Time of Day & Its Influence on Feline Behavior

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Introduction

Observing and understanding cat behaviors–particularly grooming, resting, and social interaction–offers valuable insights into improving their overall wellbeing, especially in sanctuary environments. Cats are naturally crepuscular, indicating that their peak activity levels occur at dawn and dusk. It was observed by researchers that cats have two main peaks of activity: one just before sunrise, and another in the evening before sunset (Parker, Lamoureux, Challet, Depute, Biourge, & Serra, 2019). These natural rhythms influence many key behaviors exhibited by felines, making time of day an important element when developing effective management strategies that reduce stress and promote healthy interactions with cat sanctuaries.

Grooming plays a vital role in a cat's life, serving purposes like hygiene, maintenance, thermoregulation, and strengthening social connections–particularly between mothers and their kittens. In colony settings, grooming, along with other behaviors such as rubbing and sleeping in close proximity, serves to strengthen social bonds (Crowell-Davis, Curtis, & Knowles, 2004). While in group settings, cats can form close-knit relationships with certain individuals while also maintaining a sense of independence from others. Lastly, grooming habits are also influenced by environmental and social factors, such as group density and composition, which can affect how frequently and for how long cats engage in these behaviors (Gouveia, Magalhães, & de Sousa, 2011).

The social structure of cats is strongly influenced by biotic and abiotic factors such as the availability of resources. When resources are limited, stress and tension can escalate, potentially leading to conflicts within the group dynamic. However, research has shown that providing ample space and enrichment helps ease these issues. In more enriched environments, cats are more likely to exhibit playful and grooming behaviors while showing a notable reduction in aggression overall (Wojtaś, Czyżowski, Kaszycka, Kaliszyk, & Karpiński, 2024). These findings highlight the importance of careful sanctuary planning and management to stimulate positive behavioral outcomes among group-housed cats.

Building on these insights, this study investigates how time of day influences grooming, resting, and social behaviors in cats, with the goal of providing better care in environments like rescue centers and sanctuaries. By focusing on how behaviors vary across different times of the day, the study seeks to grow our understanding of how daily cycles impact feline prosperity. Specifically, this study examines how the time of day influences the activity patterns and social behaviors of cats. Based on existing research, we hypothesize that cats will spend more time grooming or resting in the afternoon compared to the morning, as suggested by their lower activity levels in the afternoon. Adding on, we also hypothesize that cats will be more sociable in the morning than in the afternoon, corresponding with their heightened activity levels earlier in

the day. Through this exploration, this research strives to enhance our understanding of feline behavior and provide more practical recommendations based on our findings to improve the health and wellness of cats in managed-environments.

Methods

Sixteen cats were observed from two different rescues/sanctuaries, and three separate feline living quarters. The cats varied in age, breed, and sex, representing a diverse sample of rescue populations. Each cat has a unique identification number associated with its physical characteristics so that an individual cat may be identified and observed multiple times. The observations took place via live camera footage provided by Kitten Rescue Sanctuary (n.d), FeLV Suite at Kitten Rescue (n.d.), and Friends of Felines Rescue (n.d). The observations were conducted in two different time periods: morning, defined as 6:00 AM to 10:00 AM, and afternoon, defined as 12:00 PM to 4:00 PM. Focal sampling was used to observe the individual cats, allowing for analysis of a broad range of behaviors. Focal sampling was chosen due to its ability to cover a variety of behaviors in depth, as well as to reduce observer bias. Each focal period lasted three minutes during which a singular cat was observed before proceeding to the next cat. Each cat was observed twice to account for any recurring behaviors specific to an individual, once in the morning and once in the afternoon. Altogether the cats were observed for a total of 96 minutes across group members.

This study aimed to understand how time of day influences feline behavior, particularly in rescue cats housed in group settings. The coding scheme (Figure 1) consists of nine variables designed to address this objective. The environmental variables (location, date, local time, and ID) are recorded to provide context for each observation and can be used to identify behaviors specific to certain groups or situational contexts. Local time is particularly important as it serves as the foundation for the analysis in this study and may significantly influence feline behavior as it is directly correlated with the circadian system.

