



Evaluation of whisker stress in cats

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Abstract

Objectives The aim of this study was to determine if cats fed from a commercially advertised whisker-friendly dish vs their normal food dish would spend more time at the food dish, eat more and drop less food.

Methods Forty indoor cats were enrolled in the study. Owners fasted their cats for 12 h and fed them their normal measured amount of dry food in their normal dish. Owners filmed their cats eating for up to 5 mins, and measured how much food was eaten and dropped from the dish. Owners then switched to feeding their cats from a whisker-friendly dish for a 7-day transition period. Following this transition, owners were instructed to fast their cats for 12 h and then feed them their normal food from the new dish and film them eating, as previously described. The following day the owners offered food in both dishes to determine their cat's preference.

Results No evidence was found that eating from the whisker-friendly dish increased the amount of time spent eating ($P=0.8$), decreased the amount of food dropped ($P=0.9$) or increased the amount of food eaten ($P=0.7$). The estimated probability for the cats to prefer the whisker-friendly dish was 0.74 with a 95% confidence interval.

Conclusions and relevance Cats fed from a whisker-friendly dish did not spend more time eating, drop less food or eat more food in a 5-min period. Some cats appeared to prefer the new whisker-friendly dish over their normal food dish. Overall, food dish-associated whisker stress did not affect the eating habits of the study cats.

Keywords: Vibrissae; whisker; behavior; gastrointestinal

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Introduction

Mammalian vibrissae, otherwise known as whiskers, are specialized facial hairs consisting of follicle–sinus complexes with elegant somatosensory functions.^{1,2} Whiskers assist the cat in making spatial and environmental assessments.² It is believed by various animal behaviorists, scientists, veterinarians and owners that stimulating or interfering with a cat's whiskers leads to distress, a condition known as whisker stress or whisker fatigue.

Whiskers are sophisticated and complex structures that include functional blood vessels and vibrissa afferents in the trigeminal inter-polar nucleus to distinctly process orofacial sensory information,^{2–6} so it is plausible that if whiskers are negatively stimulated, whisker stress could occur. Cats and other mammals have a unique ability to protract and retract their whiskers to gain information and assess their environment;⁶ for instance, harbor seals can use their mystacial vibrissae as efficiently for active touch as monkeys use their hands.⁷ Additionally, rats have the ability to distinguish different widths associated with adjustable apertures, and need only to be in contact with an aperture for a few hundred milliseconds before determining if their body fits.⁸

Although whisker stress is a popular cultural term, there is very little evidence-based clinical research available to support its existence or impact on domesticated cats. In fact, the term whisker stress is solely found in commentary, perspective and personal-opinion literature. The goal for this study was to determine if domestic cats increase the amount of food eaten, drop less food and spend more time eating when fed from a whisker-friendly dish.

Materials and methods

Study cats

The study was approved by the Washington State University Institutional Animal Care and Use Committee

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(ASAF # 05073-001). Written informed owner consent was obtained prior to participation in the study. Presumed healthy (non-medicated) indoor cats aged 1–12 years (median 7.5 years) that ate dry food out of a stainless steel or ceramic dish were recruited to participate.

Initial whisker assessments were completed at an in-hospital visit. A brief physical examination was performed, and measurements of the eyebrow and muzzle whiskers (including total length across the bridge of the nose and each individual side, as well as whisker description such as curved or slanted in a certain direction) were taken. A front and profile photograph of each feline participant was also recorded.

Study bowls

Owners were asked to bring in their cat's normal food dish to record the diameter and depth of the bowl. A whisker-friendly dish was distributed to each study participant based on the material of their normal bowl (ceramic or stainless steel). Two commercially advertised whisker-friendly dishes were used in the study (ThinkPet Shallow Wide Cat Dish and Jackson Galaxy Eclipse Stainless Steel Bowl; Figure 1). Both bowls advertised minimizing whisker fatigue owing to their shallow depth and wide diameter (ThinkPet dish: 14 cm × 15 cm × 3.5 cm) and (Jackson Galaxy dish: 10 cm × 19 cm × 1 cm).

At home, owners were instructed to withhold food from their cats for 12h and to feed them their normal premeasured amount of dry food in their normal dish. Owners filmed their cats eating for up to 5mins or until the cat walked away, via a smartphone. They also recorded how much food the cats had eaten and how much food was dropped from the dish (number of kibbles). After these measurements were recorded, owners sent this information to the second author (TEF). For the next week, owners fed their cats their normal dry diet from the whisker-friendly dish. Following a 7-day transition, owners were instructed to fast their cats for 12h and film them eating, as previously described. The following day, the owners were instructed to offer food in both food dishes in no specified location (placed left or right) to the cat to determine preference. All the videos were submitted by the owners and reviewed by the second author (TEF) to quantify and verify the amount of time spent at the food bowl, and to witness the amount of food dropped by the cats.



Figure 1 (a) Whisker-friendly stainless steel dish used in the study (10 cm × 19 cm × 1 cm). (b) Whisker-friendly ceramic dish used in the study (14 cm × 15 cm × 3.5 cm)

Statistical analysis

A linear statistic model was used to assess the amount of time spent at the different food dishes, the amount of food dropped and the amount of food eaten. A *t*-statistic for the intercept was used to assess preference between the initial normal food dish and the whisker-friendly dish. Data analysis was performed with commercial software (SAS).

