

ENHANCING
LIVING SPACES
FOR **INDOOR CATS**

DORIS LAU | N9945512 | DNH803 | APPLIED DESIGN RESEARCH 1 & 2
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Abstract

Although the cat is now one of the most popular choices for a household pet, they are an unlikely animal for domestication due to their natural characteristics, and their minimal interactions with humans in the past. Their domestication happened through natural selection resulting in them retaining their wild behaviours which can sometimes prove problematic for owners especially when they are solely housed indoors – an environment designed for humans. An indoor living space is generally based on the family lifestyle however, consideration for the pet is rarely seen, even though they are thought of as an important family member. This is more so for the domestic cat which can show problematic behaviours in an environment unsuitable to them. This study examines the possible opportunities in which indoor living spaces for domestic cats could be enriched, to better fit them in human homes.



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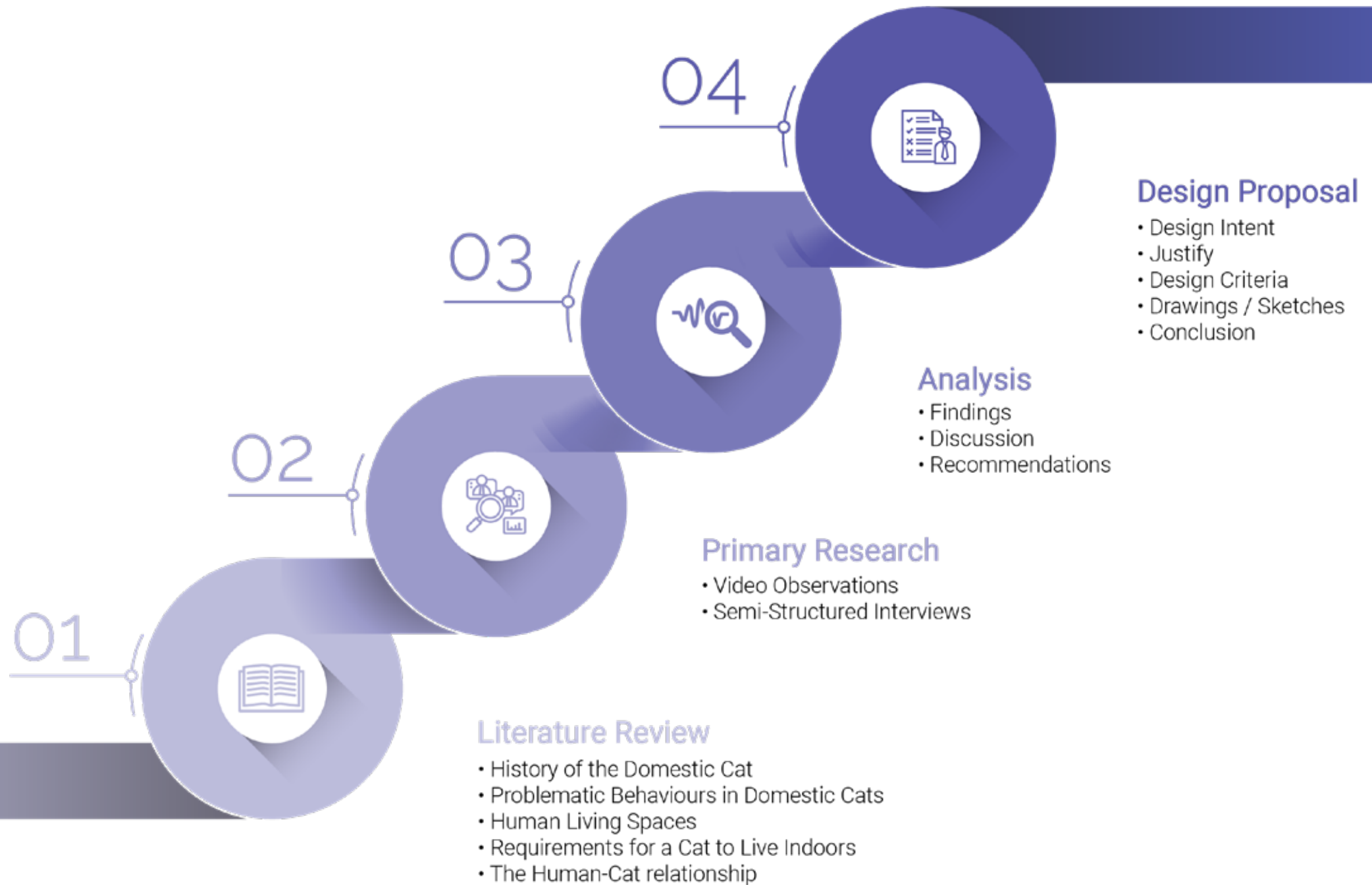
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Research Report Outline



1.0

Introduction





INTRODUCTION

Domestic cats are a common and widely loved household pet, owned by over a quarter of Australian households (ABS, 2007). They serve as partners for confiding with and can form a strong bond with humans over their lifetime. Cats have no problem adapting to life in a human home and yet, retain part of their wild instincts as a carnivore, often behaving whimsically or independently at times. This is because the domestic cat only attained fully domesticated status 3,600 years ago in Egypt which is fairly recent compared to dogs, domesticated about 15,000 years ago (Driscoll, Clutton-Brock et al., 2009; Jongman, 2007). Genetically, wild and domestic cats are almost identical explaining why their psyche is still very much the same, and why they behave almost antagonistically and enigmatically from time to time. As much as these qualities are charming for people who adore cats, they may also be the reason why cats are mistrusted and disliked by others. Common problematic behaviours of cats noted by owners include inappropriate elimination, scratching, aggression, anxiety, eating problems, vocalizations, and excessive activity (Jongman, 2007, p. 193). Without proper knowledge, these behaviours can appear to be done intentionally to spite the owner however, they are often just natural behaviours required to be redirected onto an appropriate object or place. Although there are many products on the market for cats, it is difficult to find something that satisfies what the human wants in their house, and what a cat would like for their 'problematic' behaviours to be redirected to. Housing is designed for humans as the primary end-user, without much consideration for the natural behaviours of household pets – more specifically domestic cats – creating an opportunity for living spaces in homes to be enriched for cat usage.

This project aims to explore the natural behaviours of the domestic cat in order to enhance their lives in living spaces designed for humans. Origin, behaviour and psychology of felines will be analysed to better understand natural behaviours deemed problematic for humans and the reasons why they act that way, to find supplements that negative behaviours could be redirected towards inside a human living space.

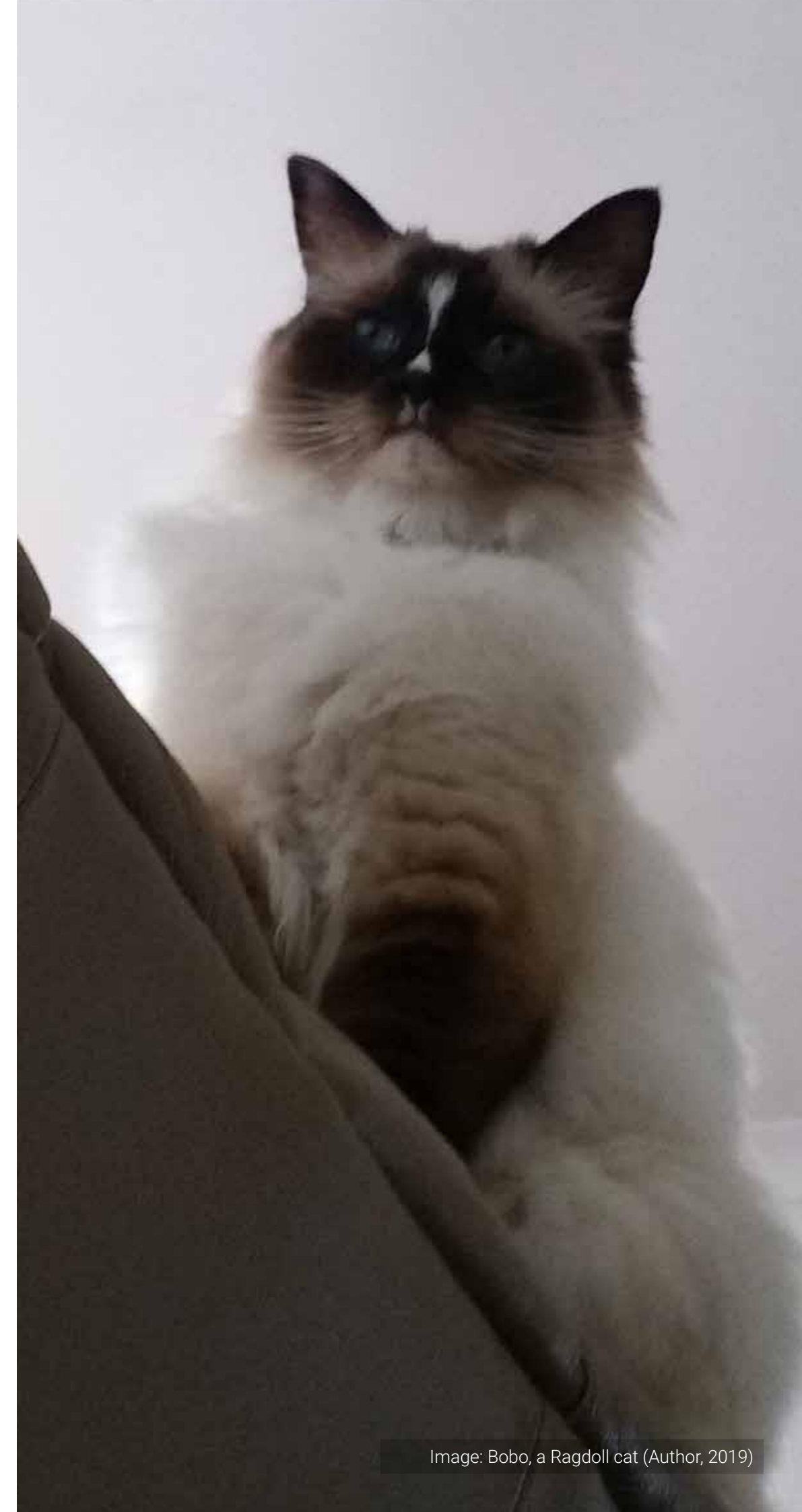


Image: Bobo, a Ragdoll cat (Author, 2019)

2.0

Literature Review

This chapter outlines the different themes that make up the overarching research topic of the indoor living environment of the domestic cat. These themes are investigated and analysed to form a research gap (section 2.6), guiding the direction of the project.





LITERATURE REVIEW

2.1 History of the Domestic Cat

To fully understand the nature of the domestic cat and how they have adapted to living with humans, an overview of their history must be reviewed. The domestic cat, *Felis silvestris catus*, takes its roots from the African wildcat, *Felis silvestris lybica*, which first began its association with humans about 11,000 years ago in the Fertile Crescent (Middle East) however, it was not until about 3,600 years ago when the cat was unmistakably 'fully' domesticated in Egypt (Driscoll, Clutton-Brock et al., 2009; Jongman, 2007; Serpell, 2000). There has been much debate over when the cat attained full domestication as studies on cats were widely overlooked because they were never really exploited by humans, rare in archaeological contexts and difficult to identify based on structure (Ottoni & Neer, 2020, p. 39). Experts traditionally thought domestication of the cat was first completed by the Egyptians based on evidence from figurative art of cats in domestic settings. It was not until a discovery in 2004 where archaeologists found a 9,500-year-old burial of an adult human and cat in Cyprus which suggested that the relationship between humans and cats had begun much earlier (Driscoll, Clutton-Brock et al., 2009; Ottoni & Neer, 2020). Since felids are not native to Cyprus, it can be implied that they must have been introduced by seafaring Neolithic farmers in tamed form. This indicated that the cat must have previously developed a relationship with Neolithic farmers (Ottoni & Neer, 2020, p. 39). However, wildcats were originally an unlikely animal for domestication which is defined as when an animal fully relies on a human for food, shelter, and control of breeding (Driscoll, Macdonald et al., 2009, p. 9977). This is because wildcats are obligatory carnivores, solitary animals attached to a territory and unlikely to perform delegated tasks. Hence, there was no reason for humans to seek out wildcats as a house pet (Driscoll, Macdonald et al, 2009, p. 9974). This leads to an underlying question – if the wildcat was an unlikely animal for domestication, how and why did they get domesticated?

During the Neolithic period, wildcats were drawn to early settlements which cultivated grains that attracted an abundance of rodents, resulting in them exploiting human environments. This was the beginning of a commensal relationship between humans and cats (refer to figure 1) (Driscoll, Clutton-Brock et al., 2009; Serpell, 2000). Under controlled conditions, domestication can be rapid, but wildcats did not show much difference in tameness even after generations because Neolithic farmers did not have the means to tame, they competed over food and were left to defend for themselves. This suggests that their hunting skills needed to remain intact and mildly tamed cats were still mixing with wildcats, causing their domestication to slow. As humans migrated, tamed cats would have also spread, introducing them to different parts of the world (Driscoll, Clutton-Brock et al., 2009, p. 71).



Image: African Wild Cat (*Felis lybica*) (Bupont, 2011)

The cat eventually spread to Egypt where clear evidence on domestication was found in paintings and sculptures where cats were portrayed as sitting under a chair, sometimes tethered while eating, chewing on bones or playing with other domesticated animals (Serpell, 2000, p. 88). They were first used to fish, control rodents, and hunt and retrieve wild birds (Beaver, 2003, p. 13). Later, they became associated with religion and were treated as an embodiment of one of their gods causing them to be treated well, and left to their own devices without interference from humans. It was most likely during this period when cats were shaped into the companion pet commonly found today (Ottoni & Neer, 2020, p. 41). The domestic cat ultimately originated through natural selection and minimal human intervention. Therefore, the domestication process of the cat was unique in comparison to farm animals and dogs which were driven by artificial selection (Driscoll, Macdonald et al., 2009, p. 9974).

Although domestic cats have adapted well to living with humans, it can also be argued that they were never truly domesticated or only semi-domesticated (Serpell, 2000, p. 89). This is because they are almost structurally and genetically identical to their ancestors, a large population of domestic cats' breeding or food supply is not controlled by humans, and their domestication was quite recent (Montague et al., 2014, p. 17232). It is more accurate to say that the domestic cat has continuously drifted through states of domestication and wilderness depending on their current environment (Serpell, 2000, p. 86). Minimal human intervention in the domestication of the cat has caused them to still behave and think like a hunter, with the capability to revert into self-sufficiency if necessary (Beaver, 2003, p. 15).



