Original Article

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Survey of cat owners on features of, and preventative measures for, feline scratching of inappropriate objects: a pilot study

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Abstract

Objectives The objective of this study was to collect preliminary data on relevant features and preventative measures of feline inappropriate scratching. Preliminary data could then be used to inform future randomized controlled studies.

Methods A paper questionnaire was distributed to 140 cat-owning clients of a small animal practice. The response rate was 82.9%. Questions related to features of inappropriate and designated items scratched, frequency of the behavior and how owners attempted to modify the behavior. The frequency of scratching was ranked and analyzed with repeated-measures models for differences between features of items. The effectiveness of techniques to modify scratching was analyzed with Student's *t*-tests comparing frequencies of scratching between cats of survey participants who did and did not use specific techniques.

Results Scratching of inappropriate items was reported for 83.9% of cats. Most cats (81.5%) scratched chairs or other furniture and 64.1% scratched carpet. The frequency of scratching inappropriate items was significantly influenced by type and material of the items scratched, with furniture and carpet, and fabric and carpet, respectively, being scratched most often. Most cats (76.1%) had a designated scratching item. The frequency of scratching designated items was significantly influenced by type, with cats using scratching posts and other items more often than scratch pads. Owners used a variety of punishment- and reward-based techniques to stop inappropriate scratching and encourage scratching of designated items; only one technique was found to have a significant effect, with the frequency of scratching designated items being significantly lower in cats that were placed near the item.

Conclusions and relevance Furniture covered with fabric was an object frequently scratched. Fabric should be further investigated as a potential material to encourage desired scratching behavior. Scratch pads appeared less desired than scratching posts. Punishment was a common strategy to deter scratching but did not appear to influence the frequency of scratching.

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Introduction

Scratching of inanimate objects is a normal, inherited behavior in cats and serves the purpose of nail sheath sharpening and removal, visual and olfactory marking, and stretching of the forelimbs and torso.[1,2] Scratching of inanimate items not designed for or dedicated to feline scratching, in this paper called inappropriate scratching, is a common complaint of cat owners, with reports stating that between 15% and 52% of cats express this behavior.[3–7] Inappropriate scratching is a major reason for owner distress, breakdown of the human–animal bond, may lead to relinquishment of the cat,[7–9] and appears to be the primary reason for onychectomy or tendonectomy in the USA and other countries.[4,10–13]

A number of recommendations have been given in the veterinary literature to prevent inappropriate scratching.[14–16] To our knowledge supportive data are

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Table 1 Demographic information

Variable	Median	Q1	Q3	Range	n
Age	3.0 years	9 months	7.0 years	1 month to 18 years	113
Number of cats in household	2	1	3	1–7	115
Time lived in household	2.1 years	4 months	5.4 years	2 days to 17 years	111
Variable	**Distribution**				
Sex	66 female cats 50 male cats				116
Neuter status	98 neutered cats 17 intact cats				115
Lifestyle	92 indoor-only cats 24 indoor and outdoor cats				116
Declaw status	100 cats not declawed 15 cats declawed (2 on all feet, 13 on front feet only)				115

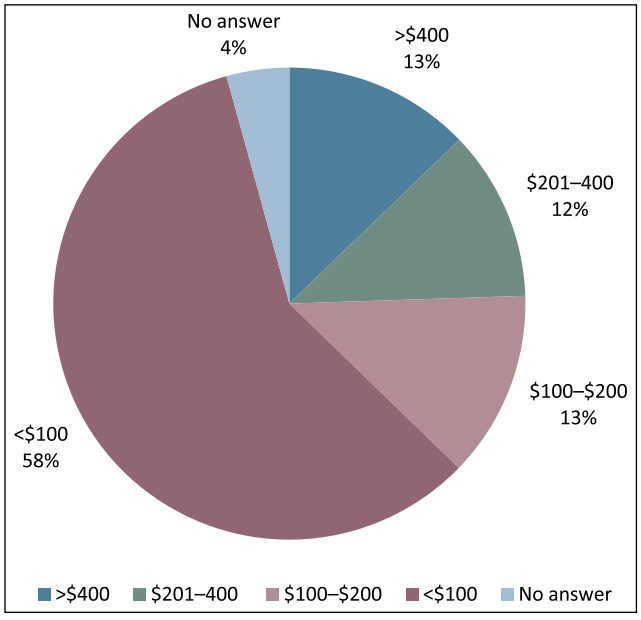

Figure 1 Amount of damage caused by inappropriate scratching in US dollars, n = 90

limited to two recent publications,[4,17] and no data currently exist on relevant features of inappropriate scratching, such as preferred target items or materials. Therefore, the purpose of this study was to collect preliminary data on relevant features and preventative measures of feline inappropriate scratching, which then can be used to inform future trials with the goal of creating evidence-based recommendations for the prevention of this undesired behavior.

