborators [3] regarding destructiveness and relinquishment. Even if such behaviors do not seem a serious problem such as aggression does, they can still be very irksome, because the contexts in which they happen (e.g., walks with the dog or the dog being unsupervised at home) are commonly occurring situations for most owners. Moreover, destructivity can have a direct economic impact, whereas disobedience an indirect one, mediated by its likelihood to

Table 3. Variables affecting satisfaction

Variable	Estimate	Standard error	t	P	Model multiple R squared	Model P value
Overall sample (UV=0)						
Adoption length	-9.87E-05	4.33E-05	-2.28	0.023	0.085	<0.001
Age dog	4.04E-02	1.32E-02	3.07	0.002		
Disobedience on walks	-1.56E-01	6.22E-02	-2.51	0.013		
Aggression people* children	-8.81E-01	2.75E-01	-3.2	0.001		
Intercept	1.68E+00	6.62E-02	25.42	<0.001		
<i>Galgos</i> (UV=9)						
Age dog	-7.94E-01	2.06E-01	-3.86	<0.001	0.244	<0.001
Presence of children	-3.92E-01	1.55E-01	-2.53	0.012		
Disobedience on walks	-2.35E-01	1.11E-01	-2.12	0.036		
Sex dog-SF	-1.48E+00	5.29E-01	-2.79	0.006		
Sex dog-CM	-1.33E+00	5.30E-01	-2.50	0.014		
Age dog* sex dog-SF	8.38E-01	2.07E-01	4.05	<0.001		
Age dog* sex dog-CM	8.29E-01	2.07E-01	4.00	<0.001		
Adoption length* harmful animals	-4.84E-04	1.30E-04	-3.72	<0.001		
Adoption length* children	4.30E-04	2.03E-04	2.12	0.035		
Adoption length* disobedience on walks ^a	3.03E-03	1.59E-04	1.90	0.059		
Intercept	3.17E+00	5.33E-01	5.96	<0.001		
Non-sighthound non- <i>podenco</i> dogs (UV=20)						
Adoption length	3.69E-04	1.69E-04	2.19	0.031	0.397	<0.001
Disobedience on walks	-3.25E-01	1.18E-01	-2.76	0.007		
Chronic health problem	-1.25E+00	6.32E-01	-1.98	0.051		
Aggression people	-1.44E+00	4.18E-01	-3.45	<0.001		
Aggression people* children	-1.07E-01	4.25E-01	-2.53	0.013		
Aggression people* owner's gender F	9.63E-01	4.17E-01	2.31	0.023		
Chronic health problem* sex dog-IM	3.53E+00	1.03E+00	3.42	<0.001		
Chronic health problem* sex dog-SF	1.63E+00	6.73E-01	2.42	0.018		
Adoption length* chronic health problem	-3.56E-04	1.28E-04	-2.77	0.007		
Adoption length* aggression people	2.62E-04	1.17E-04	2.24	0.027		
Adoption length* age dog	-3.84E-05	1.60E-05	-2.40	0.018		
Intercept	1.74E+00	4.96E-01	3.51	<0.001		

^a, variable included in the final model, but not significantly affecting satisfaction; *, interaction between the two variables. C, castrated; F, female; I, intact; M, male; S, spayed; UV, missing values.

increase the risk of accidents. It is interesting to note that, for destructiveness and inadequate behavior on the leash, as well as for all the BPs whose likelihood of expression was significantly affected by dog's (estimated) age, older dogs were less likely to show the BPs. The age of the dog was also among the variables increasing satisfaction in the overall sample, but decreasing it for *galgos*, who are usually rescued/adopted as adults, being often relinquished after their first hunting season [23]. This highlights the important role veterinary practitioners can have in educating the public toward responsible adoption/ownership, as, left on their own, people prefer to adopt younger dogs [22], who are more likely to show some satisfaction decreasing BPs.

When individual BPs were analyzed, among aggressive behaviors, which are usually associated with decreased satisfaction and relinquishment [22], only aggression toward unfamiliar dogs and predatory behavior toward small dogs, and not aggression toward any category of people, decreased satisfaction. Moreover, when the effects of the composite behaviors were analyzed, neither the CBI aggressive behavior against people *per se* nor the CBI harmful behavior towards other animals decreased satisfaction in the overall sample, although it did so in the NSNP dogs' sample. This is surprising, because aggression toward people can have serious health and legal consequences. One explanation could be that the dogs reported to be aggressive toward people in the sample, had low intensity aggression, as no detail on the severity of the aggression was asked in the survey, whereas dogs with higher intensity aggression were less represented as they were more likely to have been already relinquished. Alternatively, people having adopted a dog being aggressive toward people could have been informed of such a serious problem in advance by shelter staff, and therefore may not have experienced any satisfaction decreasing breach of expectation. However, both in the overall sample and in the NSNP dogs' sample, aggressive behavior toward people understandably decreased satisfaction when in interaction with the presence of children, probably because of the higher risk posed by the presence of more vulnerable possible victims.