Image: Callie, an exotic shorthair cat (Tran, 2020)

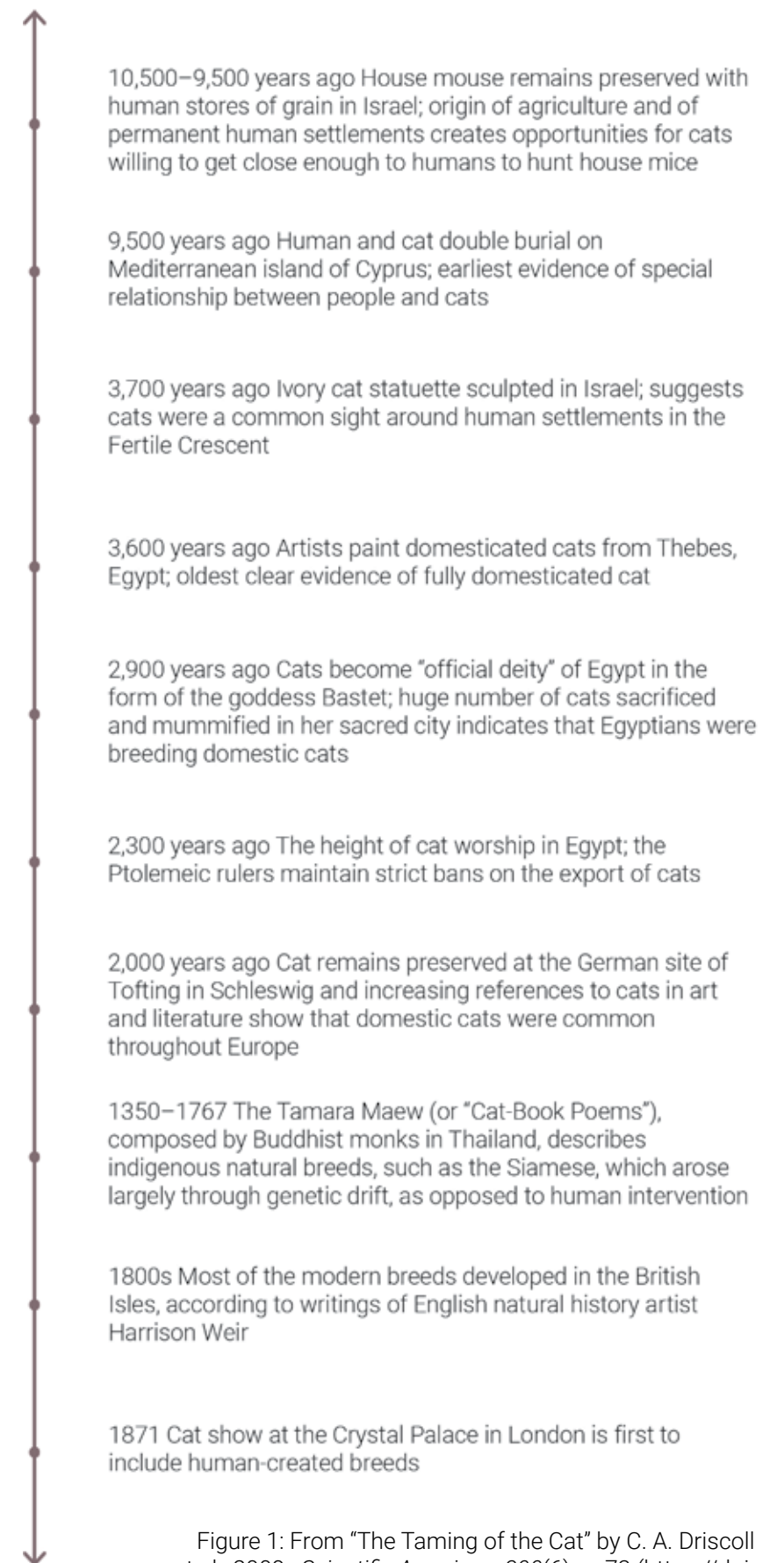


Figure 1: From "The Taming of the Cat" by C. A. Driscoll et al., 2009, *Scientific American*, 300(6), p. 73 (<https://doi.org/10.1038/scientificamerican0609-68>)

2.2 Problematic Behaviours in Domestic Cats

2.2.1 Inappropriate Elimination

Inappropriate elimination can occur due to medical or behavioural reasons and is defined as urination and/or defecation in places the owner has not designated (Herron, 2010, p. 195). This section will discuss inappropriate elimination as part of behavioural issues, as medical conditions should be advised by a veterinary. Elimination problems are one of the most common behavioural issues reported by cat owners and is a major reason behind cat relinquishment to shelters (Bernstein, 2007, p. 76). The act of inappropriate elimination can be broken down into two different categories – marking and inappropriate toileting (refer to figure 2).

Marking is a natural behaviour found in domestic cats as a primary means of communication and information marking (Feldman, 1994, p. 1093). While this behaviour is common in intact cats, 10 percent of neutered males and 5 percent of spayed females persist in marking (Herron, 2010, p. 196). By spraying urine or depositing faeces, cats are thought to convey information about their age, sex, reproductive state, and individual identity. This occurs through a felid's olfactory senses that can distinguish odours through their varying compositions (Feldman, 1994, p. 1093). In the wild, marking generally takes place at the perimeter of a cat's territory as the centre is where they perform activities such as eating, sleeping and playing. Therefore, when a cat marks in its core territory, it is associated with self-reassurance or a response to stressors. When a domestic cat marks, it can cause a divide between a cat and their owner, especially when there is a lack of knowledge leading to the likelihood of punishment. Commonly marked items in the house include furniture, walls, windows, electrical appliances and novel items. To avert marking behaviour, stressors should be identified and removed from the cat's environment (Heath, 2007, p. 106).

Cats are known to be hygienic animals partially because they bury urine and faeces to lessen odour and limit the spread of disease. When toileting behaviours occur outside a cat's allocated space, it can be because of litter box management (Herron, 2010, p. 197). A cat's litterbox must be well maintained to prevent the accumulation of waste, which can produce an odour that may cause the cat to refuse to use their tray, and eliminate elsewhere (Heath, 2007, p. 104). Another reason for inappropriate toileting could be from cats developing a preference for a different type of substrate (Guy et al., 2014, p. 78). It is evident that a large part of inappropriate toileting occurs due to owners failing to practice good litterbox management.

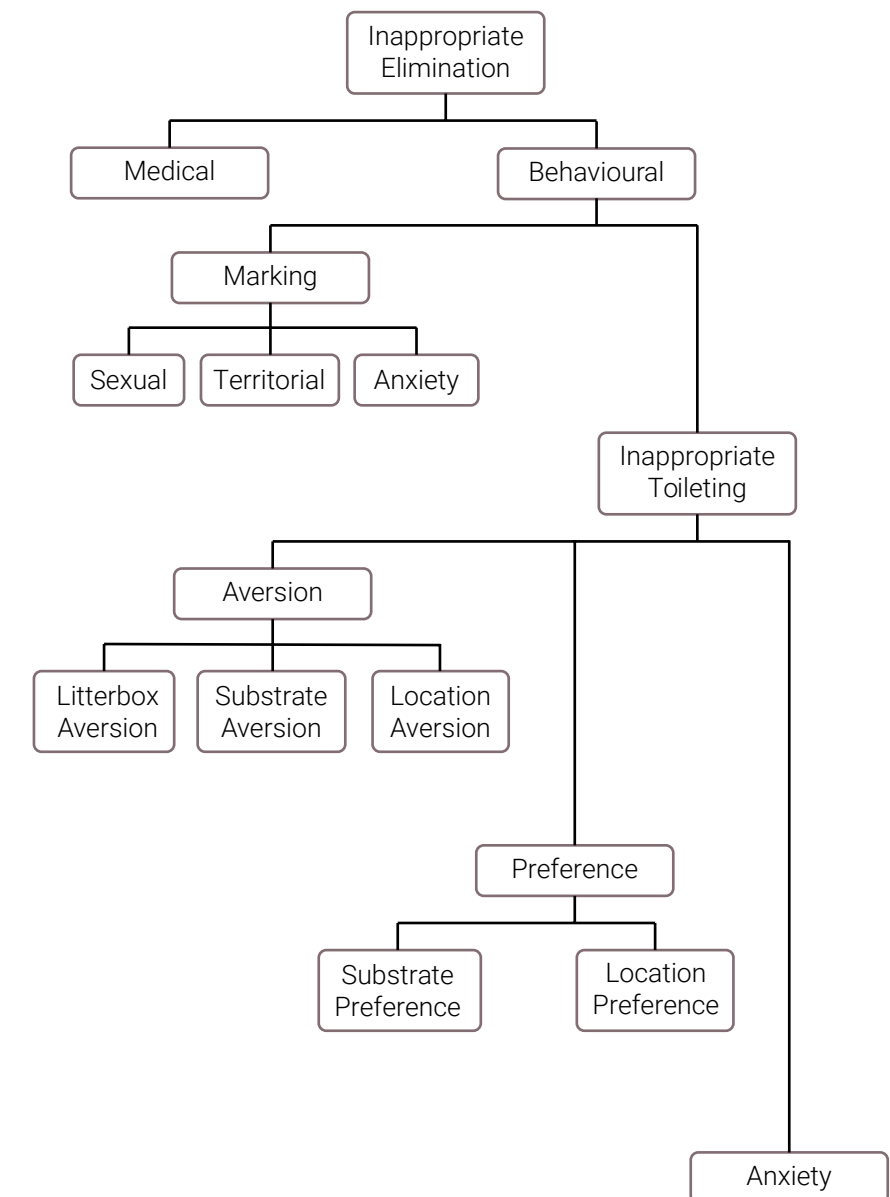


Figure 2: From "Advances in Understanding and Treatment of Feline Inappropriate Elimination" by M. E. Herron, 2010, *Topics in Companion Animal Medicine*, 25(4), p. 197 (<https://doi.org/10.1053/j.tcam.2010.09.005>)

2.2.2 Scratching

Scratching is one of the most basic behaviours in a cat, functioning as a way of claw maintenance and communication (Amat et al., 2016, p. 578). It helps remove blunt claw sheaves, and enables a cat to exercise their system for efficient protraction of claws during hunting. Without suitable facilities available, they may take to scratching anything convenient and accessible such as backs of furniture or draping curtains (Heath, 2007, p. 96). This may also happen if a cat's scratching post is not well-positioned in their environment or unsuitable for them. In kittens, scratching may occur more frequently as they are at an age with increased exploratory behaviour and are still learning how to control their claws (Mengoli et al., 2013, p. 890). Similar to spraying, scratching also acts as an information marker through visual cues and by depositing scent signals from a cat's plantar pad glands (refer to figure 3) (Mengoli et al., 2013, p. 887). Scratching as a marking behaviour generally occurs in commonly travelled routes and rarely at the perimeter of their territory (Feldman, 1994, p. 1095). Inside an indoor environment, if a cat is seen to continuously scratch as a form of marking, it usually indicates that it is feeling insecure. Owner punishment may cause the behaviour to escalate into different locations and add to anxiety.

2.2.3 Aggression

Aggression is another leading problem found in domestic cats that causes relinquishment to shelters. Cats can display aggression directed towards humans or other cats for many reasons that derive from retaining their ancestors' natural instincts. All felines are genetically conditioned to aggressive behaviours to increase their chance of survival (Penar & Klocek, 2018, pp. 144-145). Aggression is defined as a threat or action directed towards another individual and is not always done with the intention of harm (Penar & Klocek, 2018; Ramos, 2019). It can be exhibited in playful, defensive or offensive forms. Play aggression can originate from owners encouraging kittens to attack their hands or feet, eventually developing into a habit when the cat grows up and has longer claws and teeth. This form of aggression can also occur if a cat has not been provided with enough opportunities to play resulting in extreme behaviour towards owners or other cats in the household (Crowell-Davis, 2007, p. 483). Offensive aggression occurs when a cat feels the need to be assertive, characterised by having its ears facing forward, fur standing, stiff tail and long meowing or growling. Physical conflict between cats generally only happens when both refuse to back down in a confrontation. Before conflict escalates, cats will rely on vocal and postural threats (Penar & Klocek, 2018, p. 145). Offensive aggression can also be indirect.



Figure 3: A cat's plantar pad glands (Lemonsandtea, 2018)

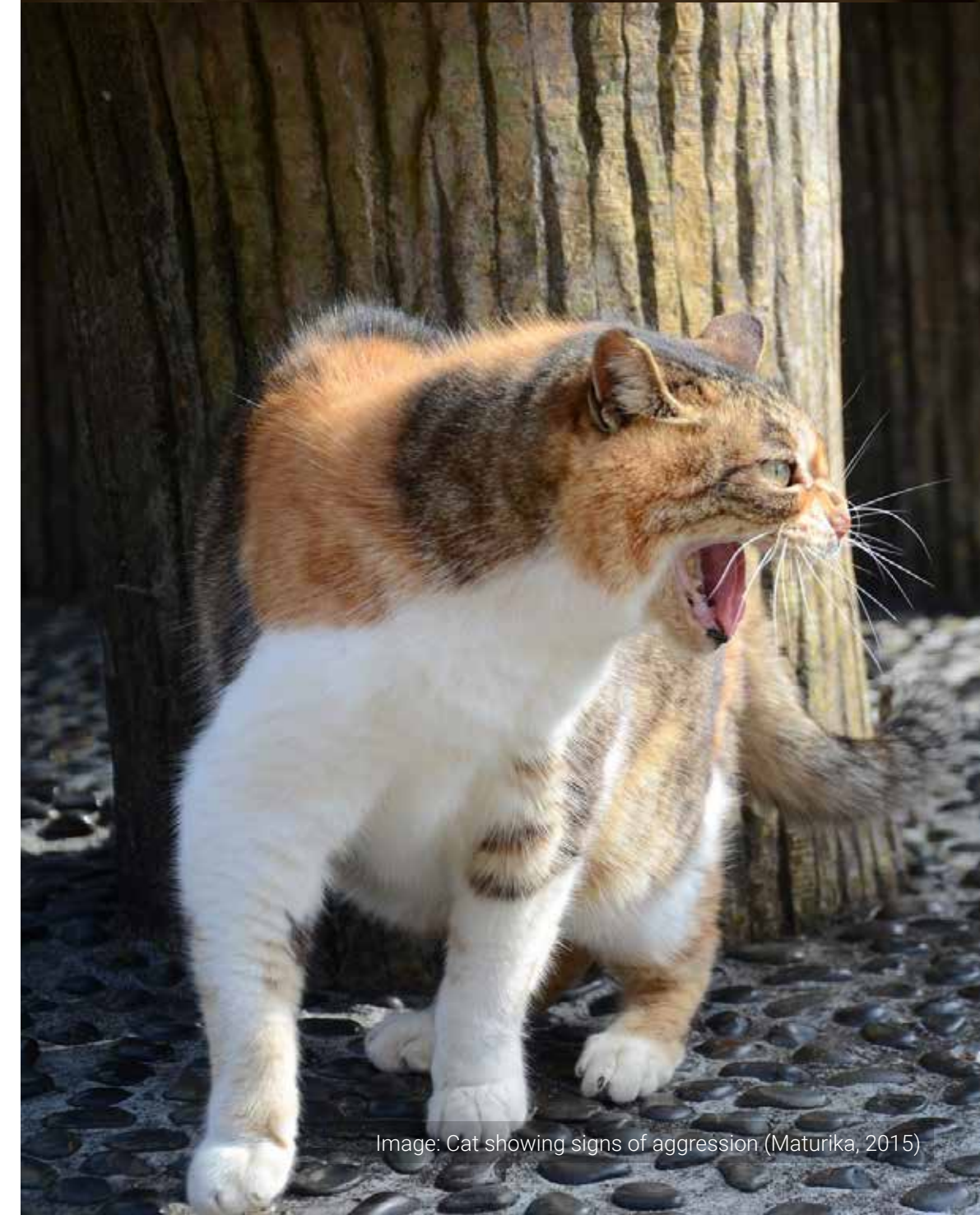


Image: Cat showing signs of aggression (Maturika, 2015)

This may be the case when competition for resources in a multi-cat household results in one cat blocking access for another. Defensive aggression occurs when a cat believes it is unable to escape and is attempting to protect itself. It will assume a crouching posture, with its legs and head tucked, ears flattened, and may growl or hiss (Penar & Klocek, 2018, pp. 144-145). Ramos (2019) states that offensive and defensive aggression arises from fear, anxiety, frustration, stress or negative emotions towards another animal in their environment or anything that they believe is a threat. Although aggression is a natural behaviour in cats, if it escalates, they should be separated from the source of fear and gradually re-introduced if possible.

2.2.4 Excessive Activity

Cats can spend up to 19 hours per day sleeping and will peak in activity during dusk and dawn (Jongman, 2007, p. 194). They can be conditioned to be more active during the day however their natural behaviour will cause them to sporadically act with short bursts of energy, which may be problematic for the owner and lead to misconceptions of madness. This has been reported by owners who have seen their cat suddenly become hyperactive and dash around the house (Heath, 2007, p. 99). Hyperactivity is fuelled by the cat's nature to intake small frequent meals over the day interspersed with sleep. This is generally not a problem for cats that have access to the outdoors as they have a place to spend their energy. The same cannot be said for an indoor cat therefore these bursts of energy will inevitably occur inside. Owners need to provide their cats with an outlet for this behaviour to encourage the spread of activity over the day, so they become more compatible with the life of domestication.



2.3 Human Living Spaces

At its most basic, a house is a place that provides shelter and privacy however, over time it has evolved into a place that holds much more significance to people (Tan, 2012, p. 5). According to Beyer et al. (1955), the major frameworks for housing values include: economy, family centrism, physical health, aesthetics, leisure, equality, freedom, mental health, and social prestige. Humans' lifestyles influence decisions about their living space and what they desire in their home (Beamish et al., 2001, p. 11). A living space reflects one's identity therefore the use of space and decorations is an expression of the self (Mallett, 2004; Steward, 2000). Although there have been many studies on the relationship between humans and their home, there is little focus on how the impact of owning a pet would influence their living spaces. Beamish et al. (2001) states that the lifestyle of individuals and families have a great impact on housing choices. A survey by Franklin (2007) found that 88 percent of Australian pet owners consider their pets as family members. This suggests that domestic pets have the potential to alter the human living space. With almost as many domestic pets as there are people in Australia, it is evident that the human living space should be inclusive of them, as pets are an important part of many people's lives (ABS, 2007).