To assess social behavior the play, aggression, talk, focus, and social distance variables were introduced. The play variable measures how a cat engages in appropriate play behaviors, such as interacting with toys or other cats in a typical and friendly manner. Aggressive behaviors such as hissing, biting, or swatting are measured to analyze social relationships between cats and assess potential conflicts within the group. ‘Talk’, or feline vocalizations, measures sociable behavior from the focal cat as vocalizations are used as a means of communicating. Focus is a key variable to categorize the primary focus of an individual cat in order to simplify motives and situational context for behavior. Social distance is another key variable to measure social behaviors, as increased social distance between cats decreases sociability. The ‘sociability’ of a cat is defined as the combination of these variables, with pair or group play, vocalizations, decreased social distance, and a focus on another cat or human increasing a cat's sociability, while isolation and aggression decrease a cat's sociability. Self-maintenance behaviors in felines play a vital role in their daily routines, so rest and grooming variables were defined to measure

their frequency and patterns. Lastly, as human interaction may affect feline behavior and social relationships, a human variable was included to assess this effect.

Variable	**Code**	**Description**
Location	N/A	The name of the rescue/sanctuary & its city and state
Date	N/A	The date of the observation in the MM-DD format
Local Time	N/A	The local start time of the observation in the XX:XX AM/PM EST/PST format
ID	N/A	A numerical identifier for the focal cat so that it may be revisited, see cat-key for ID/cat description pairings
Play	**[no]**	No: The focal cat is not playing
	[a]	Alone: The focal cat is playing with no other cats
	[p]	Pair: The focal cat is playing with one other cat
	[g]	Group: The focal cat is playing with more than one other cat
Aggression	**[no]**	No: None of the below signs of aggression
	[h]	Hissing: The focal cat hisses
	[b]	Biting: The focal cat bites another cat
	[s]	Swatting: The focal cat swats or hits another cat with its paw
	[mult]	Multiple: The focal cat shows a combination of the above signs of aggression
Rest	**[s]**	Sleeping: The focal cat is asleep for the majority of the observation period (at least 1.5 mins)
	[r]	Resting: The focal cat is awake and laying down with little movement (at least 1.5 mins)
	[a]	Active: The focal cat is awake and active for the majority of the observation period (at least 1.5 mins)
Talk	**[no]**	No: The focal cat does not make any vocalizations

	[m]	Meow: The focal cat meows
	[t]	Trill: The focal cat chirps or trills
	[g]	Growling: The focal cat growls
Focus	**[no]**	No: The focal cat does not primarily focus on any one thing or is asleep
	[env]	Environment: The focal cat is primarily focused on watching/scanning its environment
	[cat]	Cat: The focal cat is primarily focused on another cat or group of cats
	[toy]	Toy: The focal cat is primarily focused on a toy or object/furniture it is playing with
	[food]	Food: The focal cat is primarily focused on food or drinking water
	[self]	Self: The focal cat is primarily focused on itself (e.g. grooming, kneading, playing with self and no external toy)
	[hum]	Human: the focal cat is primarily focused on a human
Social Distance	**[t]**	Touching: The focal cat is touching another cat
	[cl]	Close: the focal cat is within 2 feet of another cat
	[med]	Medium: the focal cat is between 2 - 3 feet away from another cat
	[iso]	Isolated: the focal cat is more than 3 feet away from another cat
Groom	**[no]**	No: The focal cat has not engaged in grooming
	[self]	Self-grooming: The focal cat has engaged in self-grooming
	[cat]	Other Cat Grooming: The focal cat has engaged in grooming another cat or cats
Human	**[yes]**	Yes: There is a human present in the cat room
	[no]	No: There is not a human present in the cat room

Figure 1: The coding scheme used during observations

Results

This study sought to investigate how time of day influences grooming, resting, and social behaviors in cats. The hypotheses proposed that cats would spend more time grooming or resting in the afternoon than the morning, and cats would be more sociable in the morning than in the afternoon, aligning with their natural crepuscular activity peaks at dawn and dusk. To test these hypotheses, behavioral data was collected and categorized into "morning" and "afternoon" sessions, as detailed in the methodology section, analyzing many behaviors such as grooming, resting, and playfulness.