Materials and methods

A paper questionnaire was distributed to 140 clients presenting a cat to the Community Practice Clinic of the College of Veterinary Medicine, University of Georgia, during the survey period from 23 May 2011 to 22 February 2012. The response rate was 82.9 % (n = 116). The only inclusion criteria was that the cat was kept indoors for any part of the daily routine.

Questionnaire

The questionnaire (see supplementary material) contained questions on demographic information (see Table 1) and questions related to the scratching of inappropriate items, owner attempts to prevent scratching and attitudes towards declaw surgery, with the results of the last topic not being presented in this paper.

To collect information about the scratching of inappropriate items, owners were asked if their cat had scratched any items not designated for scratching since adoption. If they answered yes, owners were asked to fill out a table collecting data about what inappropriate items had been scratched. Information was collected on the type (sofa, chair, table or other furniture; carpet; wall or doorway; drapes, curtains or other hanging textile item; other) and material (cardboard; wood; carpet; leather; fabric; wicker; other) of all scratching items and how the surface the cat scratched was angled in relation to the ground (vertical, eg, the side of a sofa; horizontal, eg, carpet on the floor; a different angle). In addition, the frequency of scratching (at least once daily; more than once a week; every 1–2 weeks; every 3–4 weeks; once a month or less) inappropriate items was collected. Owners were asked to categorize the dollar amount of damage that was caused (for categories see Figure 1). They were asked to select all techniques they used to stop the scratching of inappropriate items (for options see Table 2) and who gave them advice on how to prevent the scratching of inappropriate items (for options see Figure 2).

If owners provided at least one designated item for their cat to scratch, the following information was collected for each item provided: type (scratching post or pole; scratch pad; other), material (cardboard; wood;

Table 2 Percentage of owners who used techniques to attempt to stop inappropriate scratching. Owners could report more than one technique (n = 91)

Behavior modification category	Technique	Percentage of owners using technique (%)
Disrupting the behavior	Yelling at cat	69.2
	Spraying water	37.4
	Spanking	15.4
	Shaking a rattle can	13.2
	Other*	26.4
Encouraging an alternative	Bought designated scratching item	70.3
	Placed designated scratching item next to inappropriately scratched item	36.3
	Taught cat how to use designated item	36.3
Physically preventing the cat from scratching the item	Applied double-sided tape or other sticky material to furniture	16.5
	Covered furniture with unattractive material, such as plastic or foil	12.1
	Removed the furniture from living space for a while	5.5
	Applied vinyl caps, such as Soft Paws (Soft Paws Inc)	5.5
No attempts	No technique	2.2
	Other†	18.5

None of the behavior modification categories significantly affected frequency of inappropriate scratching
*Other techniques to disrupt the behavior included clapping at the cat, making a noise, picking the cat up or moving it to another location, distracting the cat with toys, petting, spraying with bursts of air, tossing a sock, blowing on the cat's face or tapping its nose and pushing the cat away
†Other techniques included using a spray designed to keep cats away, declawing, placing obstacles in front of the scratching area, buying toys to occupy cats and trimming nails

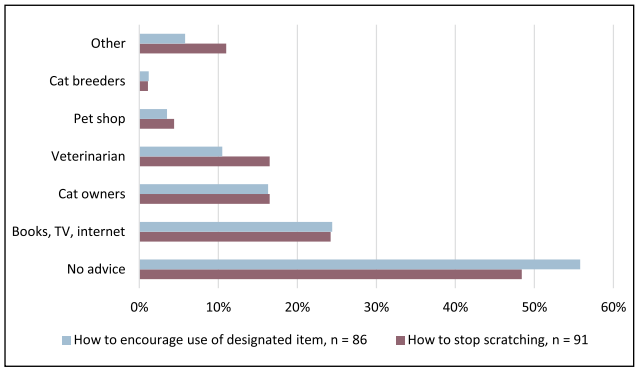

Figure 2 Source of advice on how to stop scratching and how to encourage use of designated item. Multiple answers were possible

