



# Exploring domestic cat behavior using the Fe-BARQ

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## ABSTRACT

The Fe-BARQ is a survey tool that has been validated within a Spanish population. Its aim is to enhance our comprehension of feline behavior through owner-reported assessments. This study scrutinized the impact of cat attributes, environmental elements, and owner experience on these evaluations. Among the reported behaviors, 83% of owners (N = 661) noted their cats' curiosity towards new stimuli, while only 88% (N = 703) reported rare instances of inappropriate spraying. Our analysis revealed significant variations in behaviour attributed to factors such as breed, gender, reproductive status, age at acquisition, source of acquisition, and living environment. Home attributes, sleep habits, solitary time, and other pets in the household also had an impact. Furthermore, the owner's prior experience with cats and their perception of feline behavioural problems played a role in shaping these behaviours. Understanding these patterns is crucial in comprehending typical cat behaviour and identifying factors - environmental, developmental, or genetic - that could contribute to behavioural issues, potentially impacting human-cat relationships. These insights offer prospective owners a glimpse into life with a cat, aiding them in managing behavioural challenges. Additionally, they help in gauging cat welfare by assessing playfulness, changes in elimination patterns, aggression, and stress-related behaviours. These findings highlight the impact of an owner's experience and perception of behavioural issues, emphasising the need for effective counselling by veterinarians. Understanding these patterns is essential not only for comprehending cat behaviour but also for promoting healthier and more harmonious human-feline interactions.

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## Introduction

The domestic cat (*Felis silvestris catus*) is one of the most popular companion animal species worldwide, outnumbering other types of pets such as dogs, birds, or small mammals. According to the 2023–2024 APPA National Pet Owners Survey, 66% of US households own a pet, which equates to 86.9 million homes, of which 46.5 million own a cat, the second most popular pet (Pet Industry Market Size, Trends & Ownership Statistics, n.d.). In Europe, according to The European Pet Food Industry, FEDIAF (FEDIAF | Statistics, n.d.), 90 million households in the EU (46% of households) own a pet, with pet cats being the most common companion animal, with 113 million cats. These figures suggest that humans are very fond of cats, a species that has lived with us for thousands of years. Nevertheless, the number of cats that are surrendered annually continues to grow,

with approximately 3.2 million cats entering US shelters each year (ASPCA, 2023). There are no official data for Europe, but the 2022 annual report of Fundación Affinity for Spain estimates that at least 118,352 cats were surrendered (Fundación Affinity, 2023) and, more worryingly, behavior problems top the list of reasons why cats are surrendered (Fatjó et al., 2015; Mundschauf and Suchak, 2023).

Although behavioral issues are quite common among domestic cats (Hammerle et al., 2015), owners are often reluctant to ask for help when their relationship with their cat is in difficulty (Herron, 2010; Grigg et al., 2019). Owners tend to report relatively few feline behavior problems, and those reported are mostly related to elimination problems or destructive behavior (Grigg et al., 2019). Sometimes, these behaviors are a sign of owners' misunderstanding of cat biology and behavior (Bradshaw, 2018). Also, owners' reactions to problem behaviors are not always appropriate, which may result in the problem getting worse. Unfortunately, in contrast to dog owners, cat owners often seem to ignore the advice of veterinary behaviorists who may be able to help with feline behavior problems.

The Fe-BARQ (Duffy et al., 2017) is a survey instrument designed to improve understanding of feline behavior among cat owners and breeders, animal shelters and adoption centers, behavior counselors,

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and cat researchers. Even within the limitations of any owner-directed questionnaire, it has been shown to be an internally consistent and valid questionnaire instrument for evaluating behavior and behavior problems (as evaluated by owners) in pet cats based on owner reports, both in the US (Duffy et al., 2017) and Spain (Menor-Campos et al., 2021).

Increasing knowledge about cat behavior is likely to be beneficial for both current and future cat owners, as it enables them to make informed decisions when deciding to acquire a cat or when dealing with an existing one. Moreover, clinicians can detect changes in behavior that may indicate medical conditions or welfare issues and provide proper guidance to cat owners. The goal of this research was to analyze the behavior of cats as reported by their owners and investigate the influence of cat characteristics, environmental conditions, and owner experience on these behavioral reports, thereby contributing to a better understanding of cat behavior and the factors that influence it.

## Methods

### Questionnaire

The Spanish version of the Fe-BARQ (Menor-Campos et al., 2021), a survey instrument for obtaining quantitative behavioral evaluations of pet cats from their owners (Duffy et al., 2017), was used to collect information on cat behavior from their owners in Spain. Each behavioral item in the questionnaire consists of a 5-point, ordinal rating scale describing the frequency (e.g., never, rarely, sometimes, usually, always) from 0—never to 4—always with which the behavior had been observed in the recent past (i.e., in the last few months). Survey participants were also asked to provide a range of background information about their cat (see Tables 1–3).

The full questionnaire is provided as [Supplementary Material](#).

### Procedure

Google Forms® technology ([www.google.com/forms](http://www.google.com/forms)), a tool to design online surveys, was used to collect the data. Survey participation was solicited via a variety of cat- and pet-related websites

and blogs. Cat owners were asked to complete the survey for only one cat per household.

### Behavior analysis

Descriptive analyses of cats' behavior reported were performed, providing the 10 most and least common behaviors of household cats. Fe-BARQ scores were analyzed by cat, following the extracted factor of the Spanish validation of the questionnaire (for more info regarding the factors and factor loadings, please read Menor-Campos et al. [2021]) and environmental characteristics, as well as owners' previous experience and perceptions of cat behavior.

### Ethical code

Under the requirements of the host institution, this study did not require ethical approval. However, before data collection, authors provided information to participants about the purpose of the study, the process of data collection, and the use of data, specifying that no personally identifying data would be collected. Participants were informed that completion of the questionnaire would be considered as a written consent and were free to withdraw from data collection at any time.

The study was carried out in accordance with “The European Code of Conduct for Research Integrity” (ALLEA, 2023) and the Code of Ethics of the University of Cordoba, Spain (Universidad de Córdoba, 2015).

### Statistical analyses

All statistical analyses were performed using the SPSS 22.0 software (Armonk, NY, USA). Due to the ordinal nature of the data, nonparametric analyses were conducted: Kruskal-Wallis, Mann-Whitney U, and Spearman's Rho. An a priori significance level was set at  $P < 0.05$ . When a Kruskal-Wallis test produced a significant difference, the Dunn test with Bonferroni correction was used to perform pairwise comparisons.

**Table 1**  
Demographic characteristics of the cat sample population.

| Variable                    | Groups                   | N   | %    | Variable       | Groups                      | N   | %    |
|-----------------------------|--------------------------|-----|------|----------------|-----------------------------|-----|------|
| Age                         | Kitten (2–6 mo)          | 28  | 3.5  | Breed          | European common             | 191 | 44.6 |
|                             | Junior (6 mo–2 y)        | 220 | 27.1 |                | Siamese                     | 66  | 15.4 |
|                             | Adult (3–10 y)           | 467 | 57.6 |                | Persian                     | 37  | 8.6  |
|                             | Senior (more than 10 y)  | 96  | 11.8 |                | Mongrel                     | 35  | 8.2  |
| Sex and reproductive status |                          |     |      |                | Russian blue                | 12  | 2.8  |
|                             | Female neutered          | 328 | 40.4 |                | British shorthair           | 12  | 2.8  |
|                             | Female non-neutered      | 48  | 5.9  |                | Maine Coon                  | 12  | 2.8  |
|                             | Male neutered            | 402 | 49.6 |                | Turkish Angora              | 7   | 1.6  |
|                             | Male non-neutered        | 33  | 4.1  |                | Norwegian forest            | 7   | 1.6  |
| When acquired               |                          |     |      |                | Ragdoll                     | 7   | 1.6  |
|                             | Kitten (2–6 mo)          | 436 | 53.8 |                | Carey                       | 4   | 0.9  |
|                             | Unweaned kitten (< 2 mo) | 247 | 30.5 |                | Himalayan                   | 4   | 0.9  |
|                             | Junior (6 mo–2 y)        | 93  | 11.5 |                | Sphynx                      | 3   | 0.7  |
|                             | Mature (3–10 y)          | 30  | 3.7  |                | Oriental Shorthair          | 3   | 0.7  |
|                             | Senior (> 10 years)      | 4   | 0.5  |                | Others (N less than 3 each) | 28  | 6.5  |
|                             |                          |     |      | Where acquired | Street (as a stray)         | 334 | 41.4 |
|                             |                          |     |      |                | Friend                      | 203 | 25.2 |
|                             |                          |     |      |                | Shelter                     | 133 | 16.5 |
|                             |                          |     |      |                | Home (born at)              | 42  | 5.2  |
|                             |                          |     |      |                | Breeding cattery            | 34  | 4.2  |
|                             |                          |     |      |                | Veterinary hospital         | 23  | 2.9  |
|                             |                          |     |      |                | Pet store (purchase)        | 21  | 2.6  |
|                             |                          |     |      |                | Pet store (rescue)          | 17  | 2.1  |

**Table 2**  
Environmental and lifestyle.

| Variable                   | Groups                                      | N   | %    | Variable                             | Groups   | N   | %    |
|----------------------------|---|-----|------|--------------------------------------|--|-----|------|
| <i>Home environment</i>    |   |     |      | <i>Life style</i>                    |  |     |      |
|                            | Apartment/Condo                             | 465 | 59.5 |                                      | Indoors only   | 404 | 49.9 |
|                            | House                                       | 250 | 32   |                                      | Indoors with controlled or supervised access to outdoors | 275 | 34   |
|                            | Country house                               | 52  | 6.7  |                                      | Indoors with free access to garden/backyard/terrace only | 114 | 14.1 |
|                            | Breeding cattery                            | 4   | 0.5  |                                      | Outside only (no access indoors)                         | 6   | 0.7  |
|                            | Veterinary clinic                           | 3   | 0.4  |                                      | Outside with indoors access                              | 3   | 0.4  |
|                            | Other                                       | 3   | 0.4  |                                      | Others   | 7   | 0.9  |
|                            | Foster house                                | 3   | 0.4  |                                      |  |     |      |
|                            | Shelter                                     | 1   | 0.1  |                                      |  |     |      |
| <i>Cat &amp; Dog house</i> |   |     |      | <i>Multicat house</i>                |  |     |      |
|                            | No  | 488 | 60.2 |                                      | No   | 271 | 33.7 |
|                            | Yes   | 322 | 39.8 |                                      | Yes  | 533 | 66.3 |
| <i>Where cat sleeps</i>    |   |     |      | <i>Home alone (hours per day)</i>    |  |     |      |
|                            | In bedroom on bed (with a household member) | 504 | 62.2 |                                      | Less than 1 h  | 96  | 12   |
|                            | In another room in house                    | 153 | 18.9 |                                      | 1–2 h  | 115 | 14.3 |
|                            | Other                                       | 73  | 9    |                                      | 2–4 h  | 184 | 22.9 |
|                            | In bedroom but not on bed                   | 55  | 6.8  |                                      | 4–6 h  | 156 | 19.5 |
|                            | Outside free-ranging                        | 23  | 2.8  |                                      | 6–8 h  | 176 | 21.9 |
|                            | Caged or confined in part of the house      | 2   | 0.2  |                                      | 8–12 h   | 69  | 8.6  |
|                            |   |     |      |                                      | More than 12 h   | 6   | 0.7  |
| <i>First cat owner</i>     |   |     |      | <i>Perceived behavioral problems</i> |  |     |      |
|                            | No  | 518 | 64   |                                      | Serious problems   | 9   | 1.1  |
|                            | Yes   | 292 | 36   |                                      | Moderate problems  | 63  | 7.8  |
|                            |   |     |      |                                      | Only minor problems                                      | 198 | 24.4 |
|                            |   |     |      |                                      | No behavioral problems                                   | 541 | 66.7 |

