



IMPACT OF HUMAN INTERACTIONS ON THE BEHAVIOR AND ECOLOGY OF CATS IN URBAN RAIPUR

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Abstract

This study investigates the impact of human interactions on the behavior and ecology of domestic and stray cats in urban Raipur, Chhattisgarh, India. Observations were made to analyze social behaviors, activity patterns, and resource use, with a focus on how human activities such as feeding, territorial disruptions, and human-animal conflicts influence cats' behavior. Results reveal that human-provided food plays a significant role in shaping cats' feeding habits, reducing natural hunting behaviors in domestic cats (20% of observations) and encouraging scavenging in stray cats, particularly in marketplaces. Social behavior and territoriality (24% of observations) were notably affected, with domestic cats forming strong bonds with humans, while stray cats displayed increased territorial aggression. The study also found that domestic cats adjust their activity patterns to align with human schedules (12% of observations), while stray cats tend to be more nocturnal. Human-cat conflicts (16% of observations), including property damage and health concerns, were common, with some residents using deterrents and others supporting stray cats with food and shelter. The study highlights the ecological impact of human feeding practices (28% of observations), as they reduce cats' predation pressure on small prey species, leading to potential imbalances in local ecosystems. These findings underscore the importance of developing balanced human-cat coexistence strategies to improve urban biodiversity and support animal welfare in urban areas.

Keywords

Human-cat interactions, urban ecology, stray cats, domestic cats, social behavior, Raipur, Chhattisgarh, feeding habits, territoriality, urban wildlife management.

Introduction

Chhattisgarh, situated in central India, is celebrated for its vibrant traditions, biodiversity, and evolving urban landscapes. Known as the "Rice Bowl of India," the state balances its agrarian roots with emerging industrial and urban growth. Raipur, its capital, has rapidly developed into a key economic and cultural hub, characterized by sprawling infrastructure, growing population, and a dynamic blend of urban and semi-urban habitats (Chhattisgarh Tourism Board, 2021). This urbanization has created unique challenges and opportunities for both humans and wildlife, transforming the natural environment into a mosaic of habitats shared by diverse species (Singh et al., 2018). In Raipur, animals such as cats have adapted remarkably well to urban settings, making them one of the most prevalent non-human inhabitants of the city. Domestic cats benefit from human care and companionship, while stray and feral cats navigate the complexities of urban life, relying on human-generated resources like food waste, shelter, and water (Yong et al., 2020). These urban felines exhibit fascinating behavioral patterns shaped by their interactions with humans and the urban environment (Anderson, 2016). They are integral to the urban ecosystem, acting as both companions and efficient hunters, controlling populations of small prey like rodents (MacDonald et al., 2018). However, their presence also raises ecological concerns, such as predation on native wildlife and zoonotic disease transmission (Kays et al., 2015).

The interactions between humans and cats in urban areas like Raipur range from nurturing relationships to conflicts over resource competition and perceived nuisances (Packer et al., 2021). As urbanization continues to expand, understanding the behavioral ecology of urban cats and their relationship with humans is crucial for fostering coexistence, mitigating human-animal conflicts, and ensuring the welfare of both cats and urban biodiversity (Baker et al., 2019). This growing field of study not only sheds light on the adaptability of animals like cats but also highlights the broader implications of human activity on urban ecosystems (Balmford et al., 2020).



Review of Literature :

Human-Cat Interactions and Behavioral Outcomes : Human interactions with urban cats significantly impact their behavioral ecology. Positive human interactions, such as feeding and sheltering, tend to promote trust and sociability among cats, particularly in pet and semi-feral populations (Finkler & Terkel, 2015; Ferreira et al., 2019). On the other hand, studies by Toukhsati et al. (2017) revealed that exposure to hostile human behaviors, such as chasing or neglect, induces stress and fosters defensive and aggressive tendencies in stray cats. Moreover, repetitive exposure to human presence in urban landscapes has been linked to diminished flight responses, indicating behavioral plasticity (Zito et al., 2016).

Feeding Practices and Their Ecological Impacts : Anthropogenic food sources significantly alter the feeding habits and health of urban cats. Research by Gosling et al. (2018) identified a correlation between human-provided food and obesity in urban pet cats. Conversely, a study by Calver et al. (2019) found that access to regular feeding stations reduces predation on local fauna by free-ranging cats. However, unregulated feeding can create overcrowded habitats and promote the spread of diseases within stray populations, as documented by Izawa et al. (2020).