Image: Goomba, an exotic shorthair cat (Tran, 2020)

2.4 Requirements for a Cat to Live in an Indoor Environment

2.4.1 Living Spaces

It is important to provide an adequate living environment for cats in human homes as the lack of outlets for their natural behaviours can cause the development of behavioural problems. The key idea behind enriching an environment for a cat is to ensure that they live free from distress and fear, providing them a predictable daily routine (Herron & Buffington, 2010, p. 2). By giving cats control over their environment, they feel comfortable and less stressed (Ellis et al., 2013, p. 220). A cat that has choices in its environment will be able to develop effective methods to cope with stimuli (Rochlitz, 2007, p. 179). As a domestic animal that's innate behaviour has not been modified, cats require vantage points, resting areas and hiding locations (Herron & Buffington, 2010, p. 2). Height holds great significance to cats as they spend a large amount of their time on raised structures, and naturally have the ability to climb and jump. As a result, it is vital that the vertical dimension of their environment is designed well so they are free from stressors and can maintain a social distance of 1-3 metres from other cats in a multi-cat household (Rochlitz, 2000, p. 2). Being an animal that rests most of the day, cats should be provided with comfortable rest areas that have soft surfaces. This is backed by a study from Crouse et al. (1995) which found that the addition of pillows for rest improved the welfare of cats. Another important space required for cats are hiding spots. Hiding is a coping behaviour when a cat encounters a stressful situation or change in their environment and wishes to avoid it by the security of concealment (Ellis et al., 2013, p. 220). By providing cats with control over their environment and minimising the unpredictability in their lives, they can effectively respond to stimuli in ways suitable to them (Heath, 2007, pp. 101-102).

2.4.2 Nutritional System

In the domestic environment, cats are commonly offered food in a bowl 2-3 times a day (Rochlitz, 2007, p. 187). This discourages natural feeding behaviours cats have retained from their ancestors which consists of taking several small meals per day. (Bradshaw, 2006, p. 1928). Cats practice natural feeding behaviours such as locating, capturing, killing and processing food however when food is effortlessly presented to them, it alters their behavioural sequence, especially when they would have been eating up to 10-20 prey per day (Ellis, 2009; Ellis et al., 2013). Frequent feeding to better conform to a cat's nutritional system may not always be possible and can transpire into obesity, so enrichment of feeding is recommended to extend their meal times and promote hunting behaviours (Ellis, 2009, p. 904). This can be done through the implementation of food puzzles which



Image: Callie, the garden prince (Tran, 2018)

have been found to aid in weight loss, aggression and reduce negative food driven behaviours, by mimicking hunting opportunities (Dantas et al., 2016, p. 725). Feeding areas should be located in quiet zones free from interruption while eating, as it is known to induce abnormal behaviours. Owners should be accommodating of cats and their natural feeding behaviours which drives the physical and mental activities in their daily lives. The deprivation of these opportunities could cause the development of health and behavioural problems (Herron & Buffington, 2010, p. 3).

2.4.3 Feline Elimination

Litterboxes serve as places for cats to eliminate and are necessary for cats that do not have access to the outdoors. They should be placed in a quiet and safe spot, away from the feeding area to minimise contamination (Feldman, 1994; Herron & Buffington, 2010). At the bare minimum, each cat in the household should be provided with a litterbox. Soiled litterboxes may cause cats to refrain from eliminating as per usual therefore owners should aim to scoop the contents daily and empty it often (Guy et al., 2014; Herron & Buffington, 2010). According to a study by Guy et al. (2014), cats prefer larger litterboxes when given the option to choose. This behaviour persisted even when both trays were equally clean. It is suggested that this may be due to the space required for cat elimination which involves digging and covering (Herron & Buffington, 2010, p. 3). To prevent the arise of inappropriate elimination which could lead to other subsequent issues, the elimination system for cats should be well monitored by owners.

2.4.4 Behavioural System

An indoor environment needs to allow a cat to express their natural behaviours such as scratching, marking and playing. Without the proper apparatus or place to redirect their natural behaviours, cats will choose to direct them onto anything that is convenient, causing owner frustration and those without knowledge about cats to think they misbehave out of spite (Casey et al., 2009; Jongman, 2007). Scratching behaviour tends to occur in places where cats spend most of their time. This is because they commonly use a scratching post to stretch after resting therefore appropriate outlets should be placed in those areas. As it is also a marking behaviour, owners should consider placing outlets in areas the cat may want to mark as its own such as the entry and exit of the house, to reduce the chance of furniture destruction (Heath, 2005, p. 104). Cats require an outlet for play which can be offered in the form of toys. Play behaviours are related to the cat's predatory nature where



Image: Bobo resting in a laundry basket (Author, 2019)

it spends much of its time in the wild hunting for prey (Bradshaw, 2018, p. 412). Owners may view this as just playing, but a study by Hall and Bradshaw (1998) asserts that play behaviour is motivated by hunger and can alter the intensity of play for cats. This is not to say that the sole motivator of play is hunger, as cats will still feel rewarded by the predatory sequence, which can be used to provide a positive method of engagement with the owner (Bradshaw, 2018, p. 412). To promote predatory behaviour in a cat, toys should possess similar characteristics to prey in size and texture (Hall et al., 2002, p. 270). Owners should be careful not to provoke inappropriate play which could lead to habituation of aggressive playfulness and possibly negatively impact their human-cat relationship (Gazzano et al., 2015, p. 541).

2.5 The Human-Cat Relationship

The human-cat relationship has evolved from one of commensal to companionship (Bernstein, 2005, p. 48). Pets are brought into the household for many reasons but the most common of them include keeping companion-animals for children, assisting in handling new situations such as leaving home or retiring, and to cope with loneliness when company of humans is not feasible (Franklin, 2007, p. 10). Accounts from people reveal that animals can provide more stability and consistency than human relationships. Many owners have experienced the emotional support, comfort and security of their pets, creating a sense of connectedness even across a species barrier. The ways pets engage with humans can seem 'almost human' sometimes, and it is through this reciprocation of emotions that is key in how animals become part of a family (Charles, 2014; Irvine & Cilia, 2017).

Companionship with cats can be observed to not only be a human-orchestrated one-sided relationship. The adaption of cats in the household environment has given rise to vocal expressions and body language that only occur between cats and humans, as they now display actions never found to be used with other cats (Franklin, 2007, p. 15). Cats can express their affirmation to humans through meowing, trilling, squeaking, purring and chatter (Fermo et al., 2019, p. 5). A study by Pongracz et al. (2019) also found that cats were able to follow the human gaze as cues, suggesting that signalling could be a form of communication from humans to cats. It is understood that cats recognise their owners through vocal cues and will respond mainly through ear and head movement (Saito & Shinozuka, 2013, p. 689). Social cognitive behaviour in cats is complex and differs to other domesticated animals in their style of communication. Although the relationship between humans and cats has not been widely studied, it is evident that the feeling of companionship is mutual

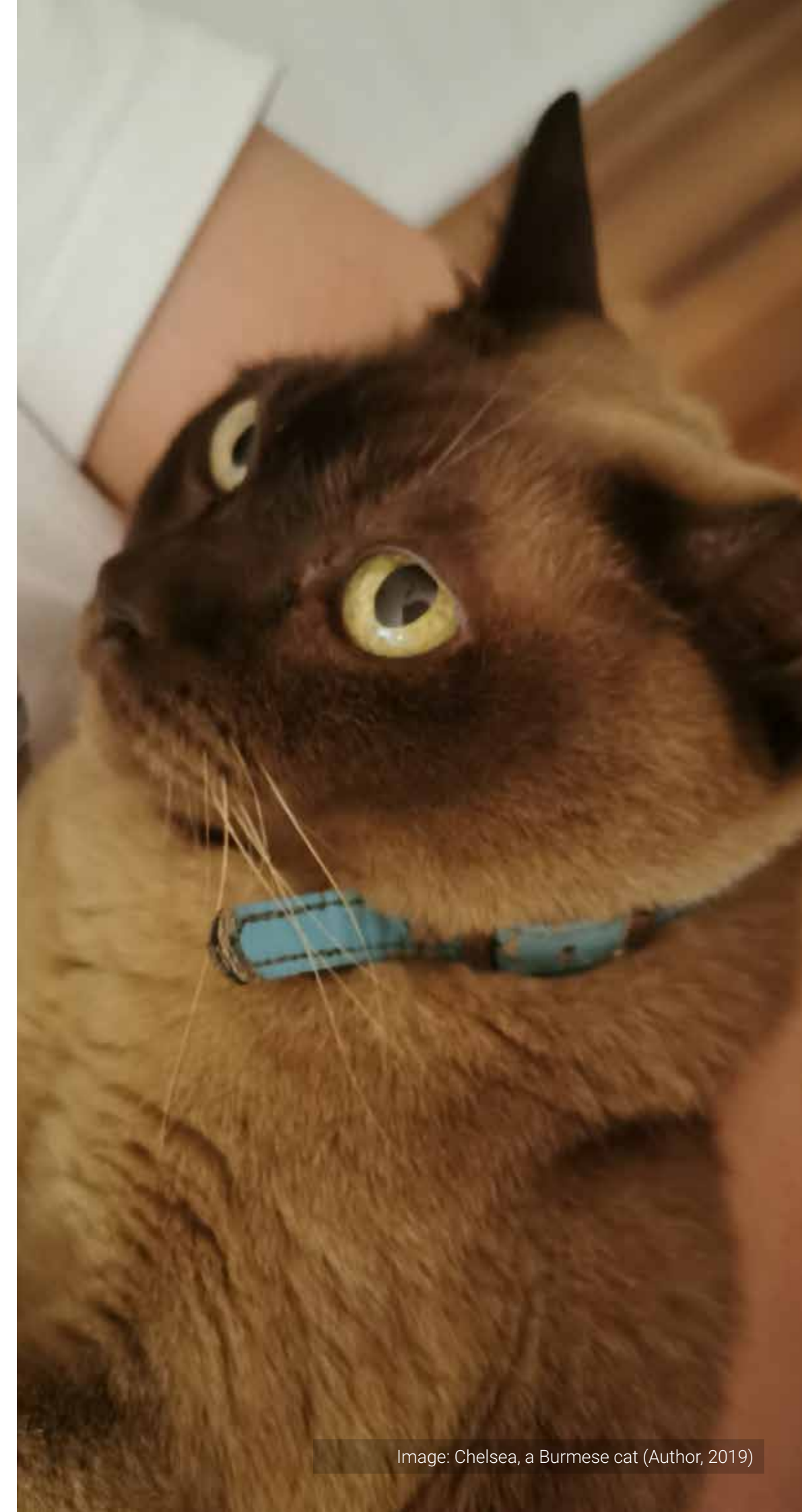


Image: Chelsea, a Burmese cat (Author, 2019)

2.6 Research Gap

The social standing of the domestic cat has changed drastically during the course of history from a commensal relationship to one of companionship. Their domestication from their wild counterparts, the African wildcat, was never fully completed, resulting in today's domestic cats to retain their wild instincts. The cat's semi-domestication was the result of natural selection which can be problematic for the owner, especially when they are prohibited from the outdoors – their typical environment. Instead, problematic behaviours such as inappropriate elimination, scratching, aggression and excessive activity, must be expressed indoors and can result in a split in the human-cat relationship, particularly when the owner is unknowledgeable about cats. Living spaces are designed with the family lifestyle in mind, however this often does not consider the pet, which is also a valued family member. This indicates that there is an opportunity to improve the human indoor living space for the usage of cats to express their natural behaviours as they would in the wild.



Image: Bobo looking through a gap in the curtains (Author, 2019)

3.0

Research Design

This chapter outlines how the primary research was conducted, why these methods were chosen and the recruitment of participants who took part in the data collection. The process that the primary research followed is also summarised in this section.





RESEARCH DESIGN

3.1 Methodology

The research aimed to identify the pain points in cat ownership and how the natural behaviours of a cat could better fit into the indoor living space of humans. Qualitative research was conducted as it specialises in gathering data on uncovering how people think and feel about the circumstances they are experiencing (Thorne, 2000, p. 68). This approach is suitable as the aim was to gain insight into cat owners and indoor cats' current experiences. The research was completed through two different methods which were chosen due to their suitability in gathering the appropriate data. The first method that took place was a video observation of domestic cats in an indoor environment. This aimed to understand the behaviour of cats in a human living space – an environment they have adapted to living in. Observations were suitable because they generated unbiased, valid information from recorded data (Candy, 2006, p. 17). The second method employed was semi-structured interviews which were used to highlight the human perspective on cat behaviour, and what activities they believed to be problematic or could be better fit into their lifestyle. Interviews were beneficial as participants highlighted and developed themes based on questions that had been asked (Candy, 2006, p. 18). These two methods were chosen as the combination of data from both participant groups were able to assist in developing opportunities that were important to cats and cat owners (refer to figure 4). After the data collection was completed, the raw data went through a thematic analysis to aid in the organisation and interpretation of it. This kind of analysis was chosen as it was appropriate for identifying common themes throughout data (Braun and Clarke, 2006, p. 6). To increase the efficiency of the data analysis process, affinity diagramming was used as it enabled data from the interviews and observations to be organised into manageable groups (Plain, 2007, p. 88).

3.2 Methods

3.2.1 Video Observations

The main goal for completing video observations is to receive insight into the domestic cat's behaviour and to try find areas in which their lives indoors could be improved. Video observations had to be implemented instead of direct observations due to the constraints that occurred during this period. Participants were asked to film short videos or take photos of their cat while they were active. In this study, 'active' was defined as when the cats were partaking in activities such as play, eating, scratching, observing, exploring or eliminating. There was no controlled time for when the observations were to be filmed to acknowledge the behaviour of cats that



Figure 4: Methodology Process (Author, 2020)

largely comprises of rest and the different routine of each cat. Observation footage included short clips of the participants' cats engaging in activities, photos of commonly used spaces and their usual resting spots. The observations were kept short in length (10 seconds to 5 minutes) to minimise file upload times when they were transferred through Google Drive. The data was then erased off the cloud in adherence to the signed ethics forms. Each video was then analysed and coupled with notes on gaps in which the behaviour of an indoor cat could be adjusted or redirected for the human lifestyle.

3.2.2 Semi-Structured Interviews

Semi-structured interviews were conducted with two types of participants – cat owners and a retired veterinarian. Interviews with cat owners were used to explore the perspective of humans and their views on problematic cat behaviour. Adjustments to their lifestyle due to the ownership of a cat/s was also discussed to find gaps on how the domestic cat could be better incorporated into their home. The interview with the veterinarian differed in the topics conversed and involved more discussion about why these problematic behaviours researched in the literature review occurred. Conducting semi-structured interviews enabled key questions to be answered while delving deeper into the reasons behind those responses. This also opened prospects for the discussion of other topics, enabling new findings on cat behaviour in the human living space to be made, thereby creating new design opportunities. Face to face interviews were not be able to be completed due restrictions that recently arose therefore, they were conducted through phone calls and facetime, depending on the preference of the participant. Interviews were recorded then transcribed and were 25-40 minutes in duration.

3.3 Participants

Participants comprised of three different groups – cat owners, domestic cats and an expert. The human participants were recruited through word of mouth, and access to six cats was made available through permission from the cat owners participating in the study. A requirement was set for the participating cats to be mainly housed indoors so they would be able to accurately represent the behaviour of indoor cats. The expert was included in the research to understand the behaviour accounted by the cat owners and displayed by the cats during the observations. By establishing an understanding of cat behaviour within indoor spaces from the three participant groups, opportunities for improvement can be identified and further explored.