## Results

### Sample characteristics

A total of 816 owners completed the online survey. The sex ratio of sampled cats was close to parity, with males ( $N = 435$ ; 53.1%) slightly outnumbering females ( $N = 376$ ; 46.9%). Most cats were neutered ( $N = 402$ , 92.55% of male cats;  $N = 328$ , 86.68% of female cats), and owners reported that the cats had been neutered primarily to control population ( $N = 382$ ; 52.4%), or to prevent or diminish marking behavior ( $N = 148$ ; 20.3%), among other reasons. Most cats were considered adults ( $N = 467$ ; 57.6%) with ages ranging from 3 to 10 years ( $5.74 \pm 4.12$  years). The most common type of breed was the domestic shorthair mixed breed cat ( $N = 572$ ; 73%). The most common pure breeds were European shorthair ( $N = 141$ ; 44.6%), Siamese ( $N = 66$ ; 15.4%), and Persian ( $N = 37$ ; 8.6%).

### Most common cat behaviors

The 10 most commonly reported cat behaviors were related to their interest in actively investigating/exploring new objects, sights, or changes in their environment (82% of cats scored as *always* or *usually*) and purring when petted (81%) (see Table 3 for details regarding the most frequent behaviors reported. A comprehensive table is provided with the percentage of all items as Appendix A).

### Least common cat behaviors

Seven behaviors were reported to never or seldom happen by more than 90% of owners (Table 4). Performing spraying (standing position with tail raised vertically) outside of the litter box or on other surfaces and objects (e.g., furniture, walls, people's legs, etc.) indoors was the most unusual behavior (86% of owners reported that their cats had never done this), following by exhibiting sudden frantic licking or chewing (83%) and self-mutilation or hair barbering (pulls fur with teeth, vigorously nibbles, and/or licks its body parts) (83%; see Table 4 for more details regarding the most unusual behaviors reported).

### Differences on Fe-BARQ responses

Fe-BARQ scores varied widely depending on cats' characteristics such as breed, sex, age of acquisition, or place of acquisition. The current environment, including type of home, the time that cats spent alone in the home, whether dog(s) were present in the house, or the place where the cat chose to sleep also influenced Fe-BARQ item scores. Finally, owners' previous experiences and perceptions of cat behavioral problems were found to influence item scores.

### Behaviors associated with cats' characteristics: Breed, sex, age of acquisition, and source of acquisition

The more common cat breeds owned by respondents were European shorthair ( $n = 191$ ), Siamese ( $n = 66$ ), and Persian ( $n = 37$ ). Judging by the reported behaviors, Siamese cats were reported to have more sociable behavior than Persian cats and to have higher fear of novelty and separation-related behaviors than European shorthair cats (Table 5).

Cats' sex influenced the behavior of cats reported by Fe-BARQ (Table 6). Female cats were reported to show higher levels of aggressiveness, whether toward strangers, owners or other cats, and higher levels of fear toward dogs and cats than male cats. Male cats were reported to show higher levels of sociability toward people and other cats and were more vocal than females. They were also reported to be more trainable, more likely to display separation-related behavior problems, and to show a greater frequency of elimination problems.

Regarding reproductive status (Table 7), non-neutered female cats were reported to show more playful behavior and to be more willing to play with objects. They were also less prone to attack other familiar cats. In males, some differences were reported as well. Non-neutered male cats were reported to be less prone to play with objects and showed less prey interest than neutered male cats.

The younger the cat was when acquired, the higher the frequency of behaviors it showed related to play or hunting (Table 8). Cats acquired as unweaned kittens were more prone to show stranger aggression than those acquired as juveniles and more likely to display excessive grooming than those acquired as adults. On the other

**Table 3**  
The 10 most frequent cat behaviors reported.

| Item ID  | Valid answers | % Always | % Usually | % Sometimes | % Seldom | % Never | % Unknown | % Always + usually |
|--|---------------|----------|-----------|-------------|----------|---------|-----------|--------------------|
| 2. Curious: actively investigates/explores new objects, sights, or changes in its environment.                       | 794           | 59.57    | 23.15     | 10.39       | 5.63     | 0.63    | 0.63      | 82.73              |
| 26. Purrs when stroked or petted.  | 807           | 51.73    | 29.70     | 10.40       | 5.45     | 2.60    | 0.12      | 81.44              |
| 23. Asks (vocalizes, walks toward door, makes noise) to be let outside or in and out of rooms.                       | 790           | 51.87    | 26.68     | 10.22       | 5.49     | 4.24    | 1.50      | 78.55              |
| 29. Seeks out physical contact with you or other household members when you/they are sitting or lying down.          | 800           | 40.38    | 35.38     | 15.63       | 6.13     | 2.50    | 0.00      | 75.75              |
| 24. Asks (vocalizes, walks toward its bowl or food source, makes noise) for food when hungry.                        | 787           | 53.26    | 21.18     | 10.65       | 6.27     | 7.27    | 1.38      | 74.44              |
| 28. Nudges and/or nuzzles you or other members of the household when you are sitting or lying down.                  | 800           | 37.78    | 36.16     | 15.71       | 5.49     | 4.61    | 0.25      | 73.94              |
| 8. Stalks, chases, or pounces on moving objects (string, balls, soft toys, etc.) during playful activity.            | 799           | 38.61    | 33.87     | 15.69       | 8.97     | 2.37    | 0.50      | 72.48              |
| 92. Readily adapts to changes in daily routines (schedules, replacement, or rearrangement of objects and furniture). | 753           | 40.40    | 30.99     | 12.67       | 7.65     | 2.76    | 5.52      | 71.39              |
| 27. Purrs when sitting/lying on someone's lap.   | 775           | 41.24    | 29.26     | 14.00       | 7.94     | 5.30    | 2.27      | 70.49              |
| 63. Comes when called  | 806           | 27.14    | 42.01     | 21.31       | 6.94     | 2.48    | 0.12      | 69.14              |

The 10 items with the highest frequency, calculated as an aggregate value of the percentages “always” plus “usually,” have been selected. Original and aggregate percentages are shown.

**Table 4**  
The 10 least frequent cat behavior reported.

| Item ID  | Valid answers | % Always | % Usually | % Sometimes | % Seldom | % Never | % Unknown | % Never + seldom |
|--|---------------|----------|-----------|-------------|----------|---------|-----------|------------------|
| 88. Sprays (standing position with tail raised vertically) outside of the litter box or on other surfaces and objects (e.g., furniture, walls, people's legs, etc.) indoors. | 791           | 0.62     | 1.99      | 3.60        | 4.72     | 87.33   | 1.74      | 92.05            |
| 76. Exhibits sudden frantic licking or chewing.  | 795           | 0.37     | 1.49      | 4.84        | 8.57     | 83.48   | 1.24      | 92.05            |
| 81. Defecates outside of the litter box or in other inappropriate areas indoors  | 799           | 1.61     | 2.11      | 3.35        | 8.05     | 83.89   | 0.99      | 91.95            |
| 75. Exhibits self-mutilation, hair barbering (pulls fur with teeth, vigorously nibbles, and/or licks its body parts).  | 796           | 1.50     | 2.62      | 4.12        | 7.87     | 83.27   | 0.62      | 91.14            |
| 39. Chases, grabs onto, or attacks people's legs or feet in movement (in a nonplayful way).  | 797           | 1.13     | 2.63      | 5.01        | 8.26     | 82.73   | 0.25      | 90.99            |
| 100. Chews or damages inappropriate objects when left alone at home (destructive behavior).  | 793           | 0.25     | 2.11      | 5.96        | 10.42    | 79.65   | 1.61      | 90.07            |
| 37. Growls, hisses, scratches, or bites when stroked along the back or spine.  | 803           | 0.87     | 2.24      | 6.72        | 10.95    | 79.10   | 0.12      | 90.05            |
| 58. Sulks, hides, and/or slinks away when you or another household member prepares to leave the home.  | 800           | 2.10     | 2.60      | 7.18        | 8.54     | 78.59   | 0.99      | 87.13            |
| 79. Shows strange repetitive movements (pacing, walking) from one place to another (short distances).  | 770           | 0.63     | 2.38      | 6.75        | 11.00    | 75.50   | 3.75      | 86.50            |
| 80. Urinates (crouching position) outside of the litter box or in other  | 789           | 3.00     | 4.26      | 5.26        | 10.76    | 75.47   | 1.25      | 86.23            |

The 10 items with the lowest frequency, calculated as an aggregate value of the percentages “never” plus “seldom,” have been selected. Original and aggregate percentages are shown.