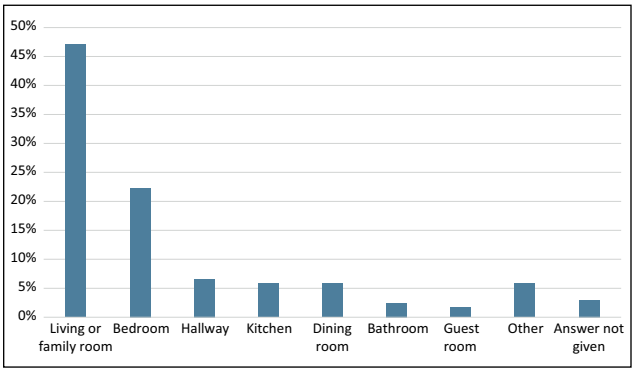

Figure 3 Location of all designated items (n = 121 items). Other includes TV room, outdoor deck, sun room, basement, closet

carpet; sisal fabric; sisal rope; burlap; fabric; other), approximate length, angle to the ground (vertical; horizontal, different angle to the ground), frequency of use (at least once daily; more than once a week; every 1–2 weeks; every 3–4 weeks; once a month or less) and the room in which the scratching item was located (for options see Figure 3). Owners were also asked to select from a list all of the techniques they used to encourage their cat to use the scratching item (for options see Table 3) and state any techniques tried, but not listed, and where they received their advice from. For all questions, owners could provide additional information.

Human subject research approval

The study was approved by the Human Subjects Office of the University of Georgia, Institutional Review Board.

Data management and analysis

Incomplete or incorrectly filled out questions were omitted from further analysis. The number of responses analyzed are given if they differ from 116.

Descriptive analyses included whether or not cats scratched a certain type of item inappropriately. As most cats scratched the type 'sofa, chair, table or other furniture', information regarding the material and

Table 3 Owner attempts to encourage cats to scratch the designated scratching item. Owners could report more than one technique (n = 85)

Behavior modification category	Technique	Percentage of owners using this strategy (%)
Place cat near item*	Place cat near the designated scratching item	57.0
Praise for scratching	Praised for scratching	51.2
Use catnip flakes, spray or other spray with designated item	Sprinkled catnip flakes over item or used catnip spray	44.2
	Used pheromone spray (Feliway; CEVA Animal Health)	1.2
Move front paws over scratching item	Holding cat's front paws and moving them over the scratching item	36.0
Give cat a treat†	Gave cat treat for scratching	22.1
	Used clicker training	1.2
Using a toy to encourage scratching	Played with cat and a toy near scratching area	29.1
	Played with their cat in a way that the cat touched the scratching items with its paws during play	14.0
	Tied toy on scratching item	15.1
No attempts	No training at all	27.9
	Other‡	5.8

*The frequency of scratching designated items was significantly lower in cats of survey participants who placed the cat near the item (yes 3.8, no 4.6; $P = 0.0135$). There were no significant differences in frequency of scratching designated items by any other category
†Included clicker training, as clicker training is often paired with a food reward
‡None of the techniques mentioned under 'other' fitted in one of the behavior modification categories. Other techniques included scratching the item with the owner's nails

angle of this type was further described. The number of different types of items scratched and which item had the highest scratching frequency was recorded, as was the amount of damage caused, attempts to stop the cat from scratching and sources of advice given. For designated items, the number and type of designated item provided was recorded, as was the highest scratching frequency for each item. Material, angle, length and location for each type of designated scratching item was recorded if information could be clearly assigned (this was not the case for seven surveys, which were excluded for this part of the analysis). If one type of item was paired with multiple pieces of information in other categories, the extra information was deleted and treated as missing values. However, for the angle combination horizontal and vertical (with or without angle to the ground) and the material combination carpet and sisal rope (with or without additional materials), new categories were designed, as owners combined these answers several times. If a range of length was given by the respondent, the lowest value of the range was included in the analysis. A category of >150 cm was added post-hoc for items where the length was unreported by respondents but that were clearly larger than 150 cm; for example, a door and door frame or floor to ceiling cat tree. Attempts by respondents to teach scratching of designated items, as well as the respondent's source of advice, were described.