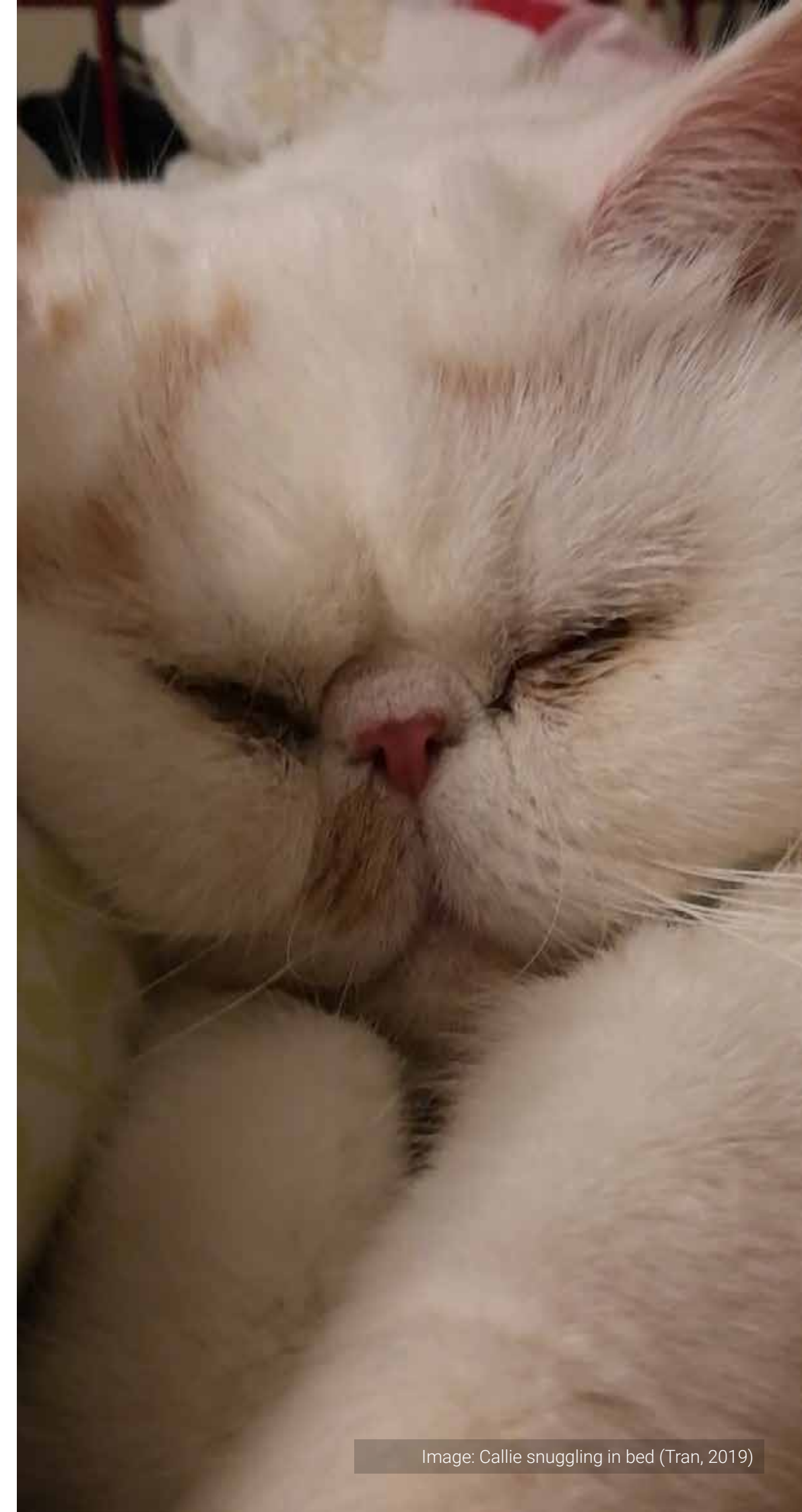


Image: Callie snuggling in bed (Tran, 2019)

4.0

Analysis and Findings

The analysis section describes the methods that were used to analyse the interview and observation data. It then digresses into the findings section which explains each of the themes that were procured during the the coding process. Limitations within the data collection were also outlined in section 4.5.



ANALYSIS AND FINDINGS

4.1 Analysis

The research was conducted through two types of methods – semi-structured interviews and video observations. The seven participants who were interviewed comprised of six cat owners who kept cats that primarily resided indoors, and a retired veterinary. Video observations were conducted with six domestic cat participants, who were owned the six cat owners. The interviews with the cat owners were designed to better understand the pain points in their cat's or their living space, whereas the veterinary gave some behavioural insight into why cats can cause issues when kept indoors. On the other hand, the video observations aimed to understand the behaviours of cats and how they interacted with the human environment. The combination of these two methods would then assist in identifying opportunities in which cats could better fit into the human living space.

Data from both methods were analysed through thematic analysis which is a method for identifying, analysing and reporting patterns, also known as themes within data. Implementation of this method minimally assists in organising data whilst interpreting the different segments of the research topic (Braun and Clarke, 2006, p. 6). This process is purely qualitative as it provides a detailed and comprehensive interpretation of the data. Essentially, it is a valuable tool for the identification of common themes across a set of interviews (Vaismoradi et al., 2013, p. 400). According to Braun and Clarke (2006), there are six phases of analysis that can be used as a guide when implementing thematic analysis to data (refer to figure 5). The main idea behind this type of analysis is to generate codes which is a word or phrase that assigns an attribute to a proportion of the data (Saldana, 2009, p. 3). They are sorted into overarching and sub themes after considering the relationships between them. The establishment of these themes then help identify the underlying opportunities presented within the analysed data. To make this process more time efficient, the thematic analysis was completed with a method called the affinity diagram. This technique involves the transfer of relevant data on sticky notes, where it is then arranged into themes and sub themes (refer to figure 6) (Plain, 2007, p. 88). Ultimately, this method is advantageous in the way that it enables data to be visually organised into manageable groups.

By applying thematic analysis through affinity diagramming to the interview and observation data, three main themes could be identified – human-cat relationship, cat behaviour and living environment. Within these three themes, 9 sub-themes were determined, and 40 codes were established (refer to appendix A). Data from both methods were compiled and grouped into their subsequent overarching themes, developing into three key areas of findings, that are discussed below.

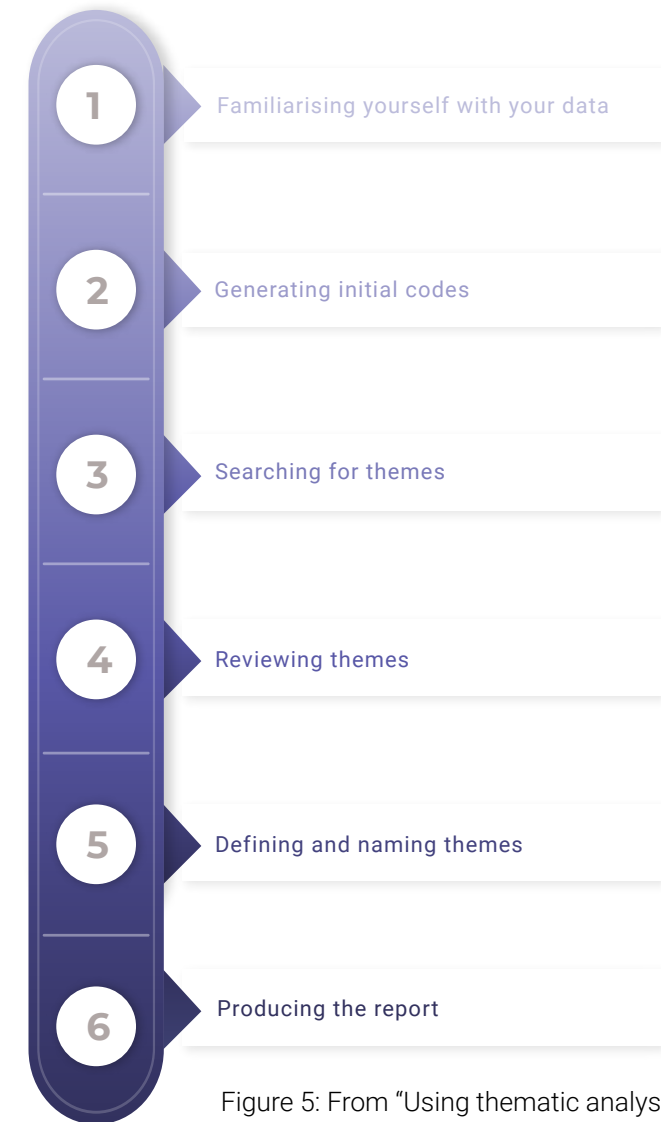


Figure 5: From "Using thematic analysis in psychology" by Braun, V., & Clarke, V., 2006, *Qualitative research in psychology*, 3(2), 77-101.

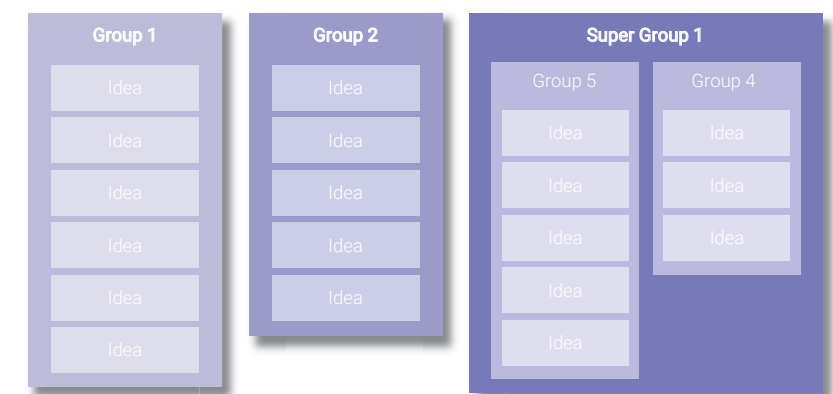


Figure 6: From "Build an Affinity for K-J Method" by Plain, C., 2007, *Quality Progress*, 40(3), 88.

4.2 Human-Cat Relationship Findings

The first theme that was generated through affinity diagramming was the human-cat relationship containing two subthemes – the human and cat perspective. Data collection was designed to gain insight into both viewpoints of this interspecies bond. A large part of the human perspective was based on adoration for their cat even when they carried out actions that were inconvenient for the owner.

Sometimes she vomits which is really inconsiderate. But, but she's very cute. So you can put up with it. – Participant 6

I developed (an) allergy. I know that I won't let her in my room unless she's really, really cute that I can't refuse. – Participant 5

It was common for cat owners to adopt a 'deal with it' attitude when undesirable events occurred, to the point where one participant would even allow their cat in their room when they would be at risk of an asthma attack. This was closely related to the idea of cat owners yielding to their cats when they occupied something that the owners needed at that moment, or cases where they would just let their cat scratch away at their furniture (refer to figure 7).

Participant 5: No, well, I don't know, I don't think she destroys anything.

Interviewer: But like, what if you had like a really nice sofa or something, would you mind?

Participant 5: Oh, if I own the sofa, I don't mind.

These accounts imply that many cat owners consider it more important that their cat's comfort stays undisturbed while they remain inconvenienced. As humans and cats spent more time together, both gained a mutual understanding of each other's thoughts even though they could not directly communicate.

Interviewer: But how do you know when she wants to play then?

Participant 5: Um, when she's suddenly alerted for nothing cause um, she will be alerted if she's scared or there's something new that she hasn't seen or heard before. But if she's alerted, and she like bends her ears away from me and she look at looks at my hand, in a way she looks at prey, and I'm like yeah, you want my hand, don't you?

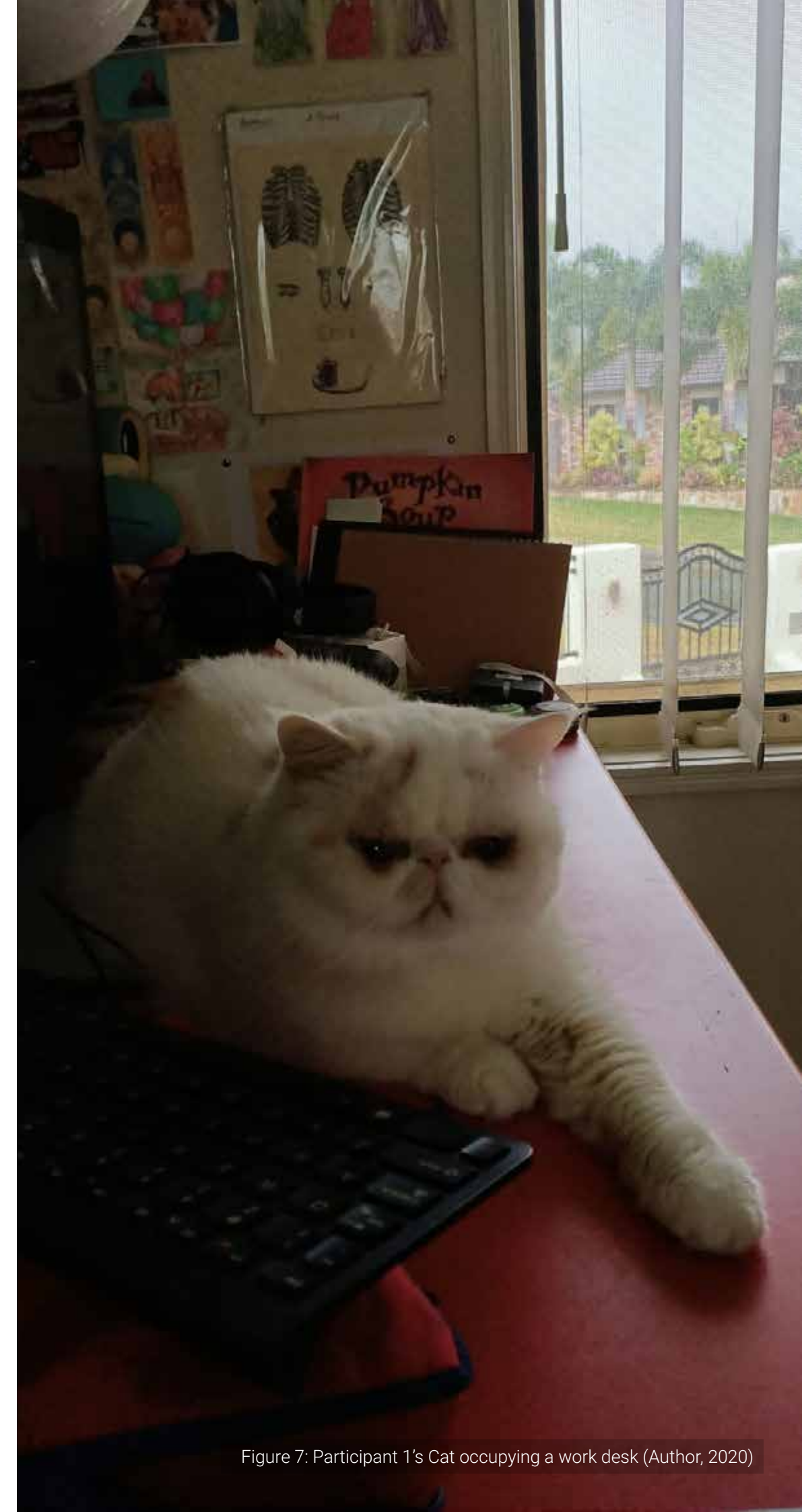


Figure 7: Participant 1's Cat occupying a work desk (Author, 2020)

It just depends on when they want to play. Like, they'll tell you. Like they'll start like, I don't know, hinting. So its like if they see a toy on the ground, they kind of hit it softly and kind of like meow at you or something. Or they just stare at you until you play with them. – Participant 1

Through vocalisation and body language such as eye contact, movement of ears or the head, humans can develop an understanding of their cat's wants and demands. This kind of interspecies understanding would also have been developed over the years of keeping their cat as a pet, as they get to know each other better. The human side of the relationship also involves taking care or responsibility of their cat's health such as managing their weight or playing with them to prevent boredom.

It's very hard to actually get him to play. So that's why we have to um do this whole feeding schedule. – Participant 2

However, this is not always known by cats who can sometimes be very food orientated, or hold little interest in play, resulting in overweightness when owners continuously give in to their demands to be fed. Demands from cats often fall into the attention seeking category which was more commonly found within completely indoor cats during research. Three out of the six cat participants solely lived indoors, and attention seeking behaviours were much more prominent in them, particularly one cat that resided in an apartment.

He does not actually, he does not do it behind us, he does it in front of us, its attention seeking, he will scratch the sofa in front of us, to show that he's not happy about us. So you can stop him immediately actually. It's a demonstration. Yeah. Yeah, so he won't do it behind us when he destroys somethings, he do it in front of us. – Participant 4

Yes. He's, absolutely- I mean he's, he's doing anything just to attract our attention. – Participant 4

Cats have different means of drawing attention from their owners. While some can be physically harmless, for example through vocalisation, other approaches may involve the damaging of furniture, commonly on the corners of a sofa or bed (refer to figure 8 & 9). On the other hand, vocalisation can be excessive to the point where a cat will stay vocal until they receive the attention they want. These behaviours were observed to stop after receiving human contact.



Figure 8: Participant 1's damaged bed corner (Author, 2020)



Figure 9: Participant 1's damaged sofa corner (Author, 2020)

And then Callie is excessively vocal. Many times, mainly at night-time and early morning or like in the AM's I think he wants attention. He wants to go on the balcony to play and he also wants food. – Participant 2

Well it's a bit cute at first but when its continuous for like an hour it gets really annoying. I mean continuous meowing for an hour- drives you crazy. – Participant 3

Participants often mentioned that their cats enjoyed the company of them, frequently following their owner around the house, wanting to be in the same space. It can be understood that cats will perceive familiar humans as companions as exhibited by often accompanying them in the same room.

Near us, yes. And when we're in the, in the study room he's in the study room. When we're in the living room, he's in the living room. – Participant 4

Ultimately, the human-cat relationship is complex but mutually reciprocated. Although there is an interspecies barrier, both manage to understand and communicate with each other, even developing a tightly knit relationship. However, within this relationship, excessive attention seeking behaviours were difficult to tolerate when a cat desired something that the owner refused to give. This indicates that some improvements could be made to reduce these behaviours.