**Table 5**

Fe-BARQ extracted factor medians by cats' breed for European Shorthair, Siamese, and Persian cats.

| Fe-BARQ extracted factors                                     | Medians        |                   |                    |
|---|----------------|-------------------|--------------------|
|   | Persian        | Siamese           | European shorthair |
| Playfulness/activity  | 2.4            | 2.56              | 2.33               |
| Play with object  | 1.67           | 1.67              | 1                  |
| Sociability   | 1.43           | 1.845             | 1.57               |
| Directed calls/vocalizations                                  | 3              | 3                 | 2.75               |
| Purring   | 4              | 3.5               | 3.5                |
| Attention-seeking   | 3.5            | 3                 | 3                  |
| Sociability with cats   | 0              | 0                 | 0.67               |
| Stranger-directed aggression                                  | 0              | 0                 | 0                  |
| Touch sensitivity/owner-directed aggression                   | 0 <sup>a</sup> | 0.5 <sup>a</sup>  | 0.25               |
| (Kruskal-Wallis $x = 7.39$ ; $P = 0.025$ ; Adj $P = 0.02$ )   |                |                   |                    |
| Resistance to restraint                                       | 0.6            | 0.775             | 0.5                |
| Familiar cat aggression                                       | 0.25           | 0                 | 0                  |
| Familiar dog aggression                                       | 0.1            | 0.4               | 0.8                |
| Nonfamiliar dog aggression                                    | 0.5            | 1.5               | 1                  |
| Fear of unfamiliar dogs/cats                                  | 0.25           | 2                 | 1.5                |
| Fear of novelty   | 1              | 1                 | 1                  |
| Separation-related behavior                                   | 0.33           | 0.33              | 0.4                |
| Trainability  | 2.67           | 2.67              | 2.5                |
| Predatory behavior  | 2              | 2                 | 2.5                |
| Prey interest   | 1.5            | 2 <sup>b</sup>    | 3 <sup>b</sup>     |
| (Kruskal-Wallis $x = 10.33$ ; $P = 0.006$ ; Adj $P = 0.015$ ) |                |                   |                    |
| Location preference for resting/sleeping                      | 1.5            | 1.5               | 1.5                |
| Excessive/compulsive self-grooming                            | 0.33           | 0.33 <sup>c</sup> | 0 <sup>c</sup>     |
| (Kruskal-Wallis $x = 6.63$ ; $P = 0.036$ ; Adj $P = 0.04$ )   |                |                   |                    |
| Other compulsive behaviors                                    | 1              | 1.25              | 1                  |
| Inappropriate elimination                                     | 0              | 0                 | 0                  |

K-W Kruskal-Wallis test and  $P$  values are provided when significant differences were found ( $P < 0.05$ ). Superscripts a, b, and c show pairwise differences (Adj.  $P < 0.05$ ).

hand, those cats acquired when adults showed less hunting behavior and prey interest than younger cats. Post-hoc analysis found no differences in other behaviors, such as touch sensitivity, separation-related behavior, or trainability, even though the Kruskal-Wallis test did.

Source of acquisition seems to have some effects. There was reduced attention-seeking behavior among cats acquired from a friend/relative/neighbor (median = 3) than among those born in their current homes (median = 3.5) (Kruskal-Wallis test  $\chi^2 = 17.53$ ;  $P = 0.025$ ; Adj.  $P = 0.025$ ), and reduced touch sensitivity in cats acquired from breeders (median = 0) compared with those acquired from shelters (median = 0.25), friends/relatives/neighbors (median = 0.25), veterinary clinics, off the street (as strays) or from pet shops (median = 0.5) (Kruskal-Wallis test  $\chi^2 = 36.74$ ;  $P < 0.001$ ; Adj.

**Table 6**

Fe-BARQ extracted factor by cat characteristic: sex.

| Fe-BARQ extracted factors                   | Female      |      |      |        | Male     |      |      |        | Mann-Whitney U test |         |
|---|-------------|------|------|--------|----------|------|------|--------|---------------------|---------|
|   | Medians     | Q1   | Q3   | AR     | Medians  | Q1   | Q3   | AR     | U                   | P value |
| Familiar cat aggression                     | 0.5         | 0    | 1.25 | 306.84 | 0        | 0    | 0.5  | 226.93 | 23,738.5            | <0.001  |
| Fear of unfamiliar dogs/cats                | 2           | 0    | 3    | 272.61 | 1        | 0    | 2.5  | 232.06 | 26,182              | 0.001   |
| Touch sensitivity/owner-directed aggression | <b>0.25</b> | 0    | 1    | 425.77 | 0.25     | 0    | 1    | 388.91 | 74,345              | 0.02    |
| Stranger-directed aggression                | <b>0</b>    | 0    | 1    | 416.25 | 0        | 0    | 0.5  | 384.94 | 72,992.5            | 0.023   |
| Inappropriate elimination                   | 0           | 0    | 0.33 | 385.22 | <b>0</b> | 0    | 0.33 | 421.11 | 88,380.5            | 0.009   |
| Directed calls/vocalizations                | 3           | 2    | 3.5  | 383.95 | <b>3</b> | 2.25 | 3.5  | 421.11 | 90,069.5            | 0.012   |
| Sociability                                 | 1.5         | 0.57 | 2.6  | 380.26 | 2        | 0.71 | 3    | 427.26 | 91,028.5            | 0.004   |
| Separation-related behavior                 | 0.33        | 0    | 0.83 | 376.62 | 0.4      | 0    | 1    | 428.41 | 91,527              | 0.001   |
| Trainability                                | 2.5         | 2    | 3    | 380.03 | 2.67     | 2    | 3.33 | 426.57 | 90,737.5            | 0.004   |
| Sociability with cats                       | 0           | 0    | 1.33 | 209.4  | 1        | 0    | 2    | 263.09 | 34,432              | <0.001  |

Mann-Whitney  $U$  test and  $P$  values when significant differences were found ( $P < 0.05$ ). Q1, Q3, and AR (average ranks) are given to show which group predominates. Bold values indicate which group predominates.

**Table 7**

Fe-BARQ extracted factors by cat characteristic: reproductive status (neutered vs. non-neutered).

| Fe-BARQ extracted factors | Medians  |              | Mann-Whitney U test |         |
|---------------------------|----------|--------------|---------------------|---------|
|                           | Neutered | Non-neutered | U                   | P value |
| Female cats               |          |              |                     |         |
| Playfulness/activity      | 2.22     | 2.67         | 10,310              | 0.001   |
| Play with object          | 1.33     | 1.67         | 9907                | 0.004   |
| Familiar cat aggression   | 0.5      | 0            | 2022.5              | 0.013   |
| Male cats                 | Neutered | Non-neutered | U                   | P value |
| Playfulness/activity      | 2.4      | 2.8          | 7979                | 0.049   |
| Prey interest             | 2        | 1.5          | 3923                | 0.005   |

Mann-Whitney  $U$  test and  $P$  values when significant differences were found ( $P < 0.05$ ).

$P < 0.025$ ). Cats acquired from a breeder showed less frequent compulsive behaviors (median = 0) than those acquired from a shelter (median = 1) (Kruskal-Wallis test  $\chi^2 = 19.26$ ;  $P = 0.014$ ; Adj.  $P = 0.02$ ).

*Environmental influence on cats' behavior: Type of home, sleep preferences, time alone, and cat/dog house*

Type of housing showed some influence on cats' behavior (Table 9). Cats living in a house in the countryside were reported to be less playful than those living in flats/apartments and showed more frequent hunting-related behavior. Meanwhile, cats living in flats/apartments were reported to show more fear of novelty than those living in urban houses.

The time that cats spend alone at home affected the frequency of some compulsive behaviors reported using the Fe-BARQ, with those spending from 4 to 8 hours alone showing higher compulsive behaviors than those spending up to 4 hours alone (Kruskal-Wallis test  $\chi^2 = 12.18$ ;  $P = 0.007$ ; Adj.  $P = 0.015$ ).

The place that cats choose to sleep was also related to their behavior (Table 10). Cats that slept on a family member's bed were more playful with objects and showed greater prey interest than cats that slept inside the home but not on a family member's bed. Those sleeping on a family member's bed also displayed higher rates of directed vocalizations, more attention-seeking, greater fear of novelty, and higher rates of separation-related behavior problems than cats that slept inside but not on beds. Cats that slept outside the home showed more hunting behavior but lower prey interest than those that slept inside the house, whether on a family member's bed or not. Although Kruskal-Wallis test was significant for the sleeping preferences factor, post-hoc analysis found no differences between pairs.

Sharing the home with a dog or dogs exerted a strong influence on cat behavior (Table 11). Cats living in houses with dogs were

**Table 8**

Fe-BARQ factor medians by cat's age of acquisition when Kruskal-Wallis test found any differences.

| Fe-BARQ factors/age at acquisition          | Unweaned kitten   | Kitten            | Junior            | Adult                 | Senior | Kruskal-Wallis test | P value | Adj. P value |
|---|-------------------|-------------------|-------------------|-----------------------|--------|---------------------|---------|--------------|
| Playfulness/activity                        | 2.5 <sup>a</sup>  | 2.33 <sup>b</sup> | 2.33              | 1.95 <sup>a,b</sup>   | 1.35   | $\chi^2 = 19.83$    | 0.001   | < 0.03       |
| Play with object                            | 1.33 <sup>c</sup> | 1.33 <sup>d</sup> | 1.33 <sup>e</sup> | 0.33 <sup>c,d,e</sup> | 0.165  | $\chi^2 = 23.27$    | < 0.001 | < 0.01       |
| Stranger-directed aggression                | 0 <sup>f</sup>    | 0                 | 0 <sup>f</sup>    | 0                     | 0.165  | $\chi^2 = 17.08$    | 0.004   | 0.002        |
| Touch sensitivity/owner-directed aggression | 0.25              | 0.25              | 0.25              | 0                     | 0.625  | $\chi^2 = 12.18$    | 0.032   | -            |
| Separation-related behavior                 | 0.5               | 0.33              | 0.2               | 0.17                  | 0      | $\chi^2 = 14.13$    | 0.015   | -            |
| Trainability                                | 2.67              | 2.67              | 2.67              | 2                     | 2      | $\chi^2 = 12.77$    | 0.026   | -            |
| Predatory behavior                          | 2 <sup>g</sup>    | 2 <sup>h</sup>    | 2.5 <sup>i</sup>  | 1 <sup>g,h,i</sup>    | 1      | $\chi^2 = 20.55$    | 0.001   | < 0.01       |
| Prey interest                               | 2.5 <sup>j</sup>  | 2.25 <sup>k</sup> | 2                 | 1 <sup>j,k</sup>      | 1.5    | $\chi^2 = 34.7$     | < 0.001 | < 0.001      |
| Excessive/compulsive self-grooming          | 0.33 <sup>l</sup> | 0                 | 0                 | 0 <sup>l</sup>        | 0      | $\chi^2 = 13.71$    | 0.018   | 0.028        |

Unweaned kitten (&lt; 2 months); kitten (2–6 months); junior (6 months–2 years); adult (3–10 years); senior (&gt; 10 years).

