

Daily behavior and interaction of cats (*Felis catus*) with humans at a canteen in IPB University

LIZA MAHERA¹, ASTUTI LATIF¹, SITI SARI AZYATI¹, HANNY RAMADHANTI¹, KANTHI ARUM WIDAYATI^{1*}

¹Department of Biology, Faculty of Mathematic and Natural Science, IPB University, Bogor, Indonesia

Abstract. Understanding feral cat behavior can be one of the aspects that is necessary for proper management and taking policy action in controlling the cat population. This study aimed to observe the daily activities of feral cats and see the correlation between the number of visitors on cat-to-human interaction at a canteen in IPB University. Observation of cat's daily behavior was conducted by scan sampling method and cats' interaction with humans was conducted by ad libitum sampling. Our results showed that self-care (66.27%) dominated the daily behavior of cats followed by negative behavior (20.83%) and affiliative behavior (12.9%). Correlation test showed there was a significant negative correlation between the number of visitors and frequency of affiliative behavior ($p = 0.024$). The number of visitors also shows a positive correlation to self-care ($p = 0.034$). No significant correlation between the number of visitors and negative encounters behavior ($p = 0.27$). The highest frequency value of cat-human interaction was approaching human (A) 28.15%, followed by vocalization (MV) 28.15% and eye contact (KM) 22.71%. Cat-human interaction behavior did not significantly correlate with the number of visitors ($p > 0.05$). Our result implies that the feral cat's use the canteen as a place to rest, not a place to find food and daily activities and human-cat interactions were specific for each study site. Therefore, in the management of feral cats, it was necessary to pay attention to the conditions of their respective habitats.

Keywords: Behavior, Cat-Human, Feral Cat, Interaction

INTRODUCTION

In recent decades, domestic cats (*Felis catus*) have become increasingly popular as pets worldwide [1]. There are three categories of domestic cats: companion cats, stray cats, and feral cats. The definition of various domestic cats used is based on the National Animal Welfare Advisory Committee [2]. A companion cat is a common domestic cat who lives with humans as pet and relying entirely on human for their care and welfare. A stray cat is a former pet cat that has been lost or abandoned by its owner, or choose to leave the household because competition between other cats. Thus, stray cat lives as a stray or stays in a community cat. Stray cats indirectly depend on human and residential centers. They tend to interbreed with fellow unneutered companion cat. Meanwhile, feral cat does not live in residential centers. The size of the feral cat population does not depend on human and is not related to the companion cat population. Feral cat can adapt to the presence of humans if they have socialized with humans from a young age [3].

An increase in the feral cat population leads to an increase in zoonotic diseases spreading and predation on wild animals, humans, and feral cats [4]. Thus, proper and good handling is needed to control the feral cat population. Understanding feral cat behavior can necessary for the appropriate management and implementation of policy action in controlling its population [5].

A study on the daily activity and foraging behavior and its relationship with cat-to-human interaction was conducted [6] by observing the behavior of feral cats in two canteens at IPB University. This study found that feral cats mostly did self-care behavior. The highest cat-to-human interaction was approaching humans and there was no significant difference between observation time, such as morning and daytime and cat-to-human interactions. However, a previous study by [6] did not consider the number of canteen visitors. Furthermore, it is still unclear whether the daily activity of feral cats is the same for each habitat. Thus, this study wants to know the daily activities of feral cats and the correlation between the number of visitors on cat-to-human interaction at a canteen in IPB University.

METHODOLOGY

Data Collection

A total of 42 hours observation of feral cat's behavior was observed in March 2022 at a canteen in IPB

*Corresponding Author:
kanthiarum@gmail.com

Received: 18 June 2022 | Revised: 13 September 2022 |
Accepted: 10 January 2023

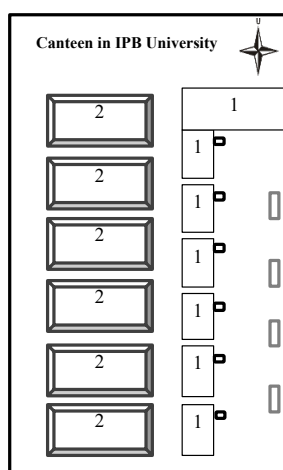


Figure 1. Map of the location for observing cat behavior at a canteen in IPB University. Note: 1. Merchant stall; 2. Table.