4.3 Cat Behaviour Findings

The second theme that emerged focused on cat behaviour which was separated into the subthemes of problematic, non-problematic and manageable. When asked about problematic behaviours that developed in cats, participants often mentioned that it was a very rare occurrence. However, one thing that all participants experienced was furniture damage.

She like scratches the carpet upstairs and it pisses off my mum and dad. So like all the carpet is kind of clawed up, upstairs cause like she stretches out on it. Scratches it up. – Participant 6



Image: Participant 3's cat expressing excessive vocalisation (Author, 2020)

Oh my god. You should have seen it like- everything was everywhere, like she'd tear up tissue boxes, she'd tear up like everything that you put on the floor. And like you know, climb up stuff. It wasn't good.
– Participant 6

No they don't, well when they try to sharpen their claws on your chair or something, or when they want attention. It's not really destroying; it just leaves some marks sometimes. – Participant 1

The participants were split on their opinions on furniture damage – it was not a prominent issue for some while others considered it problematic. This disparity could be because the level of destruction may have been different as their accounts greatly varied. The next problematic behaviour that was explored was hyperactivity, involving sudden bursts of energy. Few participants mentioned that they had issues with hyperactivity as these episodes usually involved dashing around the house or intensely scratching at outlets provided (refer to figure 10). One participant stated that they would leave their cat in the bathroom until he calmed down when this occurred. These moments were very sporadic for all cat participants and were events that ended quickly.

Otherwise, there's kind of these random moments, where they're like chill, like all of a sudden they kind of make this waily noise and like kind of skedaddle on the floor, and run away. But you don't know why they did that. – Participant 1

Cats aren't very active animals, most of the day you would find them sleeping and if not, they'd be resting in a spot. When they are active, it's very spontaneous. They have very short bursts of energy unlike a dog which you could take out for a long run. – Participant 7

We put him in the bathroom for a few minutes for him to calm down, because there is nothing dangerous in the bathroom. – Participant 4

Other problematic behaviours such as marking and aggression were also explored however, the participants had never experienced any of these with only one exception where a participant owned two cats who were aggressive to each other.

And then he also is aggressive towards Callie when he sees him. ...I think its cause he's um dominant male. – Participant 2



Figure 10: Participant 6's cat expressing hyperactivity (Author, 2020)

This indicates that while these two behaviours do occur, they were not as prominent as suggested by existing research. One participant with veterinary practice stated that problematic behaviour is quite rare because cats adapt well to their environment, only displaying them when stressed by sudden changes.

These behaviours are actually quite rare because cats adapt to their environment very well. When they do show them, it's usually because they are stressed such as when there are new people or maybe because there's a new dog. But other than that, they tend to adapt pretty well. – Participant 7

Play behaviour was experienced by all participants however, it was found that many cats had a lack of interest in cat toys, preferring miscellaneous objects instead (refer to figure 11). Additionally, some cats were also quite inactive, making it difficult for the owners to coax them into playing.

Well, he used to have a lot of toys you know its gift, very magnificent gift, expensive gift but it's useless. I mean it's useless because what he likes most is well, when we finished the chocolate with the wrap paper, aluminium paper you just squeeze it into a ball, and he like it very much and with the smell, the chocolate like he will run after the ball, all the times, especially when it's fresh. – Participant 4

Interviewer: You mentioned that she likes the... was it the toy with just a string? Is that like the main way you keep her active with that toy?

Participant 5: Yes, unfortunately.

It was observed that cat owners purchased a wide variety of toys however, mechanical or complex toys were least likely to be used, as the mechanics could be quickly understood, or they did not register to the cats as something interactive.

I gave them to other cats because he does not like, especially those mechanic toys, you know you switch it on and it will, it will walk or it will make noise or walks it's useless, he play with two minutes, and he understands everything and it will be left there. – Participant 4



Figure 11: Participant 5's cat displaying interest in a string (Author, 2020)

When questioning participants on their cat's daily life, it was understood that many cats had a routine they followed depending on the season. While it mostly comprised of rest, they had different places that they would choose to sleep at according to the time of the day. There were also set times when they would wake up for interaction with their owner or because they knew it was their feeding time.

And then she goes around the house and finds the warmest spot. Now we're talking like the sun is mainly the most, you know, that she's attracted to it the most. To be honest, so she. It's pretty much her scratching post is in a space that there's sun in the morning. Right. And then she like pretty much follows the sun around, because it's warm so um yeah then she goes to the couch, she pretty much sits on the couch for a really long time, goes upstairs, lies on the carpet, pretty much anything soft, that she can find. She's normally there. – Participant 6

Another behaviour that was commonly mentioned were feeding habits. The interviews suggested that many cats were food orientated meaning that they tended to overeat or continuously beg for food. Therefore, the owners implemented a feeding schedule, so their cats would not become overweight, however, four of the six cat participants were still above the average weight for their breed. This is because the cats frequently vocalised their demands for treats endlessly until they received what they wanted. Additionally, the cats tended to associate sounds of packaging or specific words to food, resulting in long periods of vocalisation where in the owners finally gave in to stop their disruption (refer to figure 12).

He is so sensitive to the word treat. We don't even say the word at home we say T, R, E, A, T. Because when he heard the word. He just jumps and scream and, and it will be a, he will be very, very troublesome, he- he's going to stay there long-time meowing and he won't stop until you gave him the, what he wants. – Participant 4

Excessive vocalisation did not only occur due to a cat's desire for food. Other reasons included attention seeking and the desire to go outside. Ultimately, this behaviour was understood to happen when a cat was demanding something that they knew their owner would give them eventually.



Figure 12: Participant 4's vocalising for a treat (Author, 2020)

4.4 Living Environment Findings

The third overarching theme uncovered during coding was the living environment, containing four subthemes – human, cat, combined and desired space. The human space subtheme looked at how cats interacted with human furniture. Through both methods of data collection, it was found that cats often preferred to use human furniture such as sofas or beds over cat furniture when resting.

And yeah, um she only, like, sleeps on the bed and on the sofa. She wouldn't go to the cat bed. – Participant 5

They chose areas where they could be surrounded by a soft material, lean their back on, or rest their head or cheek on (refer to figure 13 & 14). As the cats continuously used these spaces, over time, they gradually became a primary user of those areas. This resulted in purchases such as cat beds becoming unused, often left lying around a participant's house.

Something that used to be family furniture like a sofa just completely becomes a cat's bed. – Participant 1

Yeah, it all just ends up lying around the house, so we stopped buying furniture for him. We just let him use whatever human stuff he likes. – Participant 3

As mentioned in section 4.3, many toys were unable to capture the interest of cats. This was also prevalent in cat furniture where numerous cat beds also did not register as a place to rest, leading to them choosing to use human spaces.

Lots of cat beds which they choose mostly not to use, cooling mat, which they also choose not to use. – Participant 2

You know those little, like, pet furniture, things that like it's made of cardboard. And it's like supposed to be for scratching but they don't use it for scratching, they just lie on it. Yeah. Well just like don't register, it's just something that's there but they don't even know what it is. – Participant 1



Figure 13: Participant 1's cat resting on a bean bag (Author, 2020)

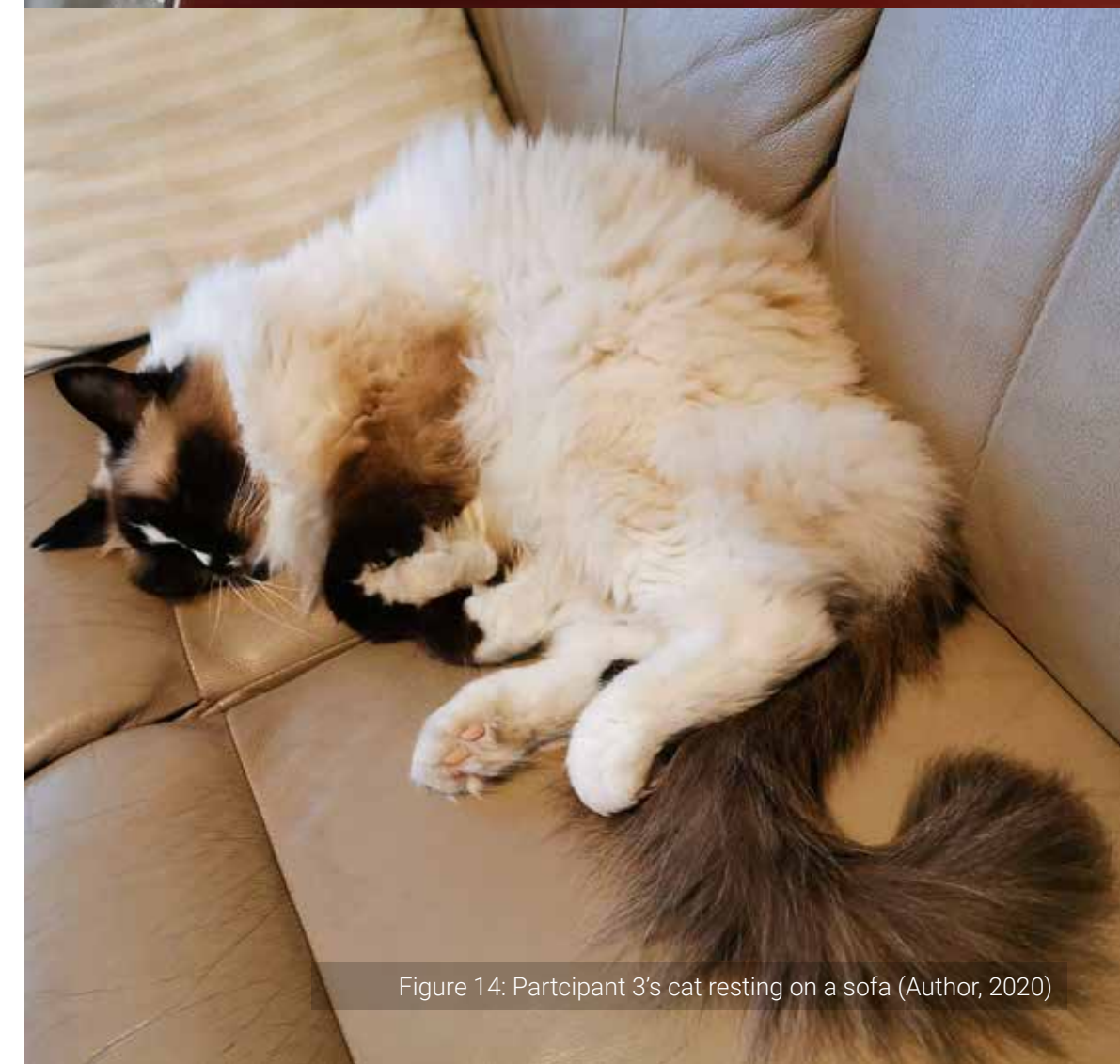


Figure 14: Participant 3's cat resting on a sofa (Author, 2020)

Although it was found that cats were allowed into most spaces in a house, there were still some places that needed to be segregated from them. For example, participants did not want them going to places that gathered a lot of dust such as underneath a bed, causing them to close doors to keep their cat out.

So, yeah, there must be dust on the floor, and if he entered the room, he will be under the bed immediately, that's what he likes most and its bad for him. We don't like him to get dirty. And once he's under the bed. It's very difficult to get him out. – Participant 4

One piece of cat furniture that almost all participants had was a scratching post. It was found that all cats consistently used them for scratching or stretching purposes however, in the case that they scratched furniture, they were attention seeking as the cats knew it would make their owners pay attention to them. Participant 5 was the only one who did not purchase a scratching post, instead, a tablecloth that was taped on the ground was used as they resided in temporary housing and it would have been inconvenient to transport it (refer to figure 15).

The research also identified one pain point stated by majority of the participants – the litter box. Frequent complaints consisted of the foul odour that it emitted, litter pellets repeatedly being kicked out by the cat, followed by playing with litter pellets.

Because it stinks. Like, not gonna lie like. Yeah. We change it frequently, but it's kind of it's just there and it's like poo and wee and we don't want that upstairs in the space where, we're spending most of our time, too you know. You know how like a toilet in flush all the shit away. Whereas like a litter box, you know, it's just there. It's just you can smell it. Like from if you, you know, leave it there for like a couple of weeks, or whatever, a week or two weeks or whatever, it starts to stink because she's peeing and poeing in it so much. – Participant 6

Normally after I scoop it, I'll clean it away so next time she can kick more out. – Participant 5

The litter box was not only used by cats as a toilet, but the edges also acted as a place to wipe their paws after eliminating. Observations indicated that this was another factor that created a mess around the litter box (refer to figure 16).



Figure 15: Participant 5's scratching mat (Author, 2020)



Figure 16: Participant 3's cat scratching the edges of his litter box (Author, 2020)

Many participants desired a space that would promote interaction, play behaviour or activity. This was because there were not many things within the house that could keep a cat interested, especially within the exclusively indoor cats, who experienced a greater amount of boredom or attention seeking behaviour. Additionally, by being limited to the indoor space, they were deprived of some activities such as exploration or predatory behaviour. As four of the six cat participants were overweight, owners also felt that their living spaces could better incorporate some form of activity to assist with their cat's weight loss.

I would like him to have that, or something like a tunnel that he can enter, and come out from the other end, it will- would be a good activity for him because he's kind of too fat. – Participant 4

I think that we already have enough spaces in our house, but it'd be better if there were more spaces for the cats to do things- since they are indoor cats. Or like have fun, casually. Especially since Callie's overweight, so it'd be great if there were like, things to keep him active or interested. – Participant 1

Because I saw online that it's like a cat course thing. It basically has cat posts and cat beds installed in the ceiling, and I'm like oh my god I want that so much. And also it's help my cat lose some weight. And yeah, it's also more convenient to store in my house. So I really wish I could install it in my house. If I ever get one. – Participant 5

An unexpected finding that was identified within the living space were breed specific issues within munchkins and exotic shorthairs. Participant 4 who owned a munchkin (cats that are bred to have short legs) did not allow him to jump down furniture as it could possibly be damaging to his spine. Therefore, cat furniture designed for the vertical environment was unsuitable for him (refer to figure 18). On the other hand, flat faced breeds such as the exotic shorthair had an issue of tearing up frequently, resulting in an abundance of tear stains around their house. It was common for towels to be placed in the cats' resting spots to prevent the house from getting stained (refer to figure 17).

I don't mind if he jumps it will be okay. But my problem is, I'm afraid, since his paws is so short. When jump down its bad, very bad for his spine. So, when he's not jumping on furniture. It assures me more. Because I'll be worried about how he will get down. – Participant 4

And also, because they're like flat face cats, they get teary more easily and they flick their tear stains everywhere. So it's like, it turns brown later unless we like, you know mop it up or scrub it off. – Participant 1



Figure 17: Towels placed on Participant 1's sofa (Author, 2020)



Figure 18: Participant 4's Munchkin cat (Author, 2020)

4.5 Limitations

Although data collection was controlled, some limitations could have caused the results to skew. Greater understanding of the research topic could have been gained from a larger number of interviews and observations. The observations were designed so that the participants needed to film their cats meaning the cat participants may have acted differently in front of their owner. Additionally, the owners were not always able to gather footage of their cats as it was commonplace for them to be active during midnight or early morning when the owners were asleep. Footage length was also limited by file sizes as they were to be transferred over Google Drive, and the videos needed to be kept shorter to minimise upload time. Requesting the participants to film their cat may have created bias in the data as they would have only filmed during moments they believed to be important to the research. Although the interviews were designed to inquire about issues cat owners faced, the questions changed over time as a greater understanding on the topic was gained. Therefore, information from the first few participants were not as comprehensive as the interviews that were conducted later. Ultimately, the data collection met various limitations and in future research, it should consider these factors to deliver more accurate results.