Frequencies of scratching were ranked from 0 (never) to 5 (at least once daily).

Repeated-measures models that recognized multiple frequencies as belonging to the same cat were then used to test for differences in scratching frequencies between features (type, material, angle) of items that were scratched inappropriately and to test for differences in scratching frequencies between features (type, material, length, angle and location) of items that were designated for scratching. Adjustment for multiple comparisons was undertaken using Tukey's test. An unstructured covariance structure was used in all repeated measures models. For repeated-measure models, data where the frequency of scratching was not clearly connected to the type of item, material or angle, for example because multiple answers were given in one category, were counted as missing values. If a type, material, angle or location was not mentioned in one survey, it was categorized as never scratched (scratching of inappropriate items) or as a missing value (designated scratching item, as the owner did not provide this item to the cat and data therefore was not available). If several frequencies were given for one type, material, angle, length or location, only the highest frequency given was included in the analysis. The repeated measures analysis was performed using PROC MIXED in SAS. Means and quartiles are presented for ranked frequencies of scratching.

To evaluate the effectiveness of techniques to stop inappropriate scratching and to encourage scratching designated items, Student's *t*-tests were used to compare the means of scratching frequencies between the cats of survey participants who did and did not use specific

Table 4 Frequency of scratching inappropriate items by type, material and angle of inappropriate item and results of repeated measurement analysis (n = 94)

	Mean frequency of scratching	Interquartile range (Q1–Q3)
By type		
Sofa(s), chair(s), tables or other furniture	3.4[a**]	3.0–5.0
Carpet	2.1[b**]	0.0–4.0
Walls or doorways	0.4[c]	0.0–0.0
Drapes, curtains or other hanging textile items	0.2[c]	0.0–0.0
Other items	0.3[c]	0.0–0.0
By material		
Fabric	3.1[a*]	0.0–5.0
Carpet	2.3[b**]	0.0–5.0
Cardboard	0.2[c]	0.0–0.0
Wood	0.5[c]	0.0–0.0
Leather	0.3[c]	0.0–5.0
Wicker	0.1[c]	0.0–0.0
Other	0.1[c]	0.0–0.0
By angle to the ground		
Vertical angle to the ground	3.3[a*]	2.0–5.0
Parallel to the ground	2.2[b**]	0.0–5.0
Different angle to the ground	0.1[c]	0.0–0.0

Mean frequencies are given as ranked frequencies: 0 = never; 1 = once a month or less; 2 = every 3–4 weeks; 3 = every 1–2 weeks; 4 = more than once a week; 5 = at least once daily. Values with different superscript letters are significantly different. *P <0.01; **P <0.0001

techniques to control inappropriate scratching or also to teach cats to scratch designated items. For this analysis, techniques for stopping the cat from scratching inappropriate items were grouped into the behavior modification categories listed in Table 2. If techniques discussed under 'other' fitted into one of these categories, they were grouped as such. Techniques to teach cats to scratch designated items were grouped into the categories listed in Table 3. None of the techniques mentioned under 'other' fitted into one of these categories. For all Student's *t*-tests, the folded form F statistic was used to test if variances were equal between groups. If unequal, then Satterwaithe's approximation for degrees of freedom for the Student's *t*-test was used

All questionnaire data were entered into Microsoft Office Excel 2010. The repeated-measures model and post-hoc tests were performed with SAS version 9.2. The remainder of the statistical analysis was performed with Stata/IC 10.1 for Windows. All statistical tests were two-sided and the significance level was alpha = 0.05.