The present study has some limitations that are common to all studies based on self-reporting volunteers [2, 13, 24], and some that may be peculiar to it, such as the total length of the questionnaire (which some people complained about). Moreover, sample size (n° 191 *galgos*), is not big, but the adoption of such dogs is a relatively recent niche phenomenon here, so it difficult to recruit a big sample of respondents. In the Veneto region, on about 915,000 censed dogs, *galgos* represent approximately the 0.15% of the

Table 4. Factors predicting behaviors associated with increased or decreased satisfaction in the final logistic regression model in the overall sample (behaviours with owner-related predictors)

Behavioral problem	UV	Factor	P value	Effect	Odds ratio (ExpB)	97.5% CI for ExpB		Pred %	Model LRT (Pr (> χ^2))
						Lower	Upper		
Aggressive behavior –unfamiliar dogs	2	Dog's age	0.007	Older +	1,130	1,034	1,237	87.29	<0.001
		Owner's age	0.050	Older -	0.973	0.946	0.999		
		Dog's type	0.005	Ref. Cat. NSNP					
			<0.001	<i>Galgos</i> -	0.260	0.114	0.553		
Being always too active	0	Adoption length	0.016	Longer +	10,009	10,002	10,016	89.56	<0.001
		Owner's age	0.057	Older +	1,030	1,000	1,063		
		Dog's age	0.001	Older -	0.673	0.517	0.838		
		Dog's type	0.044	Ref. Cat. NSNP					
			0.017	<i>Galgos</i> -	0.344	0.138	0.817		
Predatory behavior –small dogs	4	Owner's age	0.021	Older +	1,030	1,000	1,064	90.00	<0.05
Shadowing the owner	2	Adoption length	<0.001	Longer -	0.9995	0.9992	0.9998	67.96	<0.001
		Owner's age	0.042	Older -	0.979	0.960	0.999		
		Dog's type	0.091	Ref. Cat. NSNP					
			0.018	<i>Galgos</i> -	0.551	0.336	0.890		

C, castrated; CI, confidence interval; ExpB, exponent of beta coefficient; F, female; I, intact; LRT, likelihood ratio test vs. null model; M, male; NSNP, non-sighthound non-*podenco* dogs; S, spayed; UV, missing values; -, decreases probability; +, increases probability.

Table 5. Factors predicting behaviors associated with decreased satisfaction in the final logistic regression model in the overall sample (behaviours with no owner-related predictors)

Behavioral problem	UV	Factor	P value	Effect	Odds ratio (ExpB)	97.5% CI for ExpB		Pred %	Model LRT (Pr (> χ^2))
						Lower	Upper		
Destructivity (not linked to being left alone)	3	Dog's sex	0.048	Ref. Cat. IF				94.18	<0.001
			0.029	SF -	0.165	0.032	0.872		
		Dog's age	<0.001	Older -	0.773	0.600	0.935		
		Dog's type	<0.001	Ref. Cat. NSNP					
			0.031	<i>Galgos</i> -	0.290	0.086	0.860		
			0.008	<i>Podencos</i> +	7,290	1,576	32,105		
Eating inedible materials / objects	2	Dog's age	<0.001	Older -	0.785	0.681	0.888	86.46	<0.001
		Dog's type	0.035	Ref. Cat. NSNP					
			0.026	<i>Galgos</i> -	0.463	0.232	0.908		
Inadequate behavior on the leash	2	Dog's age	0.056	Older -	0.922	0.846	0.999	78.18	<0.001
		Dog's type	<0.001	Ref. Cat. NSNP					
			<0.001	<i>Galgos</i> -	0.271	0.149	0.481		
Problems when left alone	2	Dog's age	0.036	Older -	0.887	0.788	0.987	87.29	<0.05

C, castrated; CI, confidence interval; ExpB, exponent of beta coefficient; F, female; I, intact; LRT, likelihood ratio test vs. null model; M, male; NSNP, non-sighthound non-*podenco* dogs; S, spayed; UV, missing values; -, decreases probability; +, increases probability.

population (Michele Bricchese, DVM, personal communication). However, as the *Galgo Español* is a rare breed in Italy (i.e., only one recognized breeder in the country, and only 26 puppies officially registered between 2010 and 2018 in Italy, <https://www.enci.it/>) the almost totality of such 0.15% are very likely to be rescued *galgos* from Spain.

The possible limitation notwithstanding, the present study is, to our knowledge, the first to give an insight on the factors associated with an increase or a decrease in owners' satisfaction for the population of adopted rescued *galgos* from Spain. Further studies investigating other factors possibly influencing owners' satisfaction and retention of the dog in *galgos* from Spain as well as in different sub-populations of adopted dogs are needed.

CONFLICT OF INTEREST. The authors declare no conflicts of interest.

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