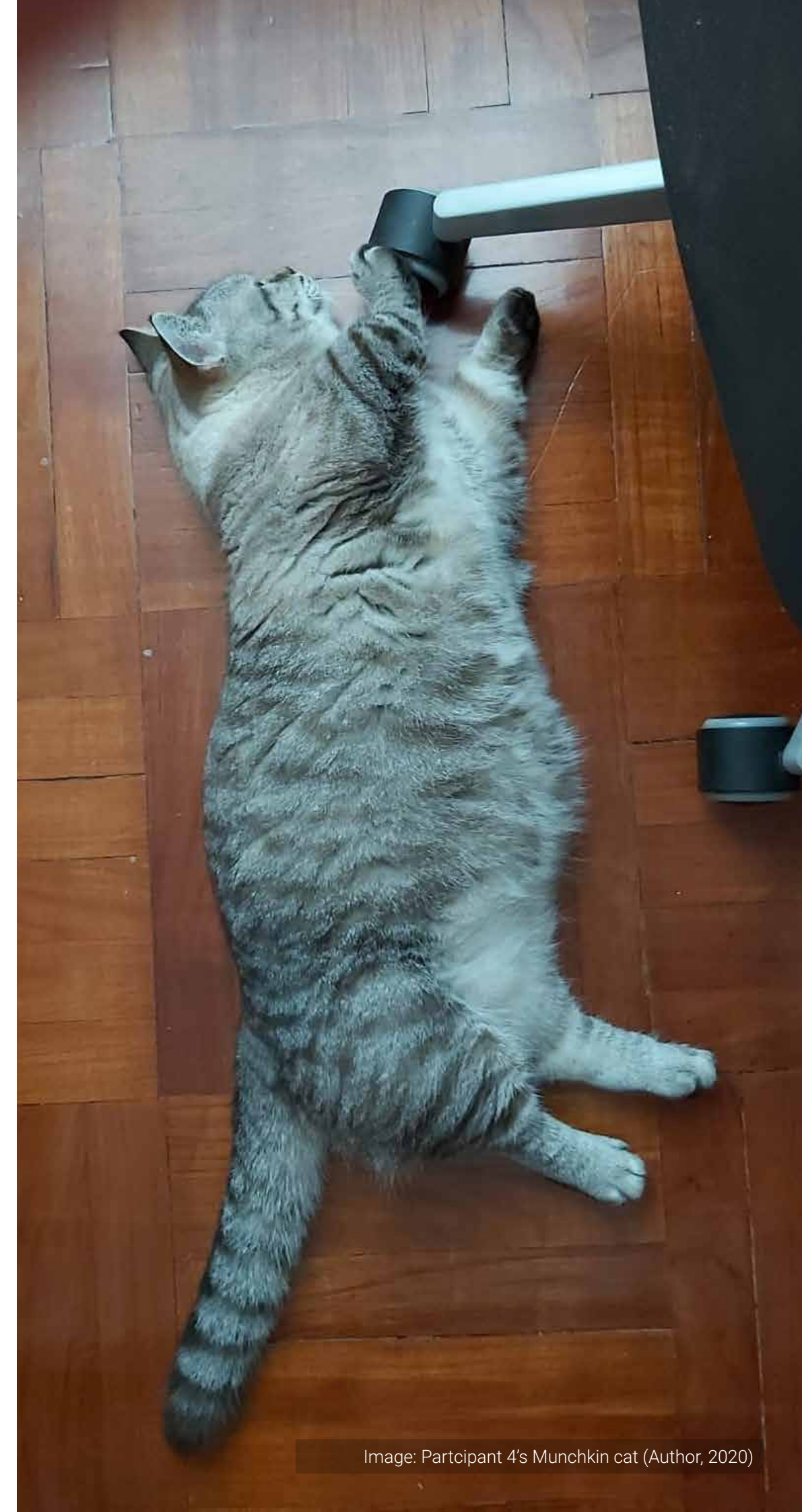


Image: Participant 4's Munchkin cat (Author, 2020)

5.0

Discussion and Recommendations

This chapter discusses the results established from the previous chapter and how it is relevant to the project. Each theme was thoroughly analysed to develop four recommendations based off the issues examined in the discussion.





DISCUSSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Introduction

An analysis into existing research encompassing the enrichment of living spaces for cats within the human space suggested that their environment could be enhanced for cats to better express their natural behaviours retained from their wild ancestors. Living spaces are designed primarily for humans, without much consideration for how outlets for cat behaviour could be integrated into this space to satisfy needs and values from both users. This study has addressed three main themes – human-cat relationship, cat behaviour and living environment – that influence the fit between the needs and values for both humans and cats providing them a user-friendly living environment. Existing literature has indicated that when stress occurs within these three areas, it is likely for cats to show problematic behaviour (Amat et al., 2016). However, results indicated that while these behaviours do occur, they were not as significant or commonplace as implied. Instead, data suggested that cats adapted to the human environment well, even when few alterations were made to accommodate their natural behaviours.

5.1.2 Human-cat relationship

The human-cat relationship was an influencing factor on living spaces as it explored the perspective of both users and how they interacted with each other within the human environment. It was suggested that a large part of the human side of the relationship was built on affection for cats. This resulted in greater tolerance for their cats' behaviours such as furniture damage. It was also found that many owners would choose to be inconvenienced so their cat was able rest comfortably, for example, by allowing their cat to sleep on the office chair while participant 1 worked on the bed (refer to figure 19). Furthermore, in cases when it was necessary to disturb the cat's rest, participant 3 mentioned that they would "...feel bad when I have to shift him a bit and wake him up." Therefore, it can be implied that even within a living space designed for humans, the integration of cats in their homes can still cause inconvenience for them.

The domestic cat's relationship with humans largely revolved around their reliance on people for attention and company. In particular, primary research found that cats that solely resided indoors were more likely to exercise attention seeking behaviour. This corresponds to research by Rochlitz (2005) who stated that by confining a cat to indoor-only housing, they are more prone to experiencing boredom because the indoor environment compared with the outdoors is impoverished, predictable and monotonous. This may explain why attention

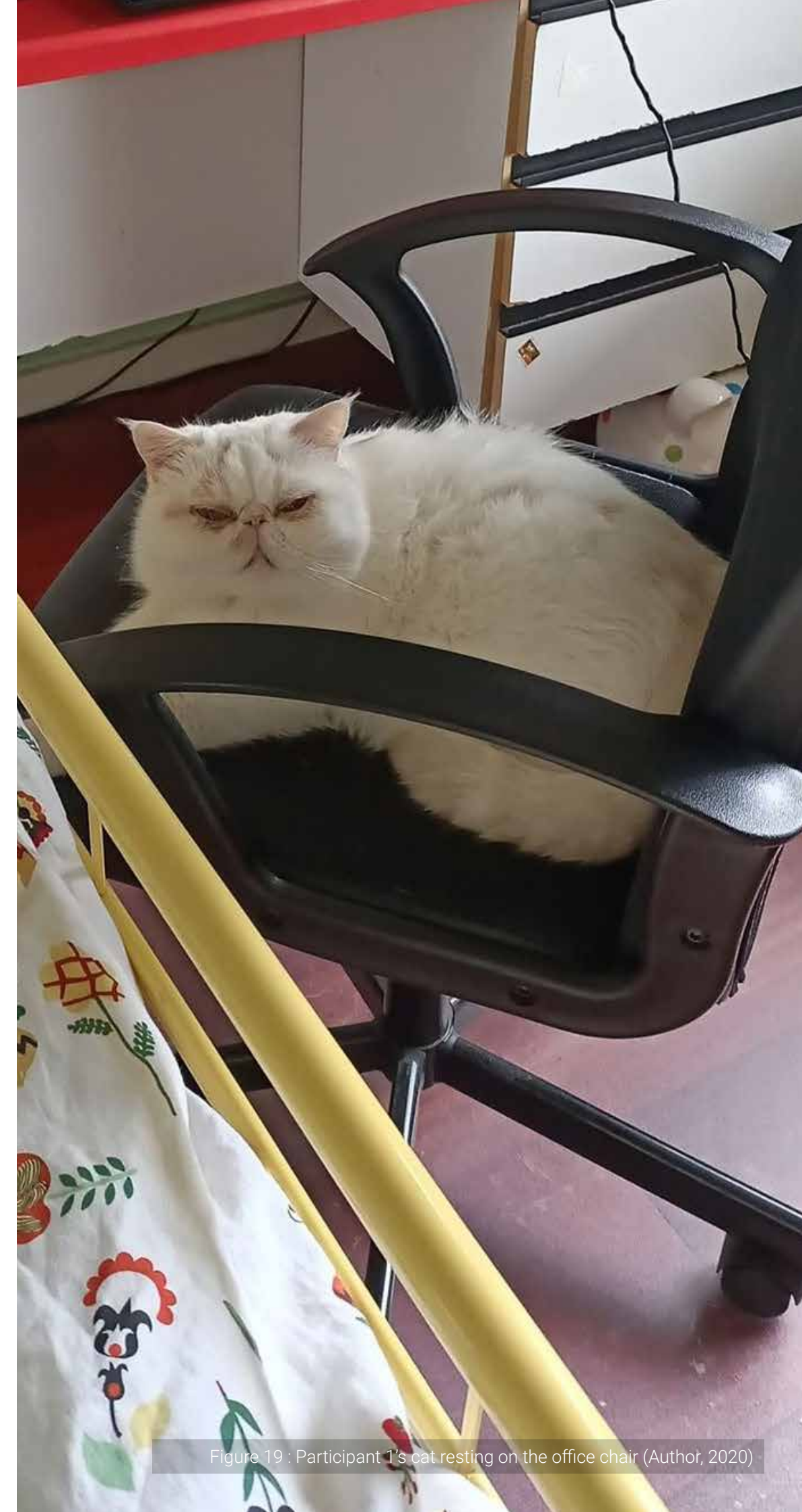


Figure 19 : Participant 1's cat resting on the office chair (Author, 2020)

seeking was more commonly found within the indoor-only cat participants. The findings indicated that attention seeking behaviour was exhibited in different forms however, it was generally achieved through tried methods that the cats knew would draw attention. This aligns with literature from Bradshaw et al. (2012) who suggests that cats will learn behaviours that are capable of drawing attention from their owner for example, scratching at furniture. The reason why attention seeking occurs can vary however, primary research often showed that cats stopped this behaviour after they received human contact. This correlates to previous studies suggesting that cats can become socially attached to their owner and seek human contact (Wedl et al., 2011, p. 66).

These findings indicate that there is an opportunity for the living environment to incorporate spaces that promote more interaction between humans and cats. Their mutual relationship thrives on interaction between each other, with both sides enjoying the other's company, particularly evident in cats that were solely housed indoors. Therefore, living spaces can be improved by the creation of areas that support interaction so indoor cats can experience an interesting life inside, while humans continue their lifestyle without being inconvenienced by their cat.

5.1.3 Cat Behaviour

As discussed by previous studies, stress within a cat's living environment can cause problematic behaviour to develop (Amat et al., 2016). However, the primary research did not find these behaviours to be as significant as implied, the only major issue occurring in participant 1's two cats that were not compatible with each other and showed aggression. The most common form of problematic behaviour that occurred within the data collection was furniture damage yet, it was understood that the cat owners were all tolerant of it. Rather, the people who showed disapproval were the ones who resided with the cat owners presumably because they had different levels of values. Existing literature stated that cats generally scratched as a form of information marking by leaving visual cues and depositing scent signals from their plantar pad glands (Mengoli et al., 2013, p. 887). Furthermore, this behaviour usually happened in places cats frequented often (Feldman, 1994, p. 1095). Data collection found that while scratching did occur in these places such as sofas or beds, it may have also transpired because the cat participants wanted attention, as once the owners initiated contact, this behaviour would come to an end.



Image: Participant 1's cat attention seeking (Author, 2020)

Existing literature found that inappropriate elimination was one of the most common behavioural issues reported by cat owners (Bernstein, 2007, p. 76). It was categorised into sections – marking and inappropriate toileting. Primary research gathered found that none of the cat participants engaged in spraying, instead choosing to scratch as their method of marking. When questioned about inappropriate toileting, there was one cat participant that displayed this behaviour, however, once participant 2 added another litter box, it solved the issue (refer to figure 20). The data gathered was contradicting of previous research implying that while inappropriate elimination occurred, it was not as widespread as described.

Excessive activity was another vital problematic behaviour asserted by previous studies. Former documentation has stated that cats can spend up to 19 hours sleeping, sporadically spiking in energy predominantly during dusk and dawn, leading to misconceptions of madness (Heath, 2007; Jongman, 2007). This behaviour derives from the small interspersed meals that occurs throughout a cat's day. However, as five out of the six cat participants had scheduled meals, hyperactivity was not a frequent occurrence. Oppositely, it was more common for the cats to be inactive. In the case that hyperactivity did happen, it usually comprised of dashing around the house, which was not an issue for the participants who resided in dwellings with enough space for movement. However, participant 4 who lived in an apartment stated that their cat often knocked things over when excited, compelling them to put their cat in the bathroom where it was safer for a few minutes until he calmed down. This suggests that hyperactivity is more problematic for cat owners residing in smaller housing.

These findings express the opportunities that could be developed to aid with the handling of common behaviours such as furniture damage or hyperactivity. Although furniture damage is tolerated by many cat owners, other residents many find it difficult to endure. Additionally, there is an opportunity for the living space to be developed to assist with the dealing of hyperactivity within smaller housing.

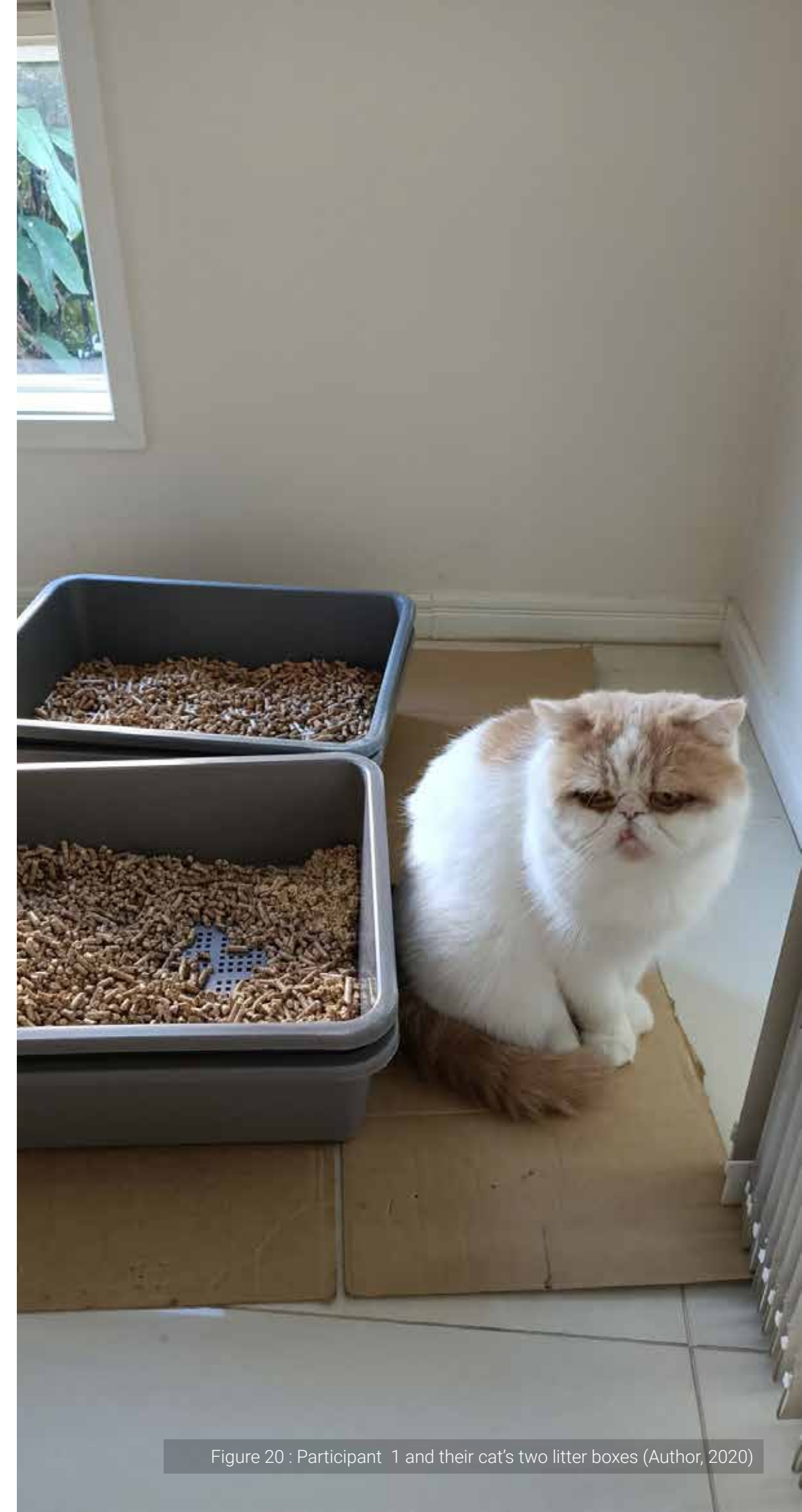


Figure 20 : Participant 1 and their cat's two litter boxes (Author, 2020)

5.1.4 Living Environment

The home living environment is a representation of the users that own that space (Mallett, 2004; Steward, 2000). On the other hand, the living space for a cat comprises of several different systems that should be met to provide an adequate environment for them indoors, so they do not develop behavioural problems. When questioned about the alterations made in their living space after owning a cat, many participants stated they implemented a cat tower. This would have provided an effective outlet for scratching and a vantage point for the cats. There were two participants who did not own a cat tower, explaining that they resided in apartments therefore they did not have enough space for it. Furthermore, one of those two participants lived in temporary housing, stating that it would be inconvenient to purchase a scratching post as it would eventually need to be transported. Therefore, the vertical dimension of their cat's environment comprised of sofas or beds. Existing research from Rochlitz (2000) stated that cat spaces should consider the vertical dimension so they can distance themselves from stressors however, primary research suggested that cats are more than capable of adapting to these environments even without considerably high spaces. As long as the cats were elevated off the ground, it was found that they were satisfied with their environment.