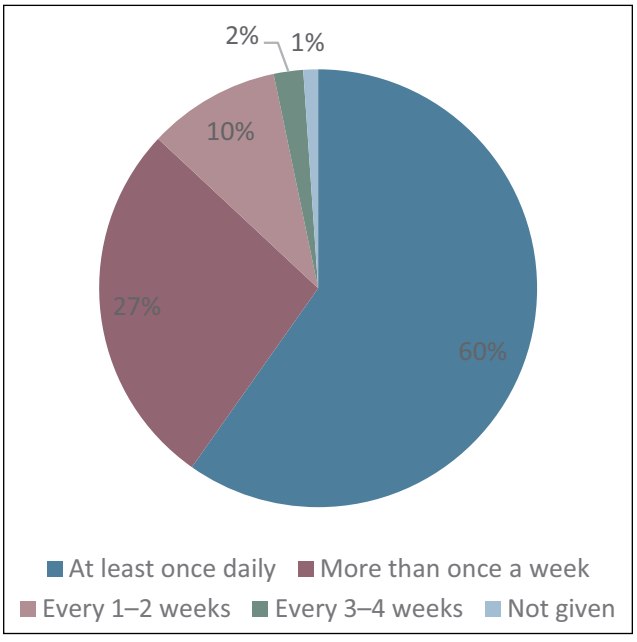

Figure 4 Frequency of scratching inappropriate items was reported for 92 cats. Scratching of inappropriate items was reported for 83.9% of cats (112), with 16.1% of cats not scratching inappropriate objects. Two surveys did not report data on the frequency of inappropriate scratching

Results

Demographic information is summarized in Table 1.

Scratching inappropriate items was reported for 83.9% of cats (n = 112). Information on the features of inappropriate items scratched was not provided in two surveys. The majority of cats scratched inappropriate items at least once daily (Figure 4). Of cats that scratched inappropriate items, most cats scratched one (33.7%) or two (43.5%) different types of items, and 22.8% of cats scratched three or more different types of items (n = 92). Most cats (81.5%) scratched chairs, sofas, tables or other furniture, including beds. Data on the material and angle

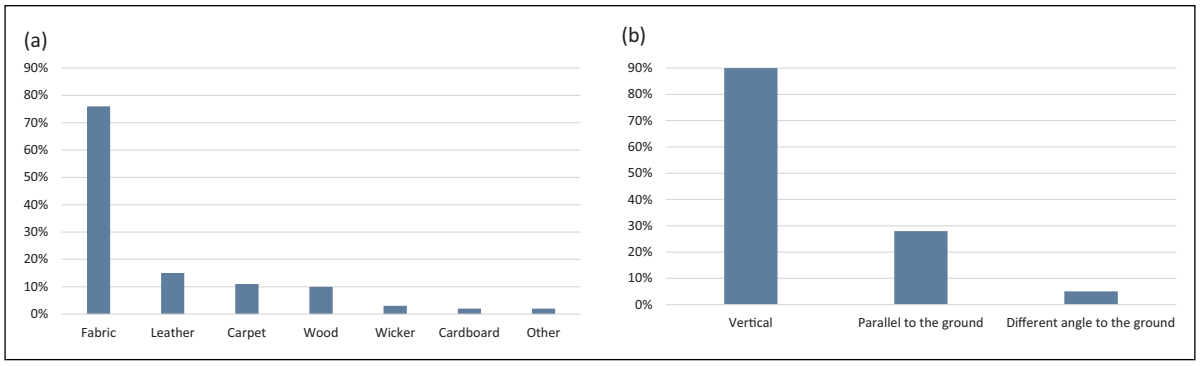

Figure 5 Features of furniture scratched inappropriately. Data on material (a; n = 62) and angle to the ground (b; n = 61). Multiple answers were possible

of the furniture scratched are presented in Figure 5. Nearly two-thirds (64.1%) of the cats that scratched inappropriate items scratched carpet. Scratching of doorways or walls and of drapes, curtains or other hanging textile items, or other items was less common (20.7%, 18.5% and 8.7%, respectively).

The frequency of scratching inappropriate items was significantly influenced by type, material and angle to the ground of the items scratched, with furniture and carpet, fabric and carpet, and vertical to the ground being the types, materials and angle scratched most often, respectively (Table 4).

More than half of owners estimated the amount of damage caused by inappropriate scratching as <US $100 (Figure 1).

The techniques owners used to attempt to stop inappropriate scratching are listed in Table 2. After grouping the techniques in the behavior modification categories given, none of the categories significantly affected the frequency of inappropriate scratching.

For designated scratching items, 3/116 surveys did not report any data. Of the remaining 113 surveys, 76.1% reported that the cat had at least one designated scratching item available, and 23.9% of cats had no designated scratching item. For the 86 cats that had a designated scratching item available, a total of 141 designated scratching items were provided (range 1–5, mean 1.6, median 1). Figure 6 depicts how often cats scratched at least one designated scratching item.

Most cats (69.8%) had a scratching post or pole available, followed by a scratch pad (51.2%) and other type of item (19.8%). Other designated scratching items included cat trees or climbing towers, various items made out of cardboard or newspaper, and household items that were dedicated to scratching, such as door frames, wicker baskets or carpet.