University. Four observers take turns monitoring the cat's behavior (Figure 1). This observation was carried out for seven days, starting at 10.00-16.00 WIB (GMT +9). During these observations, all cat behavior data were collected by direct observation, not video. During observations the researchers kept a distance from the cat and did not engage in any behavior that attracted the attention of the cat. This is done by the researchers in order to avoid bias at the time of observation.

Individual identification was made by distinguishing morphological characteristics, including hair color patterns, body size, wounds, and body shape [6]. The research subjects consisted of eight individual cats with three females and five males.

Data Analysis

Information on feral cat's behavior was recorded based on the ethogram (Table 1 and Table 2) and recapitulated for the identification process.

Table 1. Daily behaviour ethogram of feral cat [6,8]

Category	Behavior pattern	Code	Description
Affiliative	Closer	AA	Cat approaching human
	Rub	AG	Cat rubs its body against a surface, object, or observer
	Eye Contact	AK	Cat face to face with humans or fellow cats
	Play	AP	Cat playing with its own limbs, or playing with another cat or an object.
	Roll Up	AR	Cat rolling on a surface
	Vocalization	AV	Cat meows, usually when trying to get something from another cat or person.
	Petted	AE	Cat playing with humans or being petted by humans.
	Expelled	AD	Cat is chased away from humans
Self-care	Eat	PE	Cat eats food
	Foraging	PFO	Cat approaches or sniffs looking for food
	Drink	PD	Cat drinking or licking liquid
	Care	PC	Cat licking its limbs
	Sleep	PS	Cat is inactive or sleeping, eyes are closed but sometimes open, ears are wagging
	Stretch	PN	Cat stretches its whole body
	Yawn	PU	Cat opens its mouth wide, with a long breath
	Scratch	PM	Cat scratching object
	Climb	PP	Cat climbing an object
	Walk	PW	Cat walking exploring around or around
	Defecate	PB	Cat pooping
	Rest	PR	Cat lays down
	Urination	PK	Cat peeing
	Scratch	PG	Cat scratches the ear or other body part using gestures
Negative	Attack	NA	Cat attack other individuals
	Curl up	NB	Cat positions the chest and feet against the surface, the paws are folded in
	Staring	NS	Cat stares at another cat with aggressive intent
	Freeze	NQ	Cat doesn't change position for a long time
	Surprised	NO	Cat jumps unconsciously from being startled
	Alert	NW	Cat in a still position with wide eyes, occasionally wagging ears, observing the surroundings
	Threaten	NT	Cat screams or shows teeth, hair on body standing up, tail straight up
	Fight	NF	2 cats (or more) fighting, attacking each other

Table 2. Ethogram of cat-to-human interaction behavior [6,8]

Category	Code	Description
Approach	A	Behavior of cats approaching humans or food sources
Rejection	AM	Human rejection cat
Eye contact	KM	Cat-human eye contact
Rub	AG	Cat rubs its body to human
Feeding	P	Human feeds cat
Vocalization to human	MV	Cat meows to human
Petted	D	Human stroke cat body

Table 3. Percentage of daily cat behavior

Behavior	Mean $\pm$ SD
Affiliative	12.90 $\pm$ 9.76
Self-care	66.27 $\pm$ 10.67
Negative	20.83 $\pm$ 4.26

Table 4. Frequency of daily cat behaviour

Category	Behavior pattern	Code	Percentage
Affiliative	Closer	AA	5.03%
	Rub	AG	1.64%
	Eye Contact	AK	4.21%
	Play	AP	0.21%
	Roll Up	AR	0.00%
	Vocalization	AV	7.59%
	Petted	AE	4.21%
	Expelled	AD	0.92%
Self-care	Eat	PE	4.21%
	Foraging	PFO	7.49%
	Drink	PD	0.00%
	Care	PC	4.72%
	Sleep	PS	4.72%
	Stretch	PN	0.51%
	Yawn	PU	0.10%
	Scratch	PM	0.00%
	Climb	PP	6.46%
	Walk	PW	21.54%
	Defecate	PB	0.00%
	Rest	PR	7.79%
	Urination	PK	0.31%
	Scratch	PG	1.54%
Negative	Attack	NA	0.00%
	Curl up	NB	0.41%
	Staring	NS	0.21%
	Freeze	NQ	18.67%
	Surprised	NO	0.72%
	Alert	NW	0.21%
	Threaten	NT	0.00%
	Fight	NF	0.10%

The method used in this research is scan sampling method and ad libitum sampling [7]. Scan sampling method was used to observe the daily behavior of cats with 5 minutes intervals. The daily behavior observed was divided into 3 categories (affiliative behavior, self-care and negative behavior). The ad libitum sampling method was used to observe feeding behavior and cat-to-human interaction to obtain food.