Existing literature recommended that cats should be provided with soft surfaces to improve their quality of life as their routine mostly comprises of rest (Crouse et al., 1995). Primary research that was conducted found that all participants purchased a cat bed however, five out of the six cat participants chose not to use it. Instead, the cats preferred to rest on human furniture such as sofas or beds, resulting in a transfer of users, as those spaces converted into a 'cat bed' (refer to figure 21). An observation that was made found that these unused cat beds wound up being left lying around the house or thrown out. Additionally, although the cat participants preferred soft surfaces to rest on, the usage of these spaces changed according to the temperature. For example, during colder seasons, the cats would choose to rest on soft, cosy places whereas they would stick to cooler surfaces when it was hot. This implies that although it is important to have soft surfaces, resting spots for warmer temperatures should also be considered.

The litter box is necessary for indoor cats as it serves as a place to eliminate. Previous studies suggest that the litter box should be placed in a quiet, safe spot away from the feeding area to prevent contamination and allow for privacy (Feldman, 1994; Herron & Buffington, 2010). The research conducted found that all participants placed their cat's litter box in secluded spaces that allowed for privacy implying that this was generally not

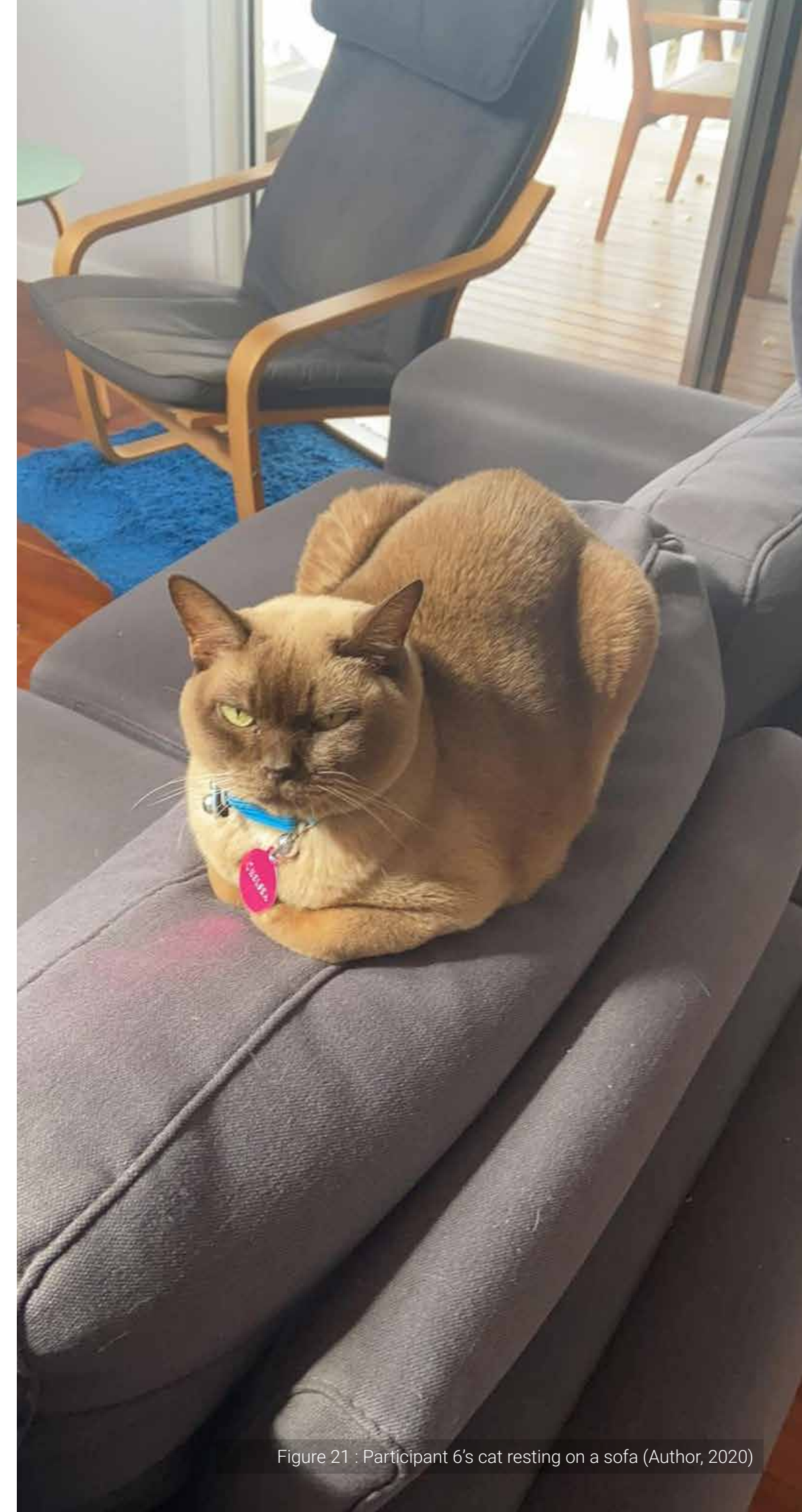


Figure 21 : Participant 6's cat resting on a sofa (Author, 2020)

a significant issue. This was because the participants viewed the litter box as a soiled item that they did not want in their living space, thus it was placed in areas not frequented often. Furthermore, when questioning the participants about their experience with the litter box, there were many negative comments about the stench it created, and the difficulty in keeping the area around it clean. This implies that the human experience with the litter box could be improved to better fit into the values of their home.

An unexpected finding found while conducting research were breed specific issues that arose in the living space for some cats. These issues were related to the munchkin and exotic shorthair (Persian cat derived) breeds. Participant 4 who owned a munchkin stated that they have issues with jumping because their legs are shorter, thereby negatively impacting their spine. Although there has yet to be any evidence proving that this statement is true because the munchkin breed is relatively new, it is still a concern that may be unsettling for munchkin owners (Haase et al., 2016, p. 272). Participant 1 was the owner of two exotic shorthairs, which is characterised by a flat face. The problem with these Persian cat derived breeds is that they display epiphora – a condition that results in excessive watering of the eyes (Hartley, 2013, p. 5). This condition often results in the creation of tear stains in the house, causing the need to frequently clean these stains. Therefore, to minimise this issue, participant 1 placed towels on furniture the cats often rested on. These breed specific issues suggest that living spaces for cats are designed with a one fits all approach, with little consideration for breeds that fall under the body type mutation category. This indicates that the cat living environment could be improved to recognise their issues.

Through primary research, it was found that majority of participants had implemented the requirements for a cat to live indoors (elimination, behavioural, nutritional systems) however, there were some spaces that the owners desired to further improve their cat's quality of life. The participants commonly stated that they wanted more places where their cat could enjoy physical activity because overweightness was an issue in four of the six cats. This was because the cats were mostly inactive throughout the day and were being overfed. Additionally, it was difficult to get their cats to participate in any kind of physical activity therefore many participants' efforts to promote play were in vain. This suggests that the indoor space could be improved to encourage exercise, especially for cats that were not interested in playing.



Image: The Munchkin, a relatively new breed of cat (Author, 2020)



Image: An exotic shorthair which is susceptible to epiphora (Author, 2020)

An analysis of the existing living environment for cats identified numerous issues currently experienced by cats and cat owners. The first issue identified found that cat owners who resided in smaller or temporary housing had issues implementing cat furniture as it took up too much space or they felt that it would be inconvenient to transport when moving. Subsequently, there needed to be more spaces that could be used all year round, regardless of temperature. Furthermore, those spaces designed for cats needed to better appeal to them to promote usage, so they did not become clutter or wastage. More consideration for breeds with body type mutations should be made so they can still safely or conveniently use these spaces. There is also an opportunity to improve spaces to promote physical activity to reduce overweightness in cats. Finally, the human experience with the litter box can be enhanced to be less troublesome to manage.



Image: Participant 5's cat resting in a cat tent (Author, 2020)

5.2 Recommendations

5.2.1 Promotion of physical activity

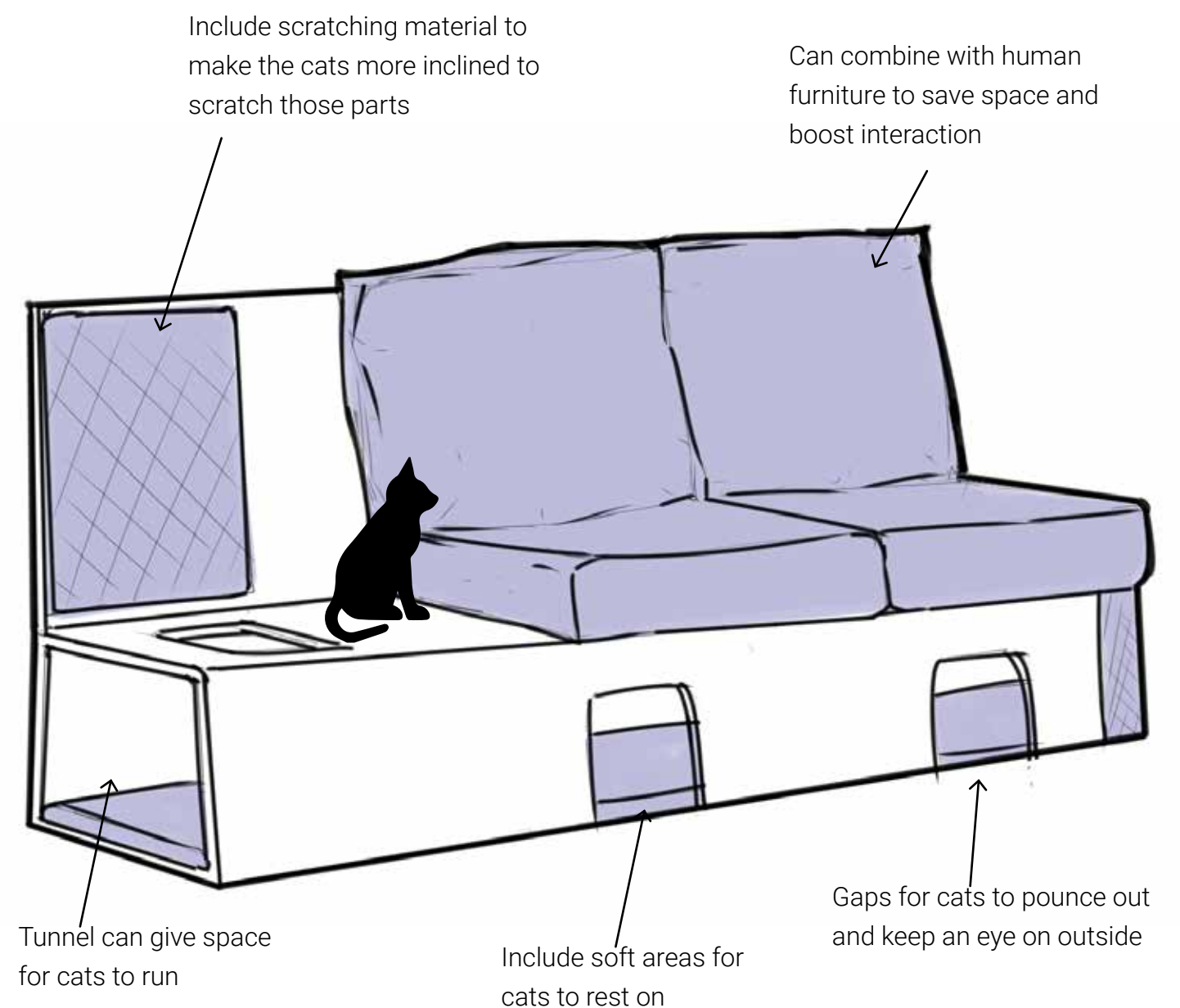
A key issue found when conducting data collection was the inability to engage cats into physical activity and when combined with overfeeding by cat owners, it caused them to become overweight. Therefore, a recommendation can be made to provide cats with a space that exploits their hunting instincts to better promote physical activity.

Limitations

- Difficulty in implementing products that take up a large amount of space in smaller housing
- Difficulty in designing a one fits all space for cats of different sizes/breeds
- Preferences that compel cats to play will vary depending on their personality and experiences

Key Considerations

- Ergonomic considerations for cats
- Adequate size of product for placement inside a living space
- Australian standard (AS/NZS 4790:2006 (R2016)) for strength and durability of furniture and storage units
- Space needs to be able to be cleaned easily
- Inclusion of spaces that can help promote locomotive or object play
- Able to endure scratching behaviour
- Sustainability of the design as a whole – material, manufacturing, design for deconstruction and disassembly
- Choice of material suitable for cat and human furniture



5.2.2 Promotion of interaction between human and cat

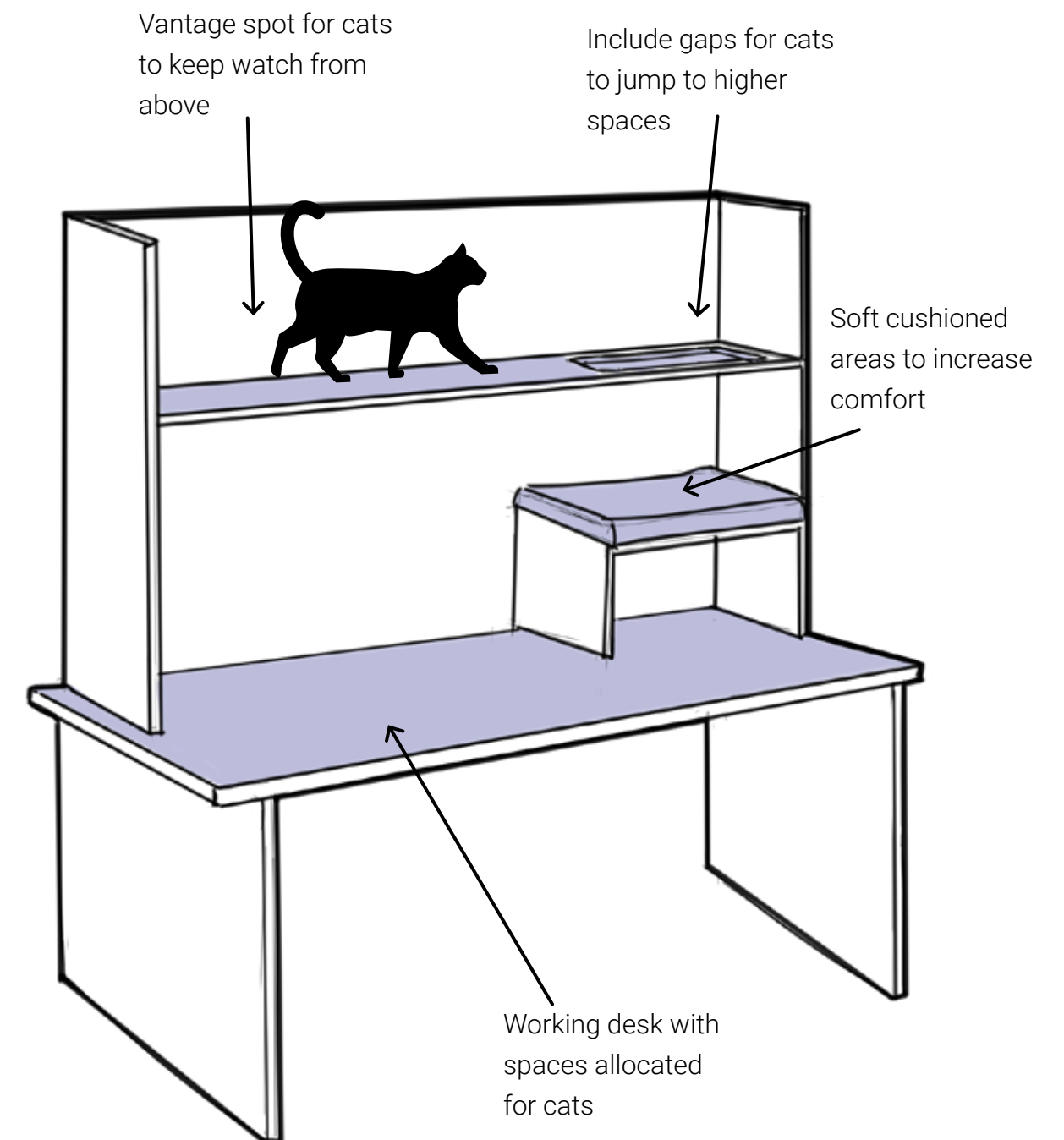
Primary research suggested that solely indoor cats are more prone to attention seeking behaviour which can occasionally cause inconvenience for cat owners. By combining the space for both humans and cats in furniture, interaction between the two can be enhanced to minimise disruptive behaviour from cats.