Further information on the features of the designated scratching items could be obtained for 121 items only, as data from seven surveys had to be excluded for this part of the analysis. Most of the 62 scratching posts were made out of carpet (32.3%), sisal rope (19.4%), a combination of

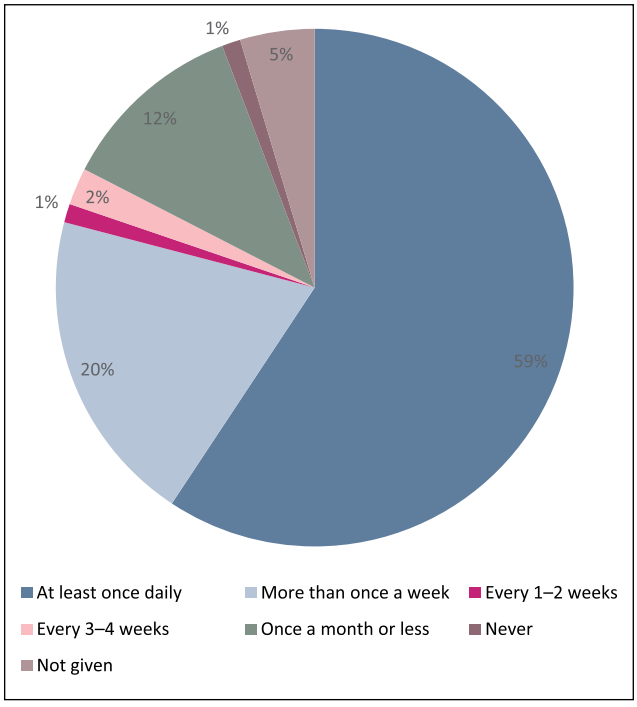

Figure 6 Frequency of scratching designated items (n = 86)

the two (20.4%) or sisal fabric (9.7%). The rest were made out of cardboard, burlap, a combination of several materials or the answer was not given. As expected, most scratching posts (72.6%) were angled vertically to the ground, whereas 9.7% were horizontal, 3.2% were at a different angle to the ground, 12.9% were vertical and horizontal to the ground, and for one scratching pole or post the orientation was not provided. The average length of scratching posts or poles was 82.2 cm (median 62.3 cm, range 30.5–198.1 cm). Most of the 39 scratch pads were made out of cardboard (59.0%) or carpet (15.4%). The remaining scratch pads were made out of sisal, wood, burlap, fabric or a combination of several materials or the answer was not given. More than half (56.4%) of the scratch pads were angled horizontally to the ground, 25.6% vertically, 5.1% were at a different angle to the ground, 5.1% were angled

Table 5 Frequency of scratching designated items by type and results of repeated measurement analysis (n = 79)

	Mean frequency of scratching	Interquartile range (Q1–Q3)
Scratching post	4.1[a*]	0.0–5.0
Scratch pads	3.6[b]	2.0–5.0
Other items	4.6[a*]	5.0–5.0

Mean frequencies are given as ranked frequencies: 0 = never; 1 = once a month or less; 2 = every 3–4 weeks; 3 = every 1–2 weeks; 4 = more than once a week; 5 = at least once daily. Values with different superscript letters are significantly different. *$P < 0.05$

horizontally and vertically, and for 7.7% the answer was not given. The average length of the scratch pads was 47.6 cm (median 45.72 cm, range 12.7–76.2 cm). Most designated scratching items were located in the living or family room and bedroom (see Figure 3).

The frequency of scratching designated items was significantly influenced by type, with cats using scratching posts and other items more often than scratch pads (Table 5), but not by material, angle, length or location of the designated item.

Owner attempts to encourage cats to use a desingated scratching item are summarised in Table 3. Cats of survey participants who attempted to teach their cat to scratch designated items by placing the cat near the item scratched the designated item significantly less than cats of participants who did not use this technique (Table 3). The frequency of scratching designated items was not influenced by any other behavior modification category (Table 3).

The majority of owners did not receive any advice on how to encourage use of a designated item for scratching and nearly half did not receive any advice on how to stop scratching. Sources of advice are given in Figure 2.