Statistical analysis was conducted using Microsoft Excel and R studio version 4.1.3. In order to examine the correlation between daily behavior and cat-to-human interaction, the Spearman correlation test was applied.

RESULTS AND DISCUSSION

Cats' daily behavior

Majority of the feral cat's daily behavior at a canteen in IPB University was self-care behavior were (66.27%), followed by negative behavior (20.83%), and affiliative behavior (12.90%), as shown in Table 3.

This result was similar with previous studies that showed self-care behavior in feral cats had the largest percentage [8,6]. Self-care behavior is a basic need of the body of every animal including feral cats, such as eating, drinking, and sleeping [9,10]. This result was different from previous study which showed that the percentage of affiliative behavior was higher than the negative behavior [6]. From the results of this study, it can be seen that (Table 4) in the affiliative category, AV (Vocalization) is the dominant behavior, the dominant selfcare behavior is PW (Walk) and Negative dominant behavior is NQ (Freeze).

This study predicted that the difference might happen because the cat has felt full, therefore it was freeze behavior even though there was leftover food around. This result also indicated that there was a possibility that the feral cat's use the canteen as a place to rest, not a place to find food.

The analysis results (Table 5) showed a significant positive correlation between the number of visitors around and frequency of self-care behavior ($p = 0.034$). There was a negative correlation between the number of visitors around and frequency of affiliative

Table 5. Correlation between daily cat behavior and the number of visitors around (*Spearman correlation test*)

Behavior	R	P-value
Affiliative	-0.86	0.024
Self-care	0.82	0.034
Negative	-0.5	0.27

Table 6. Correlation between foraging-eating behavior and number of visitors (*Spearman correlation test*)

Behavior	R	P-value
Foraging	-0.57	0.2
Eat	-0.57	0.2

Table 7. Cat-to-human interaction behavior

Behavior	Mean $\pm$ SD
A	30.44 $\pm$ 26.78
AM	2.76 $\pm$ 5.28
KM	22.71 $\pm$ 35.78
AG	6.02 $\pm$ 12.48
P	5.12 $\pm$ 7.68
MV	28.15 $\pm$ 36.18
D	4.81 $\pm$ 7.46

Description: A (Approach); AM (Rejection); KM (Eye contact); AG (Rub); P (Feeding); MV (Vocalization); D (Petted).

Table 8. Cat-to-human interaction behavior and correlation with number of visitors

Behavior	R	P-value
A	-0.11	0.82
AM	-0.67	0.1
KM	-0.52	0.23
AG	0.22	0.63
P	-0.51	0.24
MV	-0.074	0.87
D	-0.7	0.077

Description: A (Approach); AM (Rejection); KM (Eye contact); AG (Rub); P (Feeding); MV (Vocalization); D (Petted)

behavior ($p = 0.024$). On the other hand, there was no correlation between the number of visitors and negative behavior ($p = 0.27$).

In this study, we calculated the total number of visitors per day regardless of the existence of the cat. Thus, there were possibilities that the number of visitors was likely to be high when the cat was not around.

The relationship between foraging and eating behavior towards visitors shows a negative correlation, though not significant (Table 6). It means that an increase in visitors decreases the foraging and eating activity of cats. It might happen due to COVID-19 which most visitors chose to take away instead of eating it in the canteen, thus they did not provide food for the cat. This also indicates that cats do not use this canteen as a main source of food. Since cats prefer closed habitats such

as this canteen structure to shelter and resting, this canteen is likely used as a cats' rest area [11].

Cat-human interaction

The observation of cat-to-human interaction showed that feral cats mostly approach humans (A) 30,44%, followed by vocalization (MV) 28.15% and eye contact (KM) 22.71% (Table 7). This result was similar with previous study [6]. This might happen due to previous visitors' behavior that often give food to the cats. Thus, the cat might associate visitors with food and make the cats approaching human.