**Table 9**

Fe-BARQ extracted factor medians by environmental characteristic (type of home) when the Kruskal-Wallis test found any differences.

| Type of home               | Country house  | City house       | Apartment/Condo  | Others            | Kruskal-Wallis test | P value | Adj. P value |
|----------------------------|----------------|------------------|------------------|-------------------|---------------------|---------|--------------|
| Playfulness/activity       | 2.1            | 2.3 <sup>a</sup> | 2.4 <sup>a</sup> | 2.21 <sup>a</sup> | $\chi^2 = 10.87$    | 0.012   | < 0.02       |
| Play with object           | 1              | 1.33             | 1415             | 0.5               | $\chi^2 = 10.78$    | 0.013   | -            |
| Purring                    | 3.5            | 3.5              | 3                | 4                 | $\chi^2 = 12.06$    | 0.007   | -            |
| Fear of novelty            | 1              | 0.5 <sup>b</sup> | 1 <sup>b</sup>   | 0.25              | $\chi^2 = 15.88$    | 0.001   | < 0.001      |
| Predatory behavior         | 3 <sup>c</sup> | 2                | 2                | 1 <sup>c</sup>    | $\chi^2 = 11.02$    | 0.012   | 0.012        |
| Other compulsive behaviors | 0.5            | 1                | 1                | 0.75              | $\chi^2 = 10.18$    | 0.017   | -            |
| Inappropriate elimination  | 0              | 0 <sup>d</sup>   | 0 <sup>d</sup>   | 0.67 <sup>d</sup> | $\chi^2 = 11.46$    | 0.009   | < 0.02       |

Upper-scripts show post-hoc analysis differences. Adj P value is provided.

**Table 10**

Fe-BARQ extracted factor medians by environmental characteristic (sleeping preferences) when Kruskal-Wallis test found any differences.

| Fe-BARQ factors/sleeping preferences     | On a family bed    | Outside          | Indoors but not in a family bed | Kruskal-Wallis test | P value | Adj. P value |
|--|--------------------|------------------|---------------------------------|---------------------|---------|--------------|
| Play with object                         | 1.5 <sup>a</sup>   | 1.33             | 1 <sup>a</sup>                  | $\chi^2 = 14.25$    | 0.001   | 0.001        |
| Directed calls/vocalizations             | 3 <sup>b</sup>     | 2.75             | 2.75 <sup>b</sup>               | $\chi^2 = 19.91$    | < 0.001 | < 0.001      |
| Attention-seeking                        | 3 <sup>c</sup>     | 3.5              | 3 <sup>c</sup>                  | $\chi^2 = 12.15$    | 0.002   | 0.002        |
| Fear of novelty                          | 1 <sup>d</sup>     | 1                | 0.5 <sup>d</sup>                | $\chi^2 = 6.09$     | 0.048   | 0.042        |
| Separation-related behavior              | 0.4 <sup>e</sup>   | 0.16             | 0.25 <sup>e</sup>               | $\chi^2 = 9.43$     | 0.009   | 0.009        |
| Predatory behavior                       | 2 <sup>f</sup>     | 3 <sup>f</sup>   | 2 <sup>f</sup>                  | $\chi^2 = 8.36$     | 0.015   | < 0.03       |
| Prey interest                            | 2.5 <sup>g,h</sup> | 1.5 <sup>h</sup> | 2 <sup>g,h</sup>                | $\chi^2 = 13.1$     | 0.001   | 0.018        |
| Location preference for resting/sleeping | 2                  | 2                | 1.5                             | $\chi^2 = 6.44$     | 0.004   | -            |

Upper-script show post-hoc analysis differences. The adjusted (Adj) P value is provided.

**Table 11**

Fe-BARQ extracted factor by environmental characteristic: presence of dog.

| Fe-BARQ factors/presence of dog    | Presence of dog |      |      |               |            |      |      |               | Mann-Whitney test |         |
|------------------------------------|-----------------|------|------|---------------|------------|------|------|---------------|-------------------|---------|
|                                    | No              |      |      |               | Yes        |      |      |               | U                 | P value |
|                                    | Medians         | Q1   | Q3   | AR            | Medians    | Q1   | Q3   | AR            |                   |         |
| Playfulness/activity               | <b>2.44</b>     | 1.9  | 3    | 433.44        | 2.2        | 1.5  | 2.7  | 354.05        | 61,866            | < 0.001 |
| Play with object                   | <b>1.67</b>     | 0.67 | 2.67 | 431.17        | 1          | 0.33 | 2    | 357.51        | 62,966.5          | < 0.001 |
| Purring                            | 3.5             | 2.5  | 4    | <b>385.89</b> | <b>3.5</b> | 3    | 4    | <b>426.69</b> | 84,859            | 0.012   |
| Stranger-directed aggression       | <b>0</b>        | 0    | 1    | 417.98        | 0          | 0    | 0.25 | 362.25        | 64,195            | < 0.001 |
| Resistance to restraint            | <b>0.8</b>      | 0.2  | 1.75 | 423.27        | 0.5        | 0    | 1.33 | 366.83        | 65,831            | 0.001   |
| Familiar dog aggression            | <b>1</b>        | 0    | 2    | 288.47        | 0.4        | 0    | 1    | 226.59        | 21,426            | < 0.001 |
| Nonfamiliar dog aggression         | <b>1</b>        | 0    | 2.25 | 210.84        | 0.5        | 0    | 2    | 179.82        | 14,940.5          | 0.006   |
| Fear of novelty                    | <b>1</b>        | 0    | 2    | 428.32        | 0.5        | 0    | 1    | 344.96        | 58,765.5          | < 0.001 |
| Separation-related behavior        | <b>0.5</b>      | 0    | 1.19 | 447.65        | 0.17       | 0    | 0.63 | 329.78        | 54,136            | < 0.001 |
| Prey interest                      | <b>2.5</b>      | 1.5  | 3.5  | 401.31        | 2          | 1    | 3    | 364.68        | 64,379            | 0.025   |
| Excessive/compulsive self-grooming | <b>0.33</b>     | 0    | 0.67 | 420.2         | 0          | 0    | 0.5  | 373.04        | 67,905            | 0.002   |
| Other compulsive behaviors         | <b>1</b>        | 0.5  | 2    | 418.76        | 1          | 0    | 1.5  | 372.68        | 67,737            | 0.005   |

M-W Mann-Whitney U test; P values when significant differences were found ( $P < 0.05$ ). Q1, Q3, and AR (average ranks) are given to show which group predominates. Bold values indicate which group predominates.

reported to show more purring behavior than those living without dog contact, which were reported to show more playfulness, play with objects, prey interest, stranger-directed aggression, familiar and nonfamiliar dog-directed aggression, resistance to restraint, fear of novelty, separation-related problems, excessive grooming, and other compulsive behaviors.

### Owners influence on reported behaviors

Having had a previous cat was shown to have a strong influence on reported Fe-BARQ scores (Table 12). First-time cat owners reported higher levels of stranger aggression, touch sensitivity, resistance to restraint, familiar dog aggression, fear to novelty,



**Table 12**  
Fe-BARQ extracted factor by owners' previous experience.

| Fe-BARQ factors/owner experience            | Owner previous experience |     |      |        |             |     |      |        | Mann-Whitney test |         |
|---|---------------------------|-----|------|--------|-------------|-----|------|--------|-------------------|---------|
|   | No                        |     |      |        | Yes         |     |      |        | U                 | P value |
|   | Medians                   | Q1  | Q3   | AR     | Medians     | Q1  | Q3   | AR     |                   |         |
| Sociability with cats                       | 0.67                      | 0   | 2    | 248.92 | 0           | 0   | 1    | 211.58 | 20,472            | 0.004   |
| Stranger-directed aggression                | 0                         | 0   | 0.5  | 385.4  | <b>0</b>    | 0   | 1    | 419.11 | 78,690            | 0.019   |
| Touch sensitivity/owner-directed aggression | 0.25                      | 0   | 0.75 | 386.66 | <b>0.25</b> | 0   | 1.25 | 435.08 | 83,834            | 0.003   |
| Resistance to restraint                     | 0.6                       | 0   | 1.5  | 388.73 | 0.8         | 0.2 | 2    | 427.16 | 81,407.5          | 0.023   |
| Familiar dog aggression                     | 0.4                       | 0   | 1.2  | 234.51 | 0.8         | 0   | 1.6  | 279.22 | 32,601            | 0.001   |
| Fear of novelty                             | 0.5                       | 0   | 1.5  | 377.75 | 1           | 0   | 2    | 431.68 | 81,980.5          | 0.001   |
| Predatory behavior                          | 2                         | 1.5 | 3    | 350.37 | 2           | 1   | 3    | 313.62 | 46,049            | 0.018   |
| Excessive/compulsive self-grooming          | 0                         | 0   | 0.67 | 390.64 | 0.33        | 0   | 0.67 | 425.06 | 80,938            | 0.029   |
| Other compulsive behaviors                  | 1                         | 0   | 2    | 389.95 | 1           | 0.5 | 2    | 423.42 | 80,464.5          | 0.046   |

M-W Mann-Whitney U test; P values when significant differences were found ( $P < 0.05$ ). Q1, Q3, and AR (average ranks) are given to show which group predominates. Bold values indicate which group predominates.

excessive grooming, and other compulsive behaviors, while owners who had previously owned cats reported higher levels of social behavior toward other cats and hunting-related behaviors.

Owners' subjective perceptions of cat behavior problems were associated with the types of behavior most commonly reported in the Fe-BARQ (Table 13). Cats belonging to owners who reported experiencing no behavioral problems displayed more frequent play with objects, sociability, purring, attention-seeking behavior, and trainability than those whose owners reported experiencing minor-serious behavioral problems. As expected, these cats also showed more frequent aggression, resistance to restraint, fear of novelty, separation-related problems, excessive/compulsive self-grooming, and other compulsive behaviors, as well as inappropriate elimination behavior.

## Discussion

The Fe-BARQ is a survey instrument that was created to enhance the understanding of feline behavior among various groups, including cat owners and breeders, animal shelters and adoption centers, behavior counselors, and cat researchers. It is a 100-item, standardized, comprehensive, internally consistent, validated questionnaire instrument that evaluates behavior and owner-reported behavior problems in pet cats. The questionnaire is simple to use, takes about 10–15 minutes to fill out, and can be completed by anyone who is familiar with the target cat's behavior. Despite the obvious limitations of using an indirect, owner-reported behavioral assessment as a measure of cat behavior, the Fe-BARQ has been

validated to produce repeatable results in two separate countries, the USA (Duffy et al., 2017) and Spain (Menor-Campos et al., 2021). The Fe-BARQ is designed to reduce subjectivity by focusing on cats' overt responses to a range of specific situations and stimuli in the recent past, and so it may be a useful tool for evaluating the behavior of household cats.

Our findings help to shed light on both the normal behavior of house cats and the factors (environmental, developmental, and genetic) that contribute to the development of problem behaviors and the potential disruption of human-cat relationships. Behavior is also an excellent source of information on animal welfare and stress responses (Pajor et al., 1997), so using the Fe-BARQ may help understanding situations and conditions with which cats find it hard to cope.