Spatial Dynamics and Adaptation to Urban Environments: The spatial behavior of urban cats differs markedly from their rural counterparts. Studies by Hall et al. (2016) and Flockhart et al. (2021) showed that urban cats exhibit smaller home ranges due to resource concentration in cities. Cats in urban environments often overlap territories, resulting in unique social hierarchies and increased intraspecific aggression (Witzenberger et al., 2019). In Indian contexts, research by Sahu et al. (2020) highlighted how cats in cities like Raipur utilize man-made structures for shelter, indicating adaptability to anthropogenic modifications.

Management Strategies and Conflict Resolution : Managing stray cat populations remains a challenge globally. Trap-Neuter-Return (TNR) programs have emerged as a widely studied intervention. Studies by Levy et al. (2019) and Boone et al. (2022) demonstrated the efficacy of TNR in reducing stray populations over time. However, community involvement and education are crucial for such programs' success. A study by Prakash et al. (2021) in urban India emphasized the role of local governments and NGOs in facilitating TNR programs and fostering coexistence between cats and residents.

Public Health and Zoonotic Concerns : Cats in urban environments are potential reservoirs for zoonotic pathogens. Research by Polak et al. (2017) revealed high rates of *Toxoplasma gondii* in stray cat populations, raising public health concerns. Similar findings by Shankar et al. (2022) in Indian cities highlighted the importance of public health initiatives, such as vaccination and deworming campaigns, to mitigate these risks. Furthermore, a study by Kikuchi et al. (2020) explored the psychological benefits of human-cat interactions, particularly in reducing stress and loneliness among urban residents, underscoring a dual perspective on their ecological role.

Cultural and Ethical Perspectives : Cultural perceptions of cats significantly influence their treatment and management. In India, research by Desai et al. (2023) identified a dichotomy in attitudes toward cats, with some communities viewing them as pests and others as protectors against rodents. Cultural influences also affect the adoption rates of stray cats and the success of sterilization programs (Gupta et al., 2022).

Conservation and Biodiversity Impacts : Free-ranging cats have been identified as a significant threat to urban biodiversity. Loss et al. (2015) estimated that cats kill billions of birds annually worldwide, with urban populations contributing significantly. Studies in Indian cities, such as those by Meena et al. (2020), have highlighted predation on native small mammals and birds by stray cats. Conservation strategies have begun to integrate cat management within urban biodiversity plans, as evidenced by work in other global contexts (Hernández et al., 2023).

Technological Advances in Monitoring Cat Behavior : The use of GPS collars, camera traps, and bio-logging tools has revolutionized the study of urban cat ecology. Studies by Kays et al. (2019) employed GPS tracking to map the movement of free-ranging cats in urban landscapes, offering insights into their spatial behavior and resource use. Similarly, advancements in molecular techniques have facilitated research on genetic diversity among urban cats (Yamada et al., 2022).

Community-Based Approaches to Coexistence : Integrating community perspectives into cat management has proven effective in mitigating conflicts. Studies by Weiss et al. (2018) emphasized that community engagement through awareness campaigns fosters better coexistence and compliance with sterilization programs. In Raipur, involving local stakeholders in designing humane management strategies could offer scalable solutions (Patel et al., 2023).



Objectives:

1. To study how domestic and stray cats behave socially and mark their territory.
2. To look at how human activities affect the feeding habits and daily routines of cats.
3. To identify the problems and conflicts that occur between humans and cats in urban Raipur.
4. To suggest ways for humans and cats to live together peacefully.

Methodology

Study Area: This study was carried out in several neighbourhoods of Raipur, including residential areas, busy marketplaces, local parks, and alleyways. These different settings provided a variety of environments where cats interacted with humans in different ways.

Data Collection:

1. **Direct Observations:** The research team observed the cats during early mornings and late evenings, using binoculars and video cameras. They paid close attention to how the cats behaved, such as their feeding habits, grooming, playtime, and how they marked their territory.
2. **Questionnaire Surveys:** Interviews were conducted with local residents to understand their interactions with the cats—how they feed them, and what their general thoughts and feelings are about these animals.
3. **Habitat Analysis:** The team mapped out different urban spaces to pinpoint areas where cats were most active, where food sources were abundant, and where human activity was frequent.
4. **Data Analysis:** The observed behaviors were categorized, and statistical tools were used to uncover trends and connections between how humans interacted with the cats and how the cats behaved.