Limitations

- Each cat has their own preferences and the space designed may not appeal to them
- Difficulty in implementing products that take up a large amount of space in smaller housing
- Difficulty in designing a one fits all space for cats of different sizes/breeds

Key Considerations

- Design of space needs to appeal to cats, so they understand the space is for them
- Ergonomics for both cats and humans
- Australian standard (AS/NZS 4790:2006 (R2016)) for strength and durability of furniture and storage units
- Space needs to be able to be cleaned easily
- Able to endure scratching behaviour
- Sustainability of the design as a whole – material, manufacturing, design for deconstruction and disassembly
- Choice of material suitable for cat and human furniture



5.2.3 Human experience with litter box

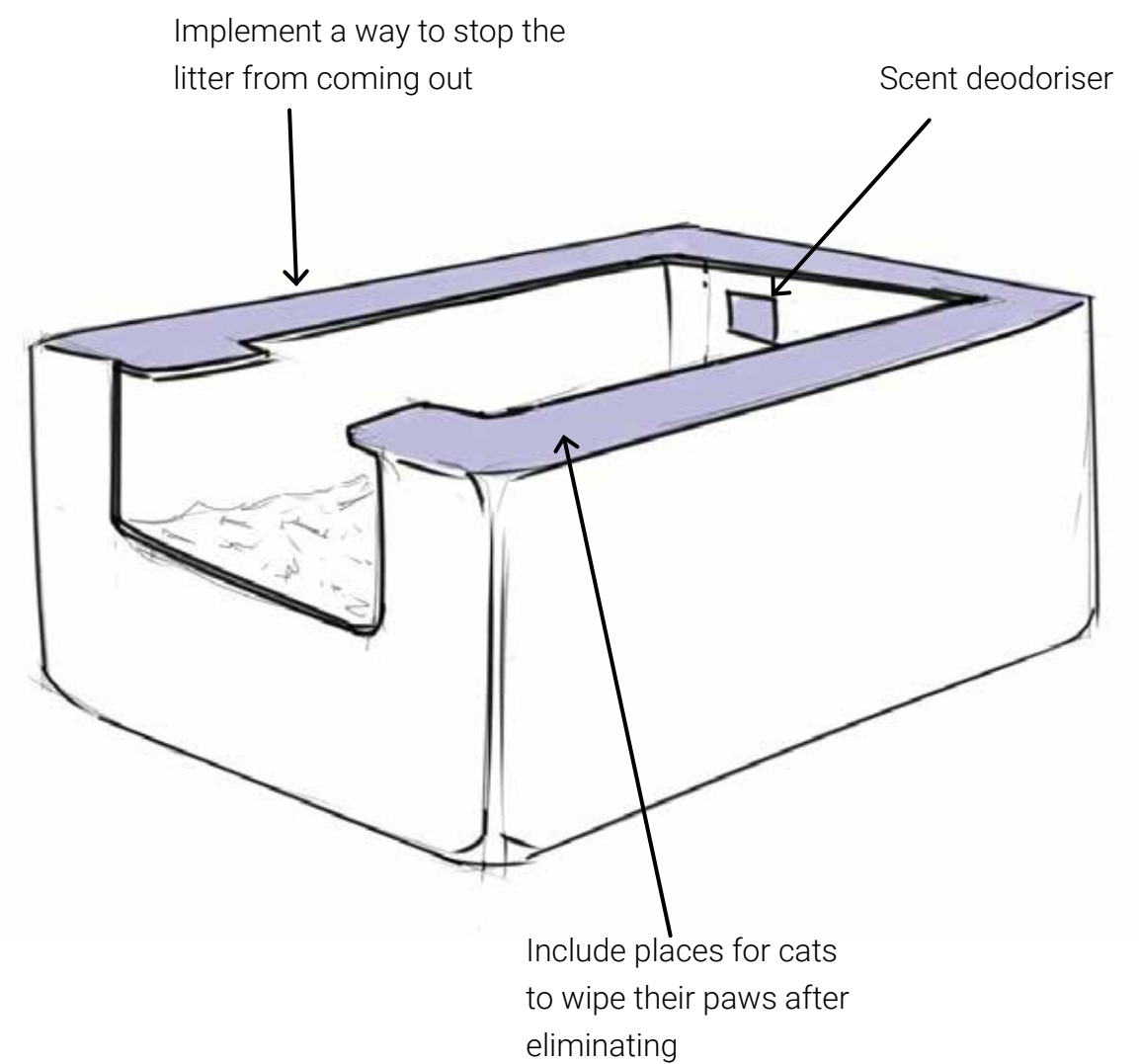
Although primary research indicated that it was rare for cats to display inappropriate elimination, cat owners considered the litter box one of the worst parts in owning a cat because it was troublesome to manage. Therefore, it was recommended to design a litter box that assists in keeping the space around it clean and minimises the odour of the litter.

Limitations

- Difficulty of user testing as it is a troublesome task to get cats to use a different litter box
- Litter boxes generally vary in size depending on the cat

Key Considerations

- Sizing of the litter box
- Needs to be easy to clean
- Ergonomics of a cat
- Endure the scraping of claws when a cat wipes its paws after eliminating
- Sustainability of the design as a whole – material, manufacturing, design for deconstruction and disassembly
- Choice of material suitable for a litter box



5.2.4 Cat furniture that is suitable for smaller housing

Primary research suggested that those who resided in smaller housing such as apartments had difficulty implementing existing cat furniture such as cat towers because they were too bulky in size. This suggests a recommendation can be made to create modular cat furniture that is compact and aesthetically pleasing for those who reside in smaller housing where there are space limitations.

Limitations

- Modular format of the cat furniture may not be very stable
- Size limitation as there is generally little space in an apartment

Key Considerations

- The aesthetic needs to complement the interior of many houses
- Australian standard (AS/NZS 4790:2006 (R2016)) for strength and durability of furniture and storage units
- Space needs to be able to be cleaned easily
- Able to endure scratching behaviour
- Ergonomic consideration for cats
- Understanding of places where the cat owners may place the product to better integrate design into the living space
- Sustainability of the design as a whole – material, manufacturing, design for deconstruction and disassembly
- Choice of material suitable for cat furniture

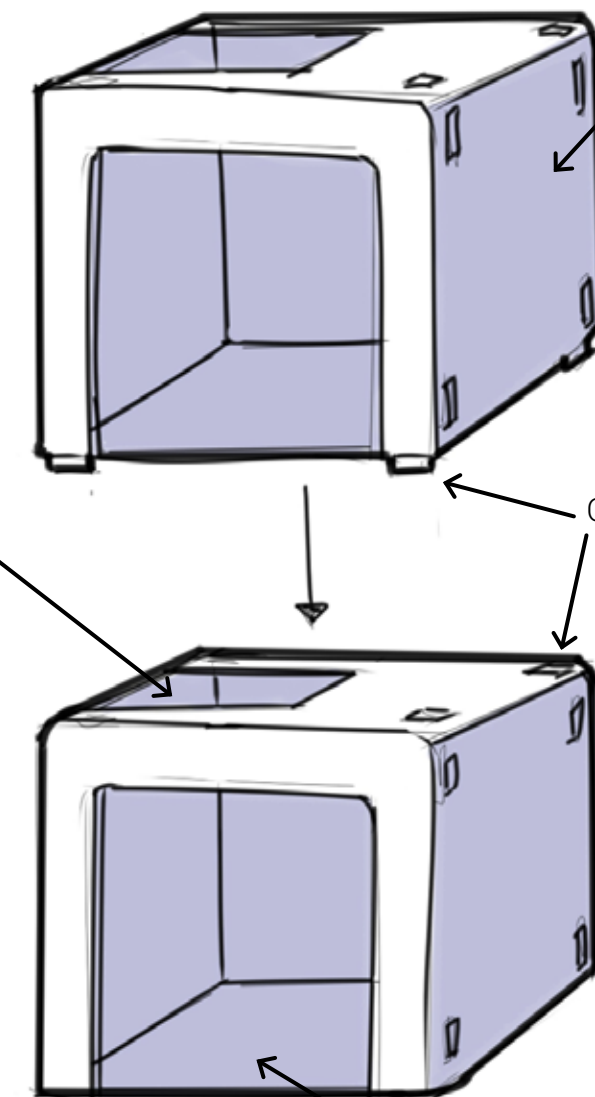
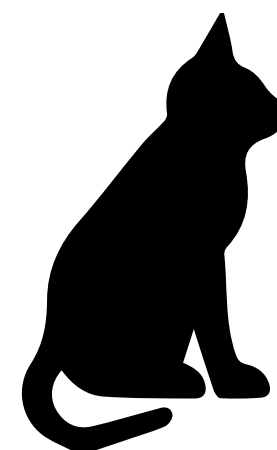
Modular format allows cat owners to build the furniture according to how much space they have

Implement scratchable material so cats are more inclined to scratch it

Smaller gaps so the cats can look out when resting inside

Can lock onto each other

Gaps to let the cats go in to rest inside



6.0

Design Proposal

This chapter outlines the design intention behind this project and the justification for why it is important. The design criteria are discussed and formulated to assist in shaping of the final design solution. A schedule is also illustrated to map out the agenda of key deliverables and aid in the time management of this project.





DESIGN PROPOSAL

6.1 Design Intent

The research in this study uncovered key problems that both cat owners and indoor cats encountered within their living environment. One major finding determined that inactivity combined with overfeeding within indoor cats was a prevalent occurrence causing them to become overweight. The design deriving from this finding will aim to add points of interest within the indoor environment of a cat to stimulate play behaviour, reducing the monotonous aspect of an indoor-only life thereby minimising the chance of boredom and overweightness. Users of the design will include cats and cat owners therefore both will need to be considered to achieve an adequate product.

6.2 Justification

The findings revealed after conducting primary research assisted in forming the direction of the project. Ultimately, the current indoor environment creates a predictable lifestyle that is difficult in promoting physical activity especially for cats who are indifferent to their owner's efforts in encouraging play. This can lead to overweightness in cats when combined with overfeeding by cat owners therefore, by creating a space that exploits the innate hunting behaviour of the domestic cat, the issue of boredom and inactivity can be minimised. Essentially, existing and primary research guided the path to the generation of the early ideation of a space both humans and cats can interact with indoors.

6.3 Context

The design will be created with the intention of being used within all kinds of housing in Australia. This includes separate housing, townhouses, semi-detached housing or apartments. As primary research indicated that the placement of cat furniture within a house varies vastly, the design will need to be able to be used in all rooms of a dwelling. The design will be targeted towards cats and cat owners so the needs and values for both users will need to be considered to create a product suitable for them.



Image: Green eyed cat (Free-Photos, 2016)

6.4 Key Criteria

The criteria below indicate the requirements that need to be met in order for the design to be successful.

User Demographic

The product will be used by both cat owners and cats. Cats of different types of breeds (body mutation breeds) may be considered when designing the product.

Cleanability

The design must be able to be cleaned easily as cats are prone to shedding and vomiting of food or furballs. This is also important for cat owners who keep a flat faced cat as they have a condition that causes excessive tearing which can lead to staining of surfaces.

Durable

The design must be able to endure scratching behaviour which is commonly exhibited by cats. It should also be sturdy enough to cope with the sporadic bursts of energy released when a cat is hyperactive or excited.

Comfortable

Comfort is important for both users of this product as cat owners will be frequently interacting with it as well as the cats themselves. Fulfilling this criterion will assist in improving the quality of life for cats in an indoor environment.

Ergonomics

Ergonomic considerations for cats and humans are equally important in this project. This will ensure that both users can interact in this space comfortably.

Material

The materials chosen for the design should consider durability, cleanability, comfort and sustainability to produce a solution that has a long product lifespan while still being pleasant to use.

Standards

Australian standard AS/NZS 4790:2006 (R2016) for strength and durability of furniture and storage units will need to be followed during the design process.



Image: Participant 3's cat in a box (Author, 2020)

Sustainability

The design needs to consider sustainability within three different contexts – material, manufacturing and design for deconstruction and disassembly – to ensure a long product lifespan, production of minimal waste during manufacturing, and ease of disassembly at the end of its lifespan.

Form

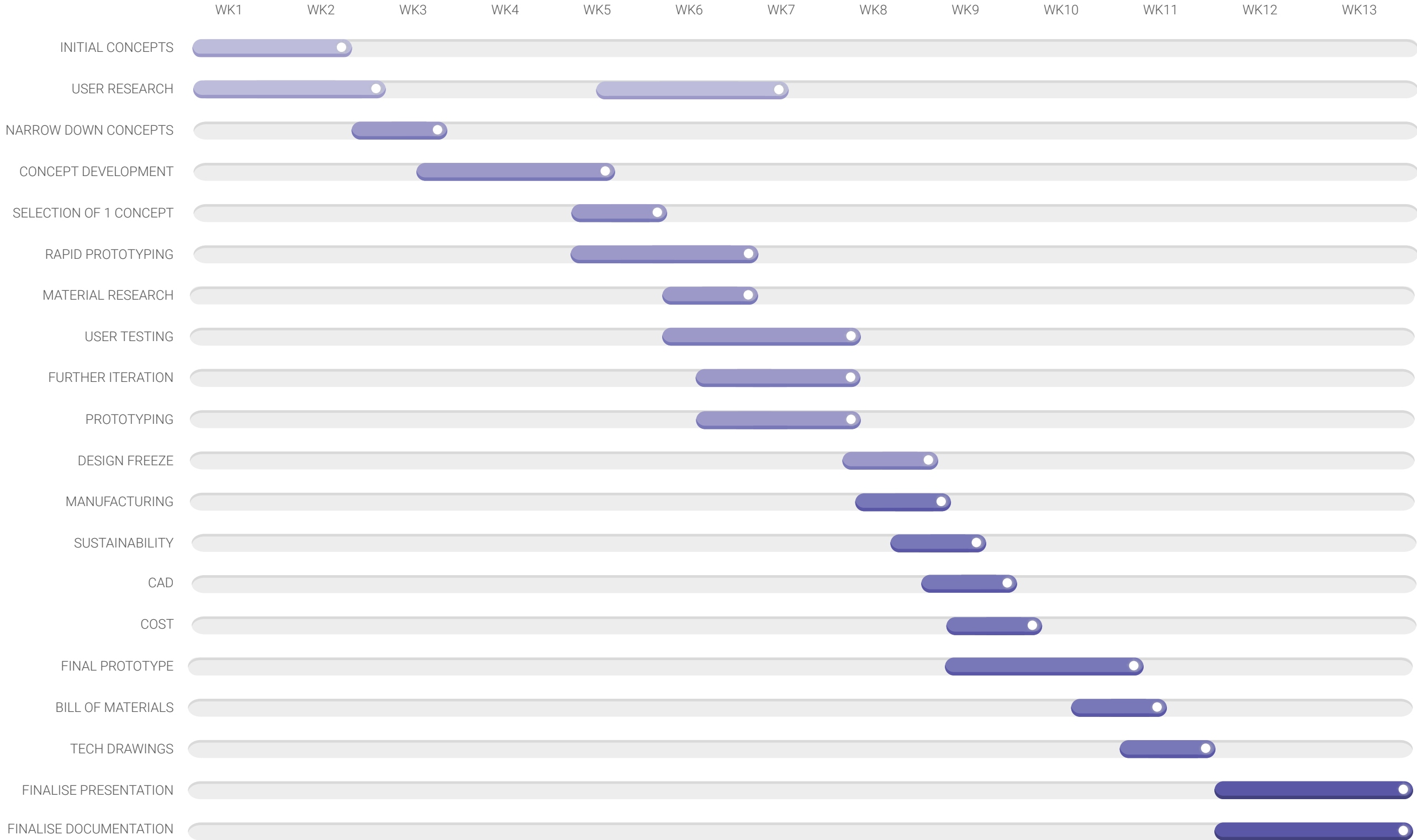
The design should be combined with human furniture to create a product that is compact and suitable for housing with less space.



Image: Participant 3's cat in a box (Author, 2020)

6.5 Design Process

This project will follow a schedule to ensure efficient time management and the delivery of the final design solution.



6.6 Conclusion

The direction of this project was formulated through thorough research of existing literature and conducting comprehensive data collection. It was found that the lifestyle of an indoor cat largely comprises of inactivity and when combined with overfeeding by owners, it was common for them to become overweight. Therefore, the direction of this project proceeded in determining a way in how the indoor living space can be enhanced to improve their monotonous life. Ultimately, the design solution will provide indoor cats and