By highlighting the most and the least commonly reported cat behaviors, our results may help prospective cat owners to understand what it is like having a cat in the home, and assist them in making informed and responsible decisions. For instance, owners frequently reported behaviors related to communication (vocalizations, purring), physical contact (seeking out physical contact, petting), and mutual interaction (purring when petted or on someone's lap, coming when called, attention to speech), behaviors that probably help to cement human-cat relationships (Bernstein, 2007). It is also worth pointing out that, while vocalizations have been thought to be relatively uncommon in the cat's wild ancestor, probably due to its need to be inconspicuous as both a predator and prey species (Bradshaw et al., 2012; Houpt, 2018), domestic cats may have learned or evolved a tendency to display more frequent vocal

**Table 13**  
Fe-BARQ extracted factor by owners' perception of cat's behavior.

| Fe-BARQ factors/owner perception            | Behavioral problem reported |      |      |        |         |      |      |        | Mann-Whitney test |         |
|---|-----------------------------|------|------|--------|---------|------|------|--------|-------------------|---------|
|   | No                          |      |      |        | Yes     |      |      |        | U                 | P value |
|   | Medians                     | Q1   | Q3   | AR     | Medians | Q1   | Q3   | AR     |                   |         |
| Play with object                            | 1.33                        | 0.67 | 2.33 | 417.47 | 1.33    | 0.33 | 2    | 381.57 | 66,438            | 0.039   |
| Sociability                                 | 1.83                        | 0.71 | 3    | 421.04 | 1.5     | 0.5  | 2.52 | 374.41 | 64,506            | 0.007   |
| Purring                                     | 3.5                         | 3    | 4    | 423.63 | 3       | 2.5  | 4    | 369.24 | 63,109.5          | 0.001   |
| Attention-seeking                           | 3                           | 2.5  | 4    | 422.9  | 3       | 2    | 4    | 370.7  | 63,504            | 0.002   |
| Sociability with cats                       | 1                           | 0    | 2    | 253.63 | 0       | 0    | 1.33 | 207.23 | 20,276.5          | <0.001  |
| Stranger-directed aggression                | 0                           | 0    | 0.5  | 379.73 | 0       | 0    | 1    | 440.18 | 80,696.5          | <0.001  |
| Touch sensitivity/owner-directed aggression | 0.25                        | 0    | 0.75 | 370.31 | 0.5     | 0    | 1.5  | 477.52 | 92,345.5          | <0.001  |
| Resistance to restraint                     | 0.5                         | 0    | 1.33 | 373.79 | 1       | 0.25 | 2.23 | 466.03 | 89,047.5          | <0.001  |
| Familiar cat aggression                     | 0                           | 0    | 0.5  | 239.12 | 0.5     | 0    | 1.75 | 312.86 | 38,652            | <0.001  |
| Fear of novelty                             | 0.5                         | 0    | 1.5  | 385.66 | 1       | 0    | 2    | 425.63 | 77,707            | 0.017   |
| Separation-related behavior                 | 0.33                        | 0    | 0.83 | 388.57 | 0.5     | 0    | 1.17 | 436.42 | 81,081.5          | 0.005   |
| Trainability                                | 2.67                        | 2    | 3.33 | 417.91 | 2.33    | 1.67 | 3    | 379.08 | 65,658.5          | 0.025   |
| Excessive/compulsive self-grooming          | 0                           | 0    | 0.67 | 391.65 | 0.33    | 0    | 0.67 | 431.79 | 79,836.5          | 0.013   |
| Other compulsive behaviors                  | 1                           | 0    | 2    | 391.6  | 1       | 0.5  | 2    | 428.66 | 79,152.5          | 0.03    |
| Inappropriate elimination                   | 0                           | 0    | 0    | 366.1  | 0       | 0    | 1    | 481.02 | 93,290.5          | <0.001  |

M-W Mann-Whitney U test; P values when significant differences were found ( $P < 0.05$ ). Q1, Q3, and AR (average ranks) are given to show which group predominates.

behavior, contextually, to communicate with humans (Tavernier et al., 2020). Surprisingly, one of the most common behavior reported was “Readily adapts to changes in daily routines (schedules, replacement, or rearrangement of objects and furniture)”. It is encouraging that 70% of the cats in our sample were adapting readily to changes in their environment, since changes to daily routines are known to be stressful for many cats (Amat et al., 2016). Nevertheless, Platto et al. (2022) reported an improvement in cats’ behavior associated with routine changes during the COVID lockdown. On the other hand, owners rarely reported behaviors that would be considered undesirable by a majority of owners, such as aggression, scratching furniture, or eliminating outside the litter box. Interestingly, these types of behaviors are commonly cited by lay people as drawbacks to keeping cats as companion animals (Patronek et al., 1996; Machado et al., 2020).

The questionnaire results may also be useful to identify and quantify cat welfare. For example, playfulness is generally considered an indicator of positive welfare in animals since it tends to disappear under unfavorable environmental conditions (Boissy et al., 2007). Therefore, tracking changes in an individual’s playfulness scores in relation to factors such as age and environmental conditions may help owners to identify subtle effects on the animal’s welfare that might have gone unnoticed. Similarly, changes in urination and defecation patterns, aggressiveness, and other behaviors might be used to alert owners to signs of stress (Mariti et al., 2016; Vojtkovská et al., 2020; Carlisle et al., 2021).

Taking the questionnaire can also help owners to know how normal their cat’s behavior is compared with that of other cats of the same age, sex, breed, et cetera. Other differences associated with cat’s characteristics and environmental conditions are presented as well, so more detailed comparisons are also possible. Previous research findings suggest that some owners are not good at recognizing behavioral signs of stress or distress in their cats (Mariti et al., 2017). Allowing different members of a family to perform a Fe-BARQ assessment of their cat may help such owners to identify and understand their pet’s behavior much better.

The results of this study may also help to identify the origin of, or predisposing factors associated with, several behavioral problems and thereby help to prevent them. For instance, separation-related problems, which are not as common in cats as they are among dogs, seem to be associated with a cat’s sex, age of acquisition, sleeping preferences, and the presence of a dog in the home (Schwartz, 2002). Even though there are certain factors that owners cannot change, such as the cat’s sex or the presence of a dog at home, they might act to not overly reinforce the human-cat bond or provide several hiding places for the cat. Additionally, data support the current best practice recommendations of adopting kittens once they have already been weaned, or even choose an adult cat, based on the results provided.

Behaviors such as resistance to restraint or owner-directed aggression provide examples of how the Fe-BARQ can be used to help identify potentially triggering factors. Our findings show that sex, age of acquisition, type of acquisition, and owner experience might lead to different level of these behaviors. While owners may be

unwilling to change their preference for a cat of a particular sex, they may be more willing to modify where and at what age they acquire the cat.

Environmental characteristics had significant effects on cats’ behavior. The type of home, amount of time alone, or even resting preferences were found to be related to some undesirable behaviors. For example, cats sleeping on a family member’s bed may have a different relationship with their owners judging by the frequency of behaviors such as attention-seeking, fear of novelty, and separation-related behaviors. Besides, our study findings suggest that some cats may display fewer behavioral problems when they live with a dog, in line with previous research (Menchetti et al., 2020).

Finally, our study confirmed a significant effect of the owner on cat behavior. It is known that experience is crucial for almost everything in life, and this is also true when discussing cat behavior. Our results show that the owner previous experience with cats exerts a positive influence on the sociability of the cat and on the prevalence of several problematic behaviors, such as aggressiveness toward people or other companion animals. These findings are consistent with those previously reported (Neville, 2004; Gazzano et al., 2015; Grigg and Kogan, 2019), where appropriate advice prevented problems associated with living with a companion animal by smoothing out potential issues. Owners’ subjective perceptions of cat’s behavior problems can also be used to provide insights regarding the areas of behavior that should be the focus of clinical intervention. Owners who reported behavioral problems in their cats scored differently on factors related to aggression, fear, separation-related behavior, and compulsive behaviors, indicating that they recognized these behaviors as problematic. Veterinarians should provide advice on how to prevent these types of behaviors and how to address them once they are already present.

## Limitations

The results of this study suggest that the Fe-BARQ may be a useful tool for measuring behavior in domestic cats, although, as a self-administered questionnaire, the possibility of self-selection and subjective biases should be considered when interpreting the data. Also, the population sampled in this study may not be representative of the Spanish domestic cat population, since neutered animals and multicat households seem to be overrepresented, while intact animals, single-cat households, and rural households are underrepresented. Regarding the reproductive status, it should be noted that the Spanish Parliament has just approved a law that makes sterilization of domestic cats compulsory, as an approach to avoid abandonment and surrender of cats to shelters (Ley 7/2023, de 28 de marzo, de protección de los derechos y el bienestar de los animales. BOE n°. 75, March 29, 2023).

## Conflicts of Interest

The authors declare that they have no competing interests related to this study.

## Appendix A

Table  
Percentage of respondents.

| Percentages  | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|--|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| 1. Aprende rápidamente como jugar con juguetes nuevos<br>[1. Quickly learns how to play with new introduced toys.] | 809 | 2.60         | 12.48         | 20.64            | 31.03          | 29.67         | 3.58    | 15.08             | 60.69               |
| 2. Curioso: Investiga/explora activamente nuevos objetos, vistas o cambios en su entorno.                          | 799 | 0.63         | 5.63          | 10.39            | 23.15          | 59.57         | 0.63    | 6.26              | 82.73               |

(continued on next page)