Discussion

The method of survey distribution was chosen to avoid voluntary response bias, the bias that results when respondents voluntarily select to participate in a survey.[18] This type of sample selection bias may occur in some online surveys, as they can attract respondents who have a special interest in the topic.[19] To reduce the risk of voluntary response bias of online surveys and ensure a high response rate in the population sampled, we chose to sample only clients of one practice associated with a teaching facility for veterinary medicine, a common method in veterinary research.[17,20,21] The high response rate of >80% indicates a low voluntary response bias. However, we did not record reasons for owners choosing not to fill out the survey and cannot rule out that some owners chose not to participate owing to reasons related to the survey topic. It is likely that our sample of cat owners is not representative of the general cat owner population. For example, students or university professionals may have been over-represented in our sample. We therefore discuss the results in the light of the limitations of the study design and, where possible, in comparison to a recent online survey on feline scratching behavior by Wilson et al.[4]

The frequency of inappropriate scratching was higher than in previous studies,[3,5–7,22] possibly owing to the broad definition of inappropriate scratching. Most cats showed the behavior at least daily, in line with the findings of Wilson et al,[4] and restricted the behavior to only one or two items, which could be indicative of a preference for scratching one specific item, as described by Landsberg.[1]

To our knowledge, this is the first study investigating features of items scratched inappropriately. Cats preferred furniture, mostly covered with fabric and occasionally with leather, and carpet for scratching. Fabric has been discussed in early work as an ideal material,[1] as claws rip through the material, causing a visual and olfactory mark. Designated scratching items in this study and the study by Wilson et al[4] did not offer fabric as material for scratching.

Scratching posts, which were mostly made out of carpet and sisal rope and angled vertically to the ground, were more preferred than scratch pads, which were mainly made out of cardboard and carpet and in a horizontal angle to the ground. From our data, we cannot draw further conclusions, as by themselves the material, angle or length had no effect on the frequency of scratching a designated item. This is in contrast to the findings of Wilson et al,[4] where a reduction in inappropriate scratching with increased scratching post length (>3 ft) and a preference for vertical over horizontal posts and for rope and carpet over cardboard were found.

Most owners reported that the damage caused by inappropriate scratching was worth less than US $100. We did not analyze if the amount of time in the household influenced the amount of damage caused. As we did not specify a minimum time of ownership as inclusion criteria for the study, it is possible that a relatively large proportion of cats owned for only a short period of time skewed the data towards a low amount of damage caused. Further, if we assume an over-representation of students in our sample, then this is likely an under-representation of the damage caused by scratching in the general population.

Interestingly, cats appeared to use the designated scratching item less if owners placed them near the item. Without further data it is difficult to explain this

observation. One possible explanation could be that scratching behavior often occurs within the context of waking or stretching, or after social tension, and that being lifted and carried interrupted the behavior chain. The majority of owners yelled or sprayed water to interrupt scratching, although these strategies did not affect the expression of the undesired behavior in this study or the study by Wilson et al.[4] Previous studies in dogs have confirmed the inferiority of punishment-based methods to modify behaviors.[20,23]

In contrast to Wilson et al,[4] who found that owners who rewarded their cat were more likely to report that the cats used their preferred post at least once daily, we did not find an effect of reward-based training on the frequency of scratching. Reward-based methods are only effective if the cat can create an association between the behavior of scratching the designated item and the reward. It is therefore important that cat owners receive correct advice on how to reward a cat effectively. Earlier surveys of veterinary practices found that only a small percentage of veterinarians routinely inquire about and give advice to prevent behavior problems,[24,25] which seems to be in line with our findings, even if they represent findings of only one practice and the veterinary students involved may have been less likely to give advice on non-core problems at this early stage of their career.

Conclusions

A survey on feline scratching of inappropriate items revealed that furniture covered with fabric is an object frequently scratched. Fabric should be further investigated as a potential material to encourage desired scratching behavior. Scratch pads appeared less desired than scratching posts. Punishment was a common strategy to deter scratching, but did not appear to influence frequency of scratching. The results emphasize the importance of increasing quantity and quality of veterinary advice given to prevent and modify behavior problems. One prerequisite is the availability of data to inform the advice given. This study and the study by Wilson et al[4] are useful to develop a data-based hypothesis on effective preventative measures. These should then be tested in randomized, blinded trials with the goal to develop evidence-based recommendations.

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Supplementary material The questionnaire used in this study is available online as supplementary material.

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