Cat-to-human interaction behavior was not significantly correlated with the number of visitors (Table 8), since visitors tend to avoid interactions with feral cats, including feeding interactions and direct physical contact because of the risk of disease and parasite transmission [12]. Based on our findings, daily activities and human-cat interactions were specific for each habitat. Therefore, in the management of feral cats, it was necessary to pay attention to the conditions of their respective habitats.

CONCLUSION

Our results showed that self-care dominates the cat's daily behavior followed by negative behavior and affiliative behavior. The result of observing cat-human interaction showed that the interaction with the highest frequency value is the approach to humans. However, the behavior of cat-human interaction was not correlated with the number of visitors.

ACKNOWLEDGMENT

The authors would like to express gratitude to the lecturers of Animal Bioscience Master Program in Mathematics and Natural Science Faculty. Especially those who teach in animal ecology course. Thank you to IPB University who facilitated this fundamental research.

REFERENCES

- [1] Lepczyk, C.A.; Dauphiné, N.; Bird, D.M.; Conant, S.; Cooper, R.J.; Duffy, D.C.; Hatley, P.J.; Marra, P.P.; Stone, E.; Temple, S.A. 2010. What conservation biologists can do regarding trap-neuter-return: response to Longcore et al. *Con Bio.* **24** 627-629. DOI: 10.1111/j.1523-1739.2009.01426.x.
- [2] National Animal Welfare Advisory Committee (NAWAC). 2007. *Animal welfare (companion cats) code of welfare*. 2007. Auckland: New Zealand. New Zealand Ministry of Agriculture and Forestry.
- [3] Levy, J. K.; Crawford, C. 2004. Humane strategies for controlling feral cat populations. *AVMA.* **225** (9) 1354-1360. DOI: 10.2460/javma.2004.225.1354.

- [4] Kennedy, B.P.A.; Cumming, B.; Brown, W.Y. 2020. Global strategies for population management of domestic cats (*Felis catus*): A systematic review to inform best practice management for remote indigenous communities in Australia. *Animals*. **10** 663. DOI: 10.3390/ani10040663.
- [5] Lepczyk, C.A.; Lohr, C.A.; Duffy, D.C. 2015. A review of cat behavior in relation to disease risk and management options. *Appl. Anim. Behav. Sci.* **173** 29-39. DOI: 10.1016/j.applanim.2015.07.002.
- [6] Julianti, S.; Qomariah I.N.; Anshari, M.A.; Salimah, I.; Widayati, K.A. 2021. Aktivitas harian dan perilaku makan kucing domestik liar di lingkungan kantin IPB. *Al-Kauniyah* **14** (2) 244-253. DOI: 10.15408/kauniyah.v14i2.15730.
- [7] Altmann, J. 1974. Observational study of behavior: Sampling methods. *Behaviour*. 49(3). 227-267.
- [8] Stella, J.; Croney, C.; Buffington T. 2014. Environmental factors that affect the behaviour and welfare of domestic cats (*Felis silvestris catus*) housed in cages. *Appl. Anim. Behav. Sci.* **160** 94-105. DOI: 10.1016/j.applanim.2014.08.006.
- [9] Baumeister, R.F.; Leary M.R. 1995. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychol. Bull.* **117** 497-529. DOI: 10.1037/0033-2909.117.3.497.
- [10] Hofmann, W.; Vohs K.D.; Baumeister, R.F. 2012. What people desire, feel conflicted about, and try to resist in everyday life. *Psychol. Sci.* **23** (6) 582-588. DOI: 10.1177/0956797612437.
- [11] Waap, H.; Gomes, J.; Nunes, T. 2014. Parasite communities in stray cat populations from Lisbon, Portugal. *J. Helminthol.* **88** 389-395. DOI: 10.1017/S0022149X1300031X.
- [12] Lozano, J.; Virgós, E.; Malo, A.F.; Huertas, D.L.; Casanovas, J. 2003. Importance of scrub-pastureland mosaics for wild-living cats occurrence in a Mediterranean area: implication for the conservation of the wildcat (*Felis silvestris*). *Biodivers. Conserv.* **12** 921-935. DOI: 10.1023/A:1022821708594.