Table (continued)

| Percentages  | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|--|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| [2. Curious: actively investigates/explores new objects, sights, or changes in its environment.]   |     |              |               |                  |                |               |         |                   |                     |
| 3. Lleva pequeños objetos/juguetes en la boca con los que interactuar. [3. Carries small objects/toys in the mouth to interact with.]  | 803 | 21.67        | 18.80         | 24.03            | 23.04          | 11.46         | 1.00    | 40.47             | 34.50               |
| 4. Corre y salta en el aire. [4. Runs and jumps in the air.]   | 788 | 6.60         | 16.88         | 24.49            | 32.87          | 18.78         | 0.38    | 23.48             | 51.65               |
| 5. Se entretiene saltando y escalando superficies altas, muebles o cortinas. [5. Engages in active jumping and climbing on high surfaces, furniture, or curtains/drapes.]  | 800 | 16.50        | 18.25         | 20.00            | 26.50          | 18.13         | 0.63    | 34.75             | 44.63               |
| 6. Muestra arrebatos súbitos en los que corre y/o escala en ciertos momentos del día. [6. Exhibits sudden bursts of running or climbing in certain periods of the day.]  | 804 | 8.71         | 19.03         | 26.00            | 27.74          | 17.54         | 1.00    | 27.74             | 45.27               |
| 7. Muestra saltos y carreras espontáneas durante el juego. [7. Exhibits sudden jumping and running during playful activity.]   | 792 | 5.68         | 13.64         | 23.74            | 33.71          | 21.72         | 1.52    | 19.32             | 55.43               |
| 8. Acecha, persigue, caza, se abalanza sobre objetos en movimiento (Cuerdas, bolas, juguetes blandos, etc) durante el juego. [8. Stalks, chases, or pounces on moving objects (string, balls, soft toys, etc.) during playful activity.]                                 | 803 | 2.37         | 8.97          | 15.69            | 33.87          | 38.61         | 0.50    | 11.33             | 72.48               |
| 9. Presenta carreras/persecuciones y caza/saltos sobre objetos/presas invisibles o imaginarios. [9. Displays running/chasing and hunting/pouncing on unseen/imaginary prey/objects.]   | 793 | 28.63        | 19.42         | 22.32            | 17.91          | 9.08          | 2.65    | 48.05             | 26.99               |
| 10. Persigue y embosca a otros miembros de la familia (incluyendo mascotas) en forma de juego. [10. Chases and ambushes other household members (including pets) playfully.]   | 802 | 18.08        | 15.09         | 23.57            | 29.43          | 13.34         | 0.50    | 33.17             | 42.77               |
| 11. Persigue o sigue sombras o focos de luz. [11. Chases or follows shadows or light spots.]   | 796 | 23.74        | 18.34         | 21.98            | 17.09          | 12.56         | 6.28    | 42.09             | 29.65               |
| 12. Inicia persecuciones mutuas corriendo de habitación en habitación por la casa. [12. Initiates mutual chasing by running from room to room in the house.]   | 799 | 16.40        | 17.77         | 24.66            | 25.03          | 13.39         | 2.75    | 34.17             | 38.42               |
| 13. Inicia juego interactivo con miembros de la familia en casa (por ejemplo, trayendo juguetes, cuerdas u objetos pequeños para jugar con ellos). [13. Initiates interactive play with people in the home (i.e., brings toys, strings, or small objects to play with).] | 806 | 38.96        | 20.35         | 18.49            | 14.14          | 6.70          | 1.36    | 59.31             | 20.84               |
| 14. Juega con otros gatos de la casa (Marque la casilla si es el único gato de la casa). [14. Plays with other household cat(s) (check the "Unknown" box if this is the only cat in the household).]   | 759 | 8.43         | 8.83          | 12.78            | 17.52          | 17.13         | 35.31   | 17.26             | 34.65               |
| 15. Está cómodo y relajado entre la gente en reuniones. [15. Is comfortable and relaxed among people in social gatherings.]  | 809 | 16.07        | 14.46         | 18.05            | 22.50          | 28.43         | 0.49    | 30.53             | 50.93               |
| 16. Está cómodo y relajado siendo acariciado por una persona ajena al grupo familiar. [16. Is comfortable and relaxed being petted by unfamiliar (non-household) person(s).]   | 790 | 24.43        | 17.72         | 19.75            | 20.13          | 17.09         | 0.89    | 42.15             | 37.22               |
| 17. Saluda a adultos que visitan la casa de forma amistosa (olfatea, se frota, ronronea, se tumba en el suelo). [17. Greets unfamiliar adults visiting your home in a friendly manner (sniffs, rubs, purrs, lies on the floor).]   | 804 | 30.22        | 15.55         | 17.04            | 16.04          | 20.52         | 0.62    | 45.77             | 36.57               |
| 18. Saluda a niños que visitan la casa de forma amistosa (olfatea, se frota, ronronea, se tumba en el suelo). [18. Greets unfamiliar children visiting your home in a friendly manner (sniffs, rubs, purrs, lies on the floor).]   | 803 | 36.11        | 13.82         | 13.20            | 9.22           | 11.46         | 16.19   | 49.94             | 20.67               |
| 19. Se muestra cómodo (confiado, relajado) cuando juega con niños conocidos. [19. Appears comfortable (confident, relaxed) when playing with familiar child(ren).]   | 796 | 22.49        | 12.56         | 12.31            | 13.07          | 14.32         | 25.25   | 35.05             | 27.39               |
| 20. Se muestra cómodo (confiado, relajado) cuando juega con niños nuevos. [20. Appears comfortable (confident, relaxed) when playing with unfamiliar child(ren).]  | 797 | 38.02        | 11.29         | 9.16             | 8.03           | 6.65          | 26.85   | 49.31             | 14.68               |
| 21. Se muestra cómodo (confiado, relajado) cuando juega con adultos nuevos. [21. Appears comfortable (confident, relaxed) when playing with unfamiliar adults.]  | 806 | 26.67        | 15.38         | 17.25            | 20.10          | 15.26         | 5.33    | 42.06             | 35.36               |
| 22. "Habla" con las personas usando llamadas/vocalizaciones (por ejemplo, responde cuando le habla una persona). [22. "Talks" to people using calls/vocalizations (i.e., answers when spoken to by a person).]   | 797 | 5.40         | 10.04         | 15.18            | 30.36          | 38.77         | 0.25    | 15.43             | 69.13               |

(continued on next page)

Table (continued)

| Percentages   | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|---|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| 23. Avisa (Vocaliza, anda hacia la puerta, hace ruido) para que se le deje salir al exterior o para entrar y salir de la habitación.<br>[23. Asks (vocalizes, walks toward door, makes noise) to be let outside or in and out of rooms.]              | 802 | 4.24         | 5.49          | 10.22            | 26.68          | 51.87         | 1.50    | 9.73              | 78.55               |
| 24. Avisa (Vocaliza, anda hacia su comedero, hace ruido) para conseguir comida cuando está hambriento.<br>[24. Asks (vocalizes, walks toward its bowl or food source, makes noise) for food when hungry.]   | 798 | 7.27         | 6.27          | 10.65            | 21.18          | 53.26         | 1.38    | 13.53             | 74.44               |
| 25. Maulla ruidosamente enfrente de cualquier puerta cerrada.<br>[25. Meows loudly in front of any closed door.]  | 799 | 24.91        | 17.02         | 19.02            | 15.89          | 21.78         | 1.38    | 41.93             | 37.67               |
| 26. Ronronea cuando se le hacen caricias.<br>[26. Purrs when stroked or petted.]  | 808 | 2.60         | 5.45          | 10.40            | 29.70          | 51.73         | 0.12    | 8.04              | 81.44               |
| 27. Ronronea cuando está sentado/tumbado en el regazo de alguien.<br>[27. Purrs when sitting/lying on someone's lap.]   | 793 | 5.30         | 7.94          | 14.00            | 29.26          | 41.24         | 2.27    | 13.24             | 70.49               |
| 28. Te empuja suavemente, te acaricia con el hocico se acurruca contigo o con otros miembros de la familia cuando estás sentados o tumbados.<br>[28. Nudges and/or nuzzles you or other members of the household when you are sitting or lying down.] | 802 | 4.61         | 5.49          | 15.71            | 36.16          | 37.78         | 0.25    | 10.10             | 73.94               |
| 29. Busca el contacto físico contigo o con otro miembro de la familia cuando estás sentados o tumbados.<br>[29. Seeks out physical contact with you or other household members when you/they are sitting or lying down.]                              | 800 | 2.50         | 6.13          | 15.63            | 35.38          | 40.38         | 0.00    | 8.63              | 75.75               |
| 30. Saluda a gatos ajenos (de fuera de la casa) que visitan tu casa de forma amistosa (olfatea, se tocan la nariz, se frota).<br>[30. Greet unfamiliar (nonhousehold) cats visiting your home in a friendly manner (sniffs, touches nose, rubs).]     | 798 | 29.57        | 7.89          | 9.27             | 5.76           | 3.63          | 43.86   | 37.47             | 9.40                |
| 31. Se aproxima a gatos adultos fuera de tu casa de manera amistosa (olfatea, se tocan la nariz, se frota).<br>[31. Approaches unfamiliar adult cats outside your home in a friendly manner (sniffs, touches noses, rubs).]                           | 798 | 29.57        | 7.89          | 6.52             | 3.88           | 3.13          | 49.00   | 37.47             | 7.02                |
| 32. Se aproxima a gatitos jóvenes fuera de tu casa de manera amistosa (olfatea, se tocan la nariz, se frota).<br>[32. Approaches unfamiliar kittens outside your home in a friendly manner (sniffs, touches noses, rubs).]                            | 796 | 26.63        | 6.41          | 6.41             | 4.02           | 2.39          | 54.15   | 33.04             | 6.41                |
| 33. Gruñe o bufa cuando una persona ajena a la familia intenta tocarlo o acariciarlo.<br>[33. Growls/hisses when an unfamiliar (nonhousehold) person tries to touch or pet him/her.]  | 805 | 69.32        | 12.42         | 8.32             | 4.97           | 2.61          | 2.36    | 81.74             | 7.58                |
| 34. Gruñe o bufa a niños nuevos que visitan la casa.<br>[34. Growls/hisses at unfamiliar child(ren) visiting its home.]   | 809 | 59.83        | 8.03          | 5.56             | 3.58           | 3.09          | 19.90   | 67.86             | 6.67                |
| 35. Gruñe o bufa a adultos nuevos que visitan la casa.<br>[35. Growls/hisses at unfamiliar adult(s) visiting its home.]   | 801 | 75.16        | 10.49         | 4.99             | 3.00           | 2.62          | 3.75    | 85.64             | 5.62                |
| 36. Araña/muerde o intenta morder (no como si estuviera jugando) cuando se le acaricia la barriga.<br>[36. Scratches/bites or attempts to bite (in a nonplayful way) when petted on the belly.]   | 809 | 47.47        | 19.90         | 12.36            | 12.11          | 7.79          | 0.37    | 67.37             | 19.90               |
| 37. Gruñe, bufa, araña o muerde cuando se le acaricia en la espalda o la columna.<br>[37. Growls, hisses, scratches, or bites when stroked along the back or spine.]  | 804 | 79.10        | 10.95         | 6.72             | 2.24           | 0.87          | 0.12    | 90.05             | 3.11                |
| 38. Ataca (araña, muerde) de manera inesperada cuando se le acaricia.<br>[38. Lashes out (scratches, bites) unexpectedly when petted.]  | 805 | 66.09        | 16.52         | 12.17            | 4.10           | 1.12          | 0.00    | 82.61             | 5.22                |
| 39. Persigue, se engancha o ataca a las piernas o los pies de las personas en movimiento (no como si estuviera jugando).<br>[39. Chases, grabs onto, or attacks people's legs or feet in movement (in a nonplayful way).]                             | 799 | 82.73        | 8.26          | 5.01             | 2.63           | 1.13          | 0.25    | 90.99             | 3.75                |
| 40. Gruñe, bufa, araña, muerde o intenta morder cuando alguien de la familia le da una medicina.<br>[40. Growls, hisses, scratches, or bites when given medicine by a familiar person.]   | 807 | 51.92        | 15.24         | 9.42             | 7.93           | 7.43          | 8.05    | 67.16             | 15.37               |
| 41. Gruñe, bufa, araña, muerde o intenta morder cuando se le baña.<br>[41. Growls, hisses, scratches, or bites when being bathed.]  | 801 | 27.72        | 7.62          | 4.37             | 4.12           | 7.74          | 48.44   | 35.33             | 11.86               |
| 42. Gruñe, bufa, araña, muerde o intenta morder cuando se le cepilla.<br>[42. Growls, hisses, scratches, or bites when being groomed.]  | 798 | 61.03        | 13.66         | 9.52             | 5.26           | 2.88          | 7.64    | 74.69             | 8.15                |
| 43. Gruñe, bufa, araña, muerde o intenta morder cuando se le cortan las uñas/garras.<br>[43. Growls, hisses, scratches, or bites when nails/claws are clipped.]   | 798 | 39.35        | 12.91         | 9.52             | 8.15           | 10.03         | 20.05   | 52.26             | 18.17               |
| 44. Gruñe o bufa cuando se le acerca un gato de la casa mientras está comiendo.<br>[44. Growls/hisses when approached by a familiar (household) cat while eating.]  | 795 | 50.57        | 6.79          | 2.77             | 1.51           | 2.01          | 36.35   | 57.36             | 3.52                |