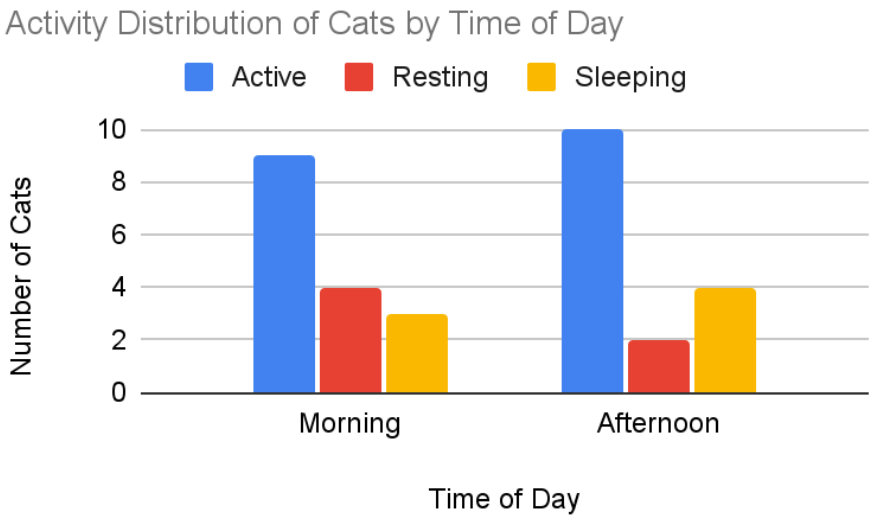

Figure 2: Activity Distribution of Cats by Time of Day

The chart shows high activity in both periods, with 56.25% active in the morning and 62.5% in the afternoon. Resting was more common in the morning, while sleeping increased to 25% in the afternoon.

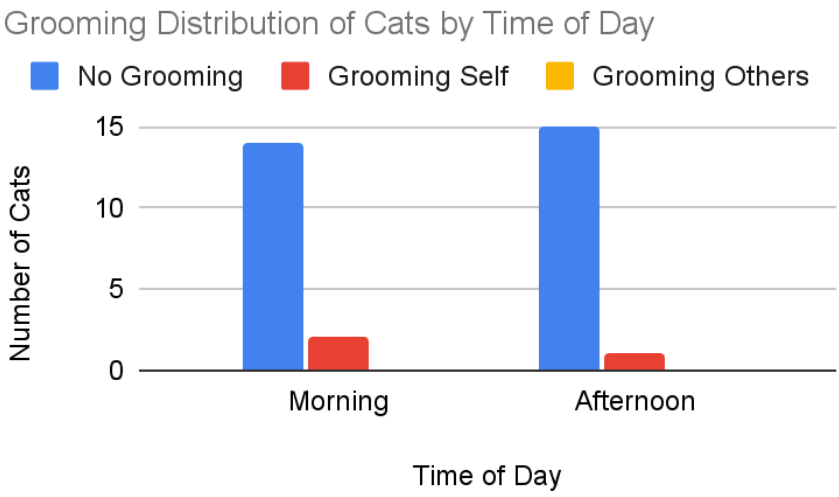

Figure 3: Grooming Distribution of Cats by Time of Day

Most cats did not groom, with 12.5% self-grooming in the morning compared to 6.25% in the afternoon. Grooming others was not observed.

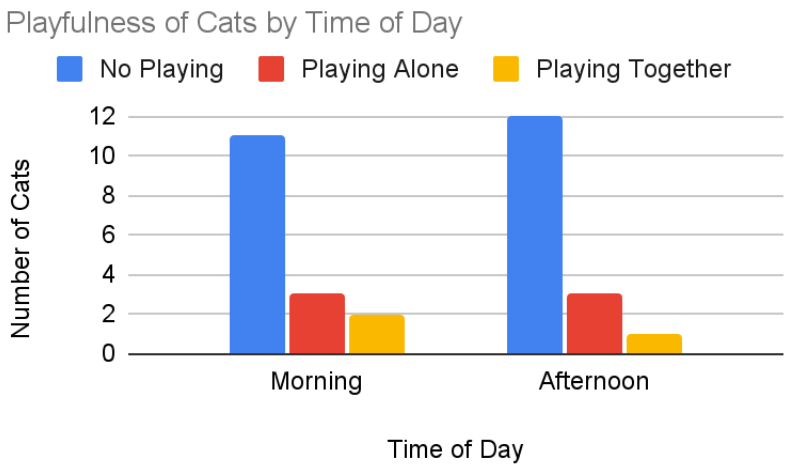

Figure 4: Playfulness of Cats by Time of Day

The bar chart depicts that, in both time periods, the majority of cats were not engaged in play. 31.25% of cats were playing in the morning while only 25% of cats were playing in the afternoon, suggesting that cats were more playful and social in the morning.