Results

Forty client-owned cats were initially enrolled in the study and 38 cats completed the study. Two cats were omitted because their owners were unable to film the cats while eating. There were 15 spayed female and 23 castrated male cats, of which there were 26 domestic shorthairs, eight domestic longhairs, two domestic medium hairs and two Maine Coons. Nineteen cats used ceramic dishes and 19 used stainless steel dishes. All normal food dishes of participant cats had smaller widths and bigger depths than the study's whisker-friendly dishes.

There was no significant difference seen in time spent eating, amount of food dropped or amount of food eaten when the whisker-friendly dish was used compared with the cats' normal dishes (Table 1).

The estimated probability of the study cats to prefer the whisker-friendly dish over their normal dish was 0.74, with a 95% confidence interval. Owner reports of food dish preference revealed that many cats preferred the whisker-friendly dish over their normal food dish ($n = 24/38$). Nine cats preferred their normal bowl and five cats had no preference.

Table 1 Mean results for the 38 enrolled cats when eating from a whisker-friendly dish and from their normal food dish

	Amount of food eaten (cups)	Amount of food dropped (number of kibbles)	Amount of time spent at bowl (s)
Whisker-friendly dish	0.22 ± 0.07	14.3 ± 26.6	198 ± 75
Normal food dish	0.21 ± 0.07	1 ± 2.2	209 ± 68

Data are mean ± SD

Discussion

The results of our study indicate that cats fed from a whisker-friendly dish did not spend more time eating, drop less food or eat more food in a 5-min recorded period vs eating from their normal food dishes. However, some cats appeared to prefer a whisker-friendly dish over their normal food dish.

Overall, the food dishes did not affect the eating habits of the study cats or support the theory of whisker stress in this population of cats; however, there are some factors that may have affected these results. It is possible that more food could have been eaten if cats were recorded over a longer timeframe. Our study only evaluated a 5-min window, but cats eat multiple small meals throughout the day.^{9,10} We chose a recorded time of 5 mins to increase owner compliance and to capture the initial interest and drive of the cats to eat. We fasted the cats to try and enhance the ability for the owners to watch their cats eat. It is possible that fasting the cats for 12h, and increasing their hunger, affected their food dish preference. It is possible that, despite experiencing whisker stress, if cats are hungry, a negative whisker sensation could be overridden.

We were unable to blind the owners as to which dish was being used, based on the design of our study. We felt it was better to have the cats eat in their own setting with their owners than having additional variables such as having another person present to record them eating or feeding the cats in another environment. We attempted to minimize variables by selecting similar food dish substrates for the cats (stainless steel and ceramic). It is possible that some cats may prefer stainless steel or ceramic, and were not fed from that substrate. As we were not evaluating the different substrates for the cats, we decided to keep the same material for the whisker-friendly dishes as their normal dishes in order to minimize substrate bias.

We did not verify that the study cats were healthy. We relied on owner awareness and our brief physical examinations, and did not enroll any cats receiving any medications. It is possible that some cats could have been dysrexic or nauseated from an unknown chronic disease during the study period. For this study, we purposefully did not exclusively enroll young, healthy animals as we wanted a varied clinical representation. However, it is possible that older cats have become accustomed to whisker stimulation during eating and may have developed 'whisker tolerance'. In the future, a study consisting of younger cats may be helpful to determine if there is a learned response.

Only 12/38 cats increased the amount of food they ate when comparing eating from the whisker-friendly dish with their normal dish. However, 18/38 cats did not change the amount they ate, because those cats ate their entire amount of measured food, regardless of which

food dish it was served from. We could have offered an increased volume of food during the study to determine if those 18/38 cats would truly eat the total amount of food, regardless of the food dish. Alternatively, we could have chosen 'pickier' cats that did not normally eat their whole meal, to better evaluate if the food dish made a difference. Unfortunately, we did not differentiate between food being 'dropped' from a cat's mouth vs food being 'pushed off the bowl'. This was a limitation of the study and was unanticipated and challenging to differentiate by owners and the authors.

Many of the owners (n = 24/38; 63%) responded that their cat preferred to eat from the whisker-friendly bowl when offered food in both dishes side by side. However, the cats were not previously tested for localization preference (left or right), so it is possible that this may have impacted the preferential response. For instance, whichever food dish was closest to the cat may have been selected or just the new whisker-friendly dish could have been chosen because it was 'different', so the cats' preference should be interpreted with caution. Interestingly, many of the owners have decided to continue to use the whisker-friendly bowl for their cat, and even purchased more for their other cats.

Conclusions

The use of whisker-friendly dishes did not increase the time cats spent at their food dish, or the amount of food eaten, nor did cats drop less food. However, more cats preferred the whisker-friendly dish over their normal dish. Further research is warranted to investigate if whisker-friendly dishes are useful in cats.

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Ethical approval This work involved the use of non-experimental animals only (including owned or unowned animals and data from prospective or retrospective studies). Established internationally recognised high standards ('best practice') of individual veterinary clinical patient care were followed. Ethical approval from a committee was therefore not necessarily required.

Informed consent Informed consent (either verbal or written) was obtained from the owner or legal custodian of all animal(s) described in this work (either experimental or

non-experimental animals) for the procedure(s) undertaken (either prospective or retrospective studies). No animals or humans are identifiable within this publication, and therefore additional informed consent for publication was not required.

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