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Table (continued)

| Percentages   | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|---|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| 45. Gruñe o bufa cuando se le acerca un gato de la casa en su lugar de descanso favorito.<br>[45. Growls/hisses when approached by a familiar (household) cat at a favorite resting place.]   | 798 | 45.36        | 7.39          | 5.39             | 3.38           | 2.63          | 35.84   | 52.76             | 6.02                |
| 46. Gruña o bufa cuando un gato de la casa le mira, gruñe o bufa.<br>[46. Growls/hisses when stared at, growled, or hissed at by a familiar (household) cat.]   | 798 | 42.11        | 8.40          | 5.01             | 3.88           | 3.13          | 37.47   | 50.50             | 7.02                |
| 47. Ataca (araña/muerde/intenta morder) cuando un gato de la casa le mira fijamente, le gruñe o le bufa.<br>[47. Attacks (scratches/bites/attempt to bite) when stared at, growled at, or hissed at by a familiar (household) cat.]   | 797 | 41.03        | 10.54         | 5.65             | 4.02           | 1.38          | 37.39   | 51.57             | 5.40                |
| 48. Gruñe/bufa a perro(s) de la casa.<br>[48. Growls/hisses at familiar dog(s).]  | 799 | 31.91        | 8.89          | 4.88             | 2.25           | 1.50          | 50.56   | 40.80             | 3.75                |
| 49. Ataca (araña/muerde/intenta morder) a perro(s) de la casa.<br>[49. Attacks (scratches/bites/attempt to bite) familiar dog(s).]  | 794 | 37.53        | 6.68          | 2.77             | 1.39           | 0.50          | 51.13   | 44.21             | 1.89                |
| 50. Gruñe/bufa cuando un perro ajeno visita la casa o entra al jardín/patio.<br>[50. Growls/hisses when unfamiliar dog visits its home or enters its yard/garden.]  | 793 | 17.91        | 7.82          | 7.69             | 5.93           | 8.20          | 52.46   | 25.73             | 14.12               |
| 51. Ataca (araña/muerde/intenta morder) cuando un perro nuevo visita la casa o entra al jardín/patio.<br>[51. Attacks (scratches/bites/attempt to bite) when unfamiliar dog visits its home or enters its yard/garden.]   | 795 | 27.04        | 6.29          | 4.28             | 3.27           | 2.89          | 56.23   | 33.33             | 6.16                |
| 52. Persigue o araña a perros nuevos en la calle cuando tiene oportunidad.<br>[52. Chases or scratches unfamiliar dogs on the street, if given the opportunity.]  | 796 | 27.26        | 1.88          | 0.38             | 0.50           | 0.75          | 69.22   | 29.15             | 1.26                |
| 53. Corre y/o se esconde cuando gatos ajenos a la casa visitan la vivienda o entran a su patio/jardín.<br>[53. Runs and/or hides when unfamiliar (nonhousehold) cats visit its home or enter its yard/garden.]  | 800 | 23.63        | 8.13          | 6.88             | 4.38           | 6.38          | 50.63   | 31.75             | 10.75               |
| 54. Corre y/o se esconde cuando perros ajenos a la casa visitan la vivienda o entran a su patio/jardín.<br>[54. Runs and/or hides when unfamiliar dogs visit its home or enter its yard/garden.]  | 800 | 14.50        | 8.13          | 8.25             | 7.25           | 13.50         | 48.38   | 22.63             | 20.75               |
| 55. Presenta intranquilidad o nerviosismo (Investigación activa) cuando se altera o cambia su área de descanso<br>[55. Shows restlessness (active investigation) when its resting area is modified (e.g., objects moved from usual place, changing fabrics/sheets, etc.).]    | 804 | 54.48        | 19.53         | 11.94            | 7.34           | 3.48          | 3.23    | 74.00             | 10.82               |
| 56. Presenta intranquilidad o nerviosismo (Investigación activa) o hiper vigilancia.<br>[56. Shows restlessness (active investigation) or hyper vigilance (constant ear movements and watchfulness) when unfamiliar objects are introduced into the home.]                    | 804 | 37.94        | 24.50         | 17.41            | 10.32          | 6.22          | 3.61    | 62.44             | 16.54               |
| 57. Muestra intranquilidad, agitación y/o camina sin rumbo cuando usted u otro miembro de la familia se prepara para salir de casa.<br>[57. Shows restlessness, agitation, and/or pacing when you or another household member prepares to leave the home.]                    | 806 | 62.03        | 15.38         | 10.55            | 7.69           | 3.23          | 1.12    | 77.42             | 10.92               |
| 58. Está malhumorado, se esconde o se escabulle cuando usted u otro miembro de la familia se prepara para salir de casa.<br>[58. Sulks, hides, and/or slinks away when you or another household member prepares to leave the home.]   | 808 | 78.59        | 8.54          | 7.18             | 2.60           | 2.10          | 0.99    | 87.13             | 4.70                |
| 59. Se tumba o se queda quieto cerca de la puerta de entrada cuando usted u otro miembro de la familia se prepara para salir de casa.<br>[59. Lies down or stays still in the vicinity of the entrance door when you or another household member prepares to leave the home.] | 808 | 52.72        | 15.84         | 14.48            | 12.13          | 4.08          | 0.74    | 68.56             | 16.21               |
| 60. Presenta intranquilidad (investigación activa) cuando se queda solo en casa.<br>[60. Displays restlessness (active investigation) when left alone at home.]   | 807 | 55.27        | 8.92          | 4.96             | 2.60           | 0.87          | 27.39   | 64.19             | 3.47                |
| 61. Permanece quieto y alerta/hiper vigilante (movimiento constante de orejas y observación constante) cuando se queda solo en casa.<br>[61. Remains still and alert/hyper vigilant (constant ear movements and watchful eyes) when left alone at home.]                      | 803 | 52.05        | 7.72          | 4.11             | 1.00           | 1.37          | 33.75   | 59.78             | 2.37                |
| 62. Vocaliza llorando o maullando cuando se queda solo en casa.<br>[62. Vocalizes by crying or meowing when left alone at home.]  | 809 | 63.66        | 10.14         | 5.69             | 3.34           | 2.10          | 15.08   | 73.79             | 5.44                |
| 63. Viene cuando se le llama.<br>[63. Comes when called.]   | 807 | 2.48         | 6.94          | 21.31            | 42.01          | 27.14         | 0.12    | 9.42              | 69.14               |
| 64. Responde bien a órdenes sencillas (dentro, fuera, para, abajo, arriba, no, tumbate, etc)<br>[64. Readily responds to simple commands (out, in, quiet, down, up, no, lie down, etc.).]   | 794 | 18.39        | 18.77         | 23.43            | 22.29          | 11.08         | 6.05    | 37.15             | 33.38               |

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Table (continued)