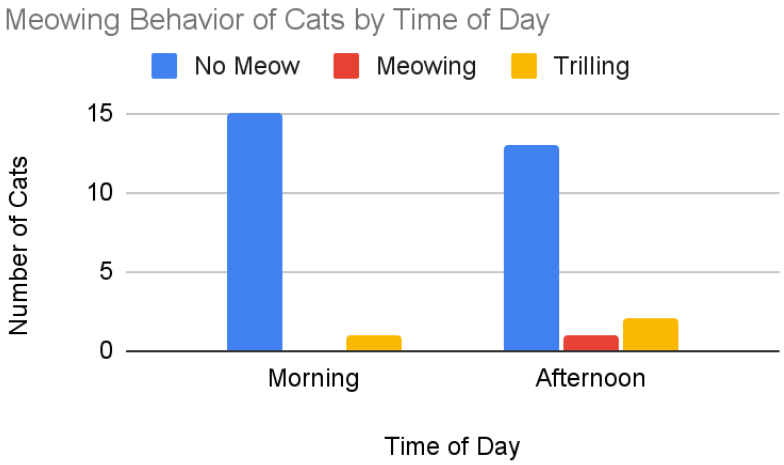

Figure 5: Meowing Behavior of Cats by Time of Day

The chart shows most cats were silent, with meowing only in the afternoon and trilling more frequent then (12.5%) than in the morning (6.25%), indicating greater vocalization in the afternoon.

Discussion

The results of the study reveal minimal differences in how time of day influences feline behavior, suggesting that self-maintenance activities, such as grooming and resting, as well as social behaviors remain relatively consistent across morning and afternoon periods. As the differences between morning and afternoon were minimal, they reinforce the notion that feline activities such as grooming, resting, and social interactions are influenced more by environmental factors and group dynamics than by time of day alone. Contrary to both hypotheses that cats would show increased grooming or resting behaviors in the afternoon and more social behaviors in the morning, the observed behaviors showed little variability throughout the day.

Activity levels were slightly higher in the afternoon than the morning, with resting being more common than sleeping in the morning (Figure 2). Though minimal, this shift away from crepuscular patterns can be explained through the works of Parker et al. (2019), suggesting that the cats have adjusted their activity patterns to adapt to their shared environment. With resources such as food, shelter, and safe spaces accommodated for the need for pronounced behavioral shifts is reduced. As emphasized by Crowll-Davis et al. (2004), grooming remains a critical component of both hygiene and social bonding in cats. As the majority of cats observed were not grooming (Figure 3), we can infer that group dynamics and other environmental factors are crucial in shaping these behaviors. High density of feline population, lack of group bond due to relatively high turnover in rescues, or general age, temperament, and social dynamics are just a few of the factors that may be contributing to lower levels of self-maintenance in this population.

Alternatively, the cats may be engaging in these behaviors in out of view areas, including secluded animal safe spaces or camera blindspots. It is also probable that grooming behaviors occurred during unobserved periods or periods where other cats were being observed. The hypothesis that cats spend more time grooming and resting in the afternoon than the morning is shown to be false by the observations from this study.

Vocalizations, while infrequent, showed an increase in the afternoon (Figure 5), while play behaviors remained relatively consistent across the morning and afternoon, with a slight decrease in play behavior in the afternoon (Figure 4). Afternoon vocalizations, including meowing and trilling, may reflect cats' responses to feeding times, human interactions, or other daily routines within the sanctuary environment. This finding aligns with the notion that vocalizations serve communicative purposes, though the infrequency demonstrates that vocalizations are not the primary form for communication between felines, and tend to be more common in cat-human communication or in kittens. In contrast, the minor decline in play behaviors may indicate that play behaviors, similar to grooming and resting behaviors, are determined more by social and environmental factors than by time of day alone. Changes in frequency of human interaction, fewer enrichment activities, or feeding times could alter the patterns and behavior of felines in regards to play. The hypothesis that cats are more sociable in the morning than the afternoon is shown to be false by the observations from this study. While there is a slight increase in play behaviors in the morning, it is both not significant and also negated by the decrease in vocalizations.

Several limitations may have impacted this study's outcomes. The focal periods are relatively short and reliance on focal sampling may have left key behaviors uncaptured. In addition, only 16 cats were observed, with each cat only being observed once in the morning and once in the afternoon. To improve accuracy and reliability in future studies the focal period should be lengthened and the number of subjects should be increased significantly. Another limitation of this study was the time period restriction of morning and afternoon. In future studies all time periods should be observed, with the day being split into six 4-hour periods to maximize the behavioral shifts observed. Additionally, there are many unaccounted for environmental factors that may influence feline behavior. Time of sunrise, temperature, and feline population density should be recorded and considered when discussing implications. It should also be noted that the main room for the Friends of Felines Rescue Center has 24/7 artificial light which can affect feline behavior and circadian rhythms. It is unknown whether or not the cats have an additional room with no artificial lighting during the night. Future research could also explore the impact of specific environmental enrichment activities, such as interactive toys or access to outdoor spaces. While this study found minimal differences in feline behaviors between morning and afternoon, the results highlight the interaction between time of day, environmental factors, and social dynamics in shaping feline behaviors, which is crucial to understand to improve rescue and shelter experiences.

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