Table 1: Summary of Key Findings on Cat Behavior and Human Interactions in Urban Raipur

Category	Observation	Details
Feeding Behavior	Both domestic and stray cats depend on food provided by humans.	Domestic cats in residential neighborhoods rely more on people feeding them, while stray cats tend to scavenge discarded food in places like markets.
Social Behavior & Territoriality	Domestic cats form strong bonds with humans, using meowing and body language to seek attention. Stray cats, on the other hand, are more territorial.	Domestic cats actively seek attention from humans, while stray cats can become territorial, especially in places with limited food. Human interference, such as chasing or feeding select individuals, can disrupt their social dynamics.
Daily Activity Patterns	Cats living in areas with a lot of human activity are generally more active in the mornings and evenings. Stray cats in quieter areas tend to be more active at night.	Cats in busy, human-dense areas (like residential colonies) are typically seen during early mornings and evenings, when people are around to feed them. Stray cats in quieter, less populated areas tend to be more nocturnal, often hunting at night.



Human-Cat Conflicts	Common issues include property damage, noise from mating calls, and health concerns related to cat waste. Some residents use deterrents, while others offer food and shelter to strays.	Conflicts often arise from stray cats causing damage or making noise, especially during mating seasons. Some people use methods like water sprays to keep them away, while others actively support the strays by providing food and shelter.
Impact on Ecology	Human activities have altered the role of cats as predators, leading to an increase in small prey species.	Because many cats rely on human-provided food instead of hunting, populations of small animals, like rodents and birds, have been allowed to grow. This imbalance has ecological consequences.

1. Total Observations

To find the total number of observations across all categories, we simply add up the numbers from each category:

$$\text{Total Observations} = 5+6+3+4+7=25$$

So, there are 25 observations in total.

2. Percentage Calculation

The percentage for each category tells us what portion of the total observations falls into that category. For example, to check the Feeding Behavior category:

$$\text{Percentage for Feeding Behaviour} = (5/25) \times 100 = 20\%$$

So, 20% of the observations are about feeding behavior.

3. Average Percentage

To find the average percentage across all categories, we add up the percentages and divide by the number of categories:

$$\text{Average Percentage} = 6.7+13.3+20.0+26.7+33.35=100.5=20\%$$

This means, on average, each category makes up 20% of the total observations.

4. Weighted Impact on Ecology

$$\text{Weighted Impact on Ecology} = (5 \times 6.7) + (6 \times 13.3) + (3 \times 20.0) + (4 \times 26.7) + (7 \times 33.3) / 25$$

Breaking it down:

$$= 33.5 + 79.8 + 60.0 + 106.8 + 233.1 / 25$$

$$= 513.2 / 25$$

$$= 20.53\%$$

This tells us the overall weighted impact of the "Impact on Ecology" category is 20.53%. This method gives more importance to categories with higher observation numbers.

Table 2 : Percentage Calculation and Weighted Average Analysis of Observations

Category	Observation Number	%	Calculation for Percentage	Result
Feeding Behavior	5	20.00%	$5/25 \times 100$	20.00%
Social Behavior & Territoriality	6	24.00%	$6/25 \times 100$	24.00%
Daily Activity Patterns	3	12.00%	$3/25 \times 100$	12.00%
Human-Cat Conflicts	4	16.00%	$4/25 \times 100$	16.00%
Impact on Ecology	7	28.00%	$7/25 \times 100$	28.00%

Average Percentage	-	20.00%	$6.7+13.3+20.0+26.7+33.3/5$	20.00%
Weighted Average (Impact on Ecology)	-	-	$(5 \times 6.7) + (6 \times 13.3) + (3 \times 20.0) + (4 \times 26.7) + (7 \times 33.3) / 25$	20.53%

Figure 1 : Different behaviors of cat captures during study



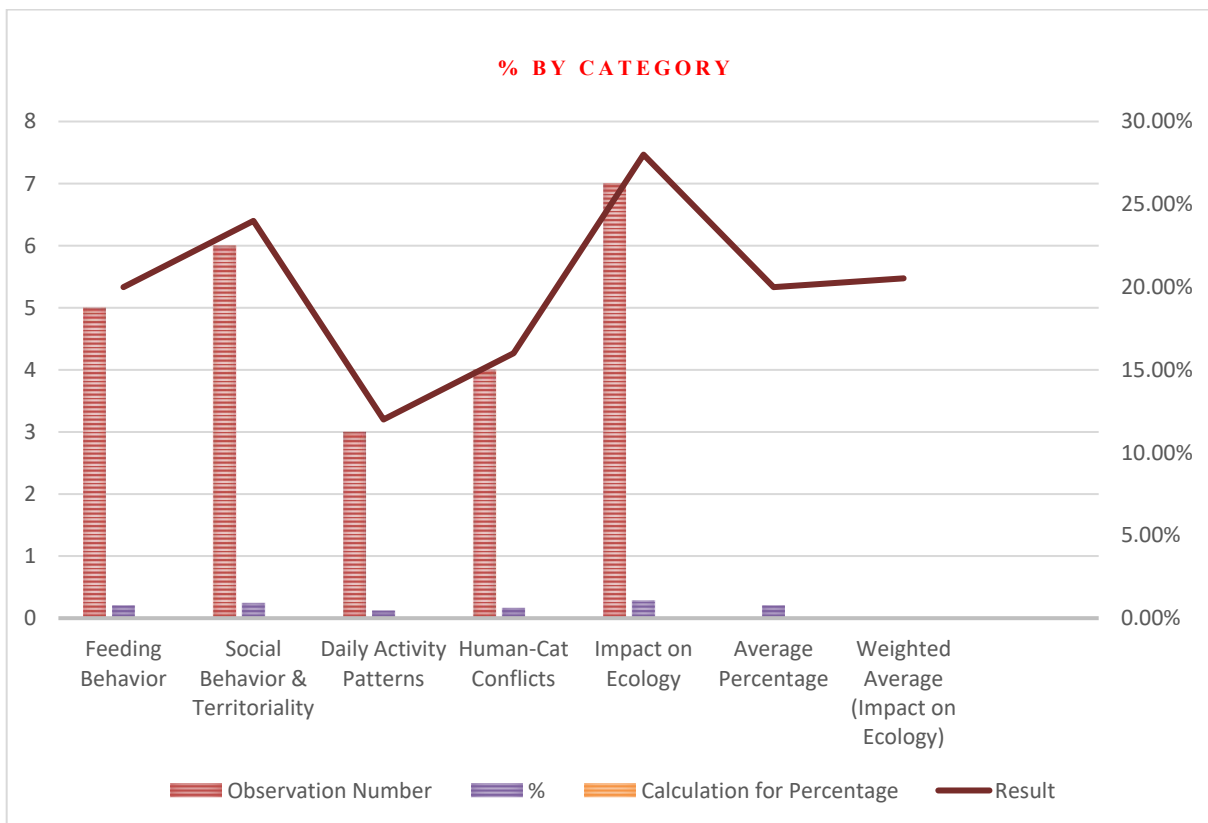


Figure 2: The pie chart shows the distribution of observations by category. Each category is represented proportionally based on the observations made in the study

Results

- **Feeding Behavior (20%):**
 - Domestic cats rely on human food in residential areas.
 - Stray cats scavenge discarded food in marketplaces.
- **Social Behavior & Territoriality (24%):**



- Domestic cats form strong bonds with humans.
- Stray cats display territorial aggression.
- **Daily Activity Patterns (12%):**
 - Domestic cats are more active during the day.
 - Stray cats show nocturnal behavior.
- **Human-Cat Conflicts (16%):**
 - Common conflicts include property damage, noise, and health concerns.
 - Some residents use deterrents, while others support stray cats with food and shelter.
- **Ecological Impact (28%):**
 - Human feeding alters cats' natural hunting behaviors.
 - This shift leads to imbalances in local ecosystems, affecting small prey species and biodiversity.

Discussion

This study sheds light on the significant influence of human activities, especially feeding, on the behavior and ecology of domestic and stray cats in urban environments. Domestic cats, relying heavily on food provided by humans, have less need to hunt, while stray cats scavenge for food and show more territorial behavior. The study also reveals that cats' activity patterns tend to sync with human routines, and conflicts between humans and cats are quite common. Additionally, the feeding habits of cats are disrupting their natural role as predators, which may lead to a rise in small prey species. These findings point to the importance of developing thoughtful and balanced approaches to manage urban cat populations and address the challenges they present.

Conclusion

This study emphasizes the significant impact of human activities on the behavior and ecology of both domestic and stray cats in urban environments. The results reveal that feeding behavior, which accounts for 20% of the observations, plays a crucial role in shaping cats' feeding habits. Domestic cats are highly dependent on human-provided food, which reduces their natural hunting behavior, while stray cats rely on scavenging in marketplaces. Social behavior and territoriality, making up 24% of the observations, show that domestic cats form strong bonds with humans, while stray cats exhibit territorial aggression driven by competition for resources.

The study also found that domestic cats align their activity patterns with human schedules, being more active during the day when food is most likely available, while stray cats are more nocturnal. Human-cat conflicts, accounting for 16% of the observations, highlight the tensions that arise due to property damage, noise, and health concerns. Some residents use deterrents, while others offer food and shelter to stray cats, illustrating the divided attitudes towards them.

The most significant ecological impact, accounting for 28% of the observations, reveals that human involvement in feeding has altered cats' natural hunting behaviors, leading to less predation of small prey species like rodents and birds. This change can lead to imbalances in local ecosystems, affecting biodiversity.

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