| Percentages  | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|--|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| 65. Atiende y escucha atentamente a todo lo que dices o haces.<br>[65. Attends and listens closely to everything you say or do.]   | 802 | 2.62         | 11.35         | 21.07            | 36.28          | 27.93         | 0.75    | 13.97             | 64.21               |
| 66. Trae presas (ratones, pájaros, reptiles, ranas, insectos, gusanos, etc) a casa cuando tiene oportunidad.<br>[66. Brings prey animals (rodents, birds, reptiles, frogs, insects, worms, etc.) into the home, given the opportunity.]                                  | 802 | 26.56        | 11.72         | 13.47            | 11.47          | 7.86          | 28.93   | 38.28             | 19.33               |
| 67. Persigue pájaros, lagartijas, roedores, ardillas, conejos u otros animales pequeños cuando tiene la oportunidad.<br>[67. Chases rodents, birds, reptiles, squirrels, rabbits, or other small animals, given the opportunity.]  | 798 | 7.14         | 7.89          | 13.66            | 20.55          | 30.58         | 20.18   | 15.04             | 51.13               |
| 68. Está muy pendiente de las actividades de otras mascotas pequeñas (roedores, pájaros, reptiles, peces, etc) de la casa.<br>[68. Is fascinated by the activities of other small pets (rodents, birds, reptiles, fish, etc.) in the home.]                              | 799 | 6.26         | 6.01          | 9.76             | 17.27          | 12.89         | 47.81   | 12.27             | 30.16               |
| 69. Hace sonidos parecidos a piar o trinar cuando observa pájaros u otros animales pequeños fuera de casa.<br>[69. Makes chirping or chattering noises when observing birds or other small animals outside the home.]  | 801 | 21.97        | 8.61          | 12.48            | 18.35          | 27.59         | 10.99   | 30.59             | 45.94               |
| 70. Mueve la cola hacia los lados, eriza el pelo o se pone en tensión cuando observa pájaros u otros movimientos a través de la ventana.<br>[70. Displays lashing tail, skin rippling, and/or a tense body when looking at birds or other movements through the window.] | 802 | 15.59        | 13.47         | 18.83            | 24.56          | 22.57         | 4.99    | 29.05             | 47.13               |
| 71. Acostumbra a descansar o dormir en lugares elevados (estanterías, librerías, parte de arriba de armarios, etc)<br>[71. Tends to rest/sleep in elevated places (shelves, bookcases, tops of wardrobes, or cupboards, etc.).]  | 801 | 22.47        | 15.23         | 19.60            | 27.09          | 15.23         | 0.37    | 37.70             | 42.32               |
| 72. Acostumbra a descansar o dormir encima de superficies calientes (reproductor de dvd, televisión, impresora, ordenador, radiador, etc)<br>[72. Tends to sleep/rest on top of warm appliances (DVD player, TV, printer, computer, radiator, etc.).]                    | 804 | 36.94        | 16.67         | 18.53            | 17.66          | 6.47          | 3.73    | 53.61             | 24.13               |
| 73. Acostumbra a descansar o dormir dentro de armarios, cajones de ropa, cestas de ropa, etc<br>[73. Tends to sleep/rest inside cupboards, clothes drawers, laundry baskets, etc.).]   | 802 | 24.94        | 18.83         | 24.19            | 24.81          | 5.86          | 1.37    | 43.77             | 30.67               |
| 74. Muestra acicalamiento intenso y excesivo (por ejemplo, varias veces al día durante mucho tiempo).<br>[74. Shows excessive and intensive grooming (e.g., several times a day for long periods).]  | 800 | 55.50        | 21.75         | 11.75            | 6.25           | 2.13          | 2.63    | 77.25             | 8.38                |
| 75. Presenta automutilación, depilación (se tira del pelaje con los dientes, se mordisquea vigorosamente y/o se lame partes de su cuerpo).<br>[75. Exhibits self-mutilation, hair barbering (pulls fur with teeth, vigorously nibbles, and/or licks its body parts).]    | 801 | 83.27        | 7.87          | 4.12             | 2.62           | 1.50          | 0.62    | 91.14             | 4.12                |
| 76. Presenta lamidos o mordiscos frenéticos de forma súbita.<br>[76. Exhibits sudden frantic licking or chewing.]  | 805 | 83.48        | 8.57          | 4.84             | 1.49           | 0.37          | 1.24    | 92.05             | 1.86                |
| 77. Se queda mirando fijamente a las personas.<br>[77. Stares intently at people.]   | 809 | 39.56        | 21.76         | 22.00            | 12.48          | 2.97          | 1.24    | 61.31             | 15.45               |
| 78. Se queda quieto mirando fijamente a nada visible.<br>[78. Freezes and stares intently at nothing visible.]   | 794 | 40.05        | 25.94         | 22.54            | 8.69           | 1.13          | 1.64    | 65.99             | 9.82                |
| 79. Muestra extraños movimientos repetitivos (anda, deambula) de un lugar a otro (distancias cortas).<br>[79. Shows strange repetitive movements (pacing, walking) from one place to another (short distances).]   | 800 | 75.50        | 11.00         | 6.75             | 2.38           | 0.63          | 3.75    | 86.50             | 3.00                |
| 80. Orina (posición agachada) fuera del arenero o en otras áreas inapropiadas dentro de la casa.<br>[80. Urinates (crouching position) outside of the litter box or in other inappropriate areas indoors.]   | 799 | 75.47        | 10.76         | 5.26             | 4.26           | 3.00          | 1.25    | 86.23             | 7.26                |
| 81. Defeca fuera del arenero o en otras áreas inadecuadas dentro de la casa.<br>[81. Defecates outside of the litter box or in other inappropriate areas indoors]  | 807 | 83.89        | 8.05          | 3.35             | 2.11           | 1.61          | 0.99    | 91.95             | 3.72                |
| 82. Tiene lugares preferidos (por ejemplo, lugares tranquilos, altos o escondidos) para orinar o defecar.<br>[82. Shows location preferences for toileting (e.g., quiet, high, or hidden places).]   | 802 | 47.13        | 4.36          | 5.86             | 8.48           | 16.71         | 17.46   | 51.50             | 25.19               |
| 83. Prefiere determinados sustratos (por ejemplo, arenero, arena, guijarros, hierba, periódicos, etc) para orinar o defecar<br>[83. Shows substrate preferences for toileting (e.g., litter type, sand pebbles, grass, newspaper, bedding, laundry).]                    | 806 | 21.96        | 4.34          | 6.20             | 9.06           | 40.32         | 18.11   | 26.30             | 49.38               |
| 84. Está más activo por la tarde, hacia el atardecer, el anochecer o durante la noche.   | 798 | 5.01         | 14.66         | 23.06            | 34.46          | 21.18         | 1.63    | 19.67             | 55.64               |

(continued on next page)

Table (continued)

| Percentages  | N   | Never<br>(0) | Seldom<br>(1) | Sometimes<br>(2) | Usually<br>(3) | Always<br>(4) | Unknown | Never<br>+ seldom | Always<br>+ usually |
|--|-----|--------------|---------------|------------------|----------------|---------------|---------|-------------------|---------------------|
| [84. Shows increased activity in the evening around dusk/sunset or late at night.]   |     |              |               |                  |                |               |         |                   |                     |
| 85. Está más activo a primeras horas del día, al amanecer; puede despertar al resto de la familia temprano por la mañana.<br>[85. Shows increased activity in the early hours of morning around dawn/sunrise; may wake members of the household early in the morning.]   | 799 | 17.02        | 18.52         | 19.15            | 25.16          | 18.65         | 1.50    | 35.54             | 43.80               |
| 86. Se muestra agitado, inquieto o vocaliza cuando tú o algún otro miembro de la familia muestra afecto por otra persona, gato o animal.<br>[86. Shows agitation, restlessness, or vocalization when you or another member of the household shows affection for another person, cat, or animal.]   | 799 | 62.58        | 12.27         | 10.89            | 4.88           | 1.38          | 8.01    | 74.84             | 6.26                |
| 87. Hace repentinas y ruidosas vocalizaciones (maullidos, gemidos) durante el día o la noche (sin otro gato o animal a la vista).<br>[87. Gives sudden and loud vocalizations (meowing, yowling) either during the daytime or at night (without another cat or animal in sight).]  | 802 | 51.25        | 18.08         | 13.34            | 9.98           | 3.87          | 3.49    | 69.33             | 13.84               |
| 88. Marca con orina (estando de pie con la cola levantada verticalmente) fuera del arenero o en otras superficies y objetos en el interior de la vivienda.<br>[88. Sprays (standing position with tail raised vertically) outside of the litter box or on other surfaces and objects (e.g., furniture, walls, people's legs, etc.) indoors.] | 805 | 87.33        | 4.72          | 3.60             | 1.99           | 0.62          | 1.74    | 92.05             | 2.61                |
| 89. Parece incómodo (tiembla, se pone tenso/rígido, forcejea) cuando se le coge o sujeta en brazos, o cuando está sentado en el regazo.<br>[89. Appears uncomfortable (trembles, becomes rigid/tense, struggles) when picked up/held in arms and/or when sitting on laps.]   | 798 | 46.12        | 20.43         | 16.67            | 9.27           | 6.77          | 0.75    | 66.54             | 16.04               |
| 90. Gruñe, bufá, araña o muerde cuando alguien se le acerca cuando tiene comida robada o presas.<br>[90. Growls, hisses, scratches, or bites when approached while in possession of stolen food or prey.]  | 807 | 75.71        | 5.33          | 2.11             | 1.73           | 0.87          | 14.25   | 81.04             | 2.60                |
| 91. Juega a “Buscar y traer cosas”; le gusta traer objetos y juguetes lanzados.<br>[91. Plays “fetch”; likes to retrieve thrown objects or toys.]  | 799 | 41.43        | 19.02         | 15.02            | 11.89          | 10.39         | 2.25    | 60.45             | 22.28               |
| 92. Se adapta bien a cambios en la rutina diaria (horarios, reemplazos o cambios de disposición de muebles y objetos).<br>[92. Readily adapts to changes in daily routines (schedules, replacement, or rearrangement of objects and furniture).]   | 797 | 2.76         | 7.65          | 12.67            | 30.99          | 40.40         | 5.52    | 10.41             | 71.39               |
| 93. Gruñe, bufá, araña o muerde cuando es examinado o tratado por un veterinario.<br>[93. Growls, hisses, scratches, or bites when examined or treated by a veterinarian.]   | 794 | 47.73        | 16.25         | 10.33            | 8.56           | 12.59         | 4.53    | 63.98             | 21.16               |
| 94. Corre y/o se esconde en respuesta a ruidos repentinos y fuertes.<br>[94. Runs and/or hides in response to sudden or loud noise (e.g., vacuum cleaner, car backfire, road drills, dropped object, sounds of musical instruments, doorbells, or someone knocking on the door).]  | 806 | 11.29        | 17.74         | 19.35            | 25.31          | 25.43         | 0.87    | 29.03             | 50.74               |
| 95. Escapa o intenta escapar de casa o del jardín/patio cuando puede<br>[95. Escapes or attempts to escape from the home or yard/garden, if given the opportunity.]  | 799 | 40.30        | 18.40         | 13.02            | 10.89          | 6.63          | 10.76   | 58.70             | 17.52               |
| 96. Se afila las uñas en objetos o superficies inapropiadas dentro de casa (muebles, cortinas, papel de las paredes, alfombras, etc)<br>[96. Scratches claws on inappropriate objects or surfaces indoors (furniture, rugs, drapes, curtains, wallpaper, etc.).]   | 805 | 22.86        | 22.73         | 20.50            | 19.13          | 13.42         | 1.37    | 45.59             | 32.55               |
| 97. Acostumbra a tumbarse en periódicos, libros o cosas que están siendo usadas por alguien.<br>[97. Tends to lie on paper, books, or things that are being used by people.]   | 803 | 12.83        | 13.20         | 23.79            | 28.52          | 21.30         | 0.37    | 26.03             | 49.81               |
| 98. Persigue su propia cola<br>[98. Chases its own tail/hind end.]   | 778 | 70.69        | 14.40         | 8.35             | 4.11           | 1.03          | 1.41    | 85.09             | 5.14                |
| 99. Pisotea como amasando o amasa con las patas delanteras, chupetea, mastica y/o monta juguetes blandos, telas, almohadas, etc.<br>[99. Kneads, suckles, chews, and/or mounts soft toys, fabrics, pillows, etc.]  | 802 | 18.33        | 14.09         | 22.44            | 29.43          | 14.71         | 1.00    | 32.42             | 44.14               |
| 100. Mastica o daña objetos inapropiados cuando se le deja sólo en casa (comportamiento destructivo).<br>[100. Chews or damages inappropriate objects when left alone at home (destructive behavior).]   | 806 | 79.65        | 10.42         | 5.96             | 2.11           | 0.25          | 1.61    | 90.07             | 2.36                |

## Appendix B. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.jveb.2023.12.004](https://doi.org/10.1016/j.jveb.2023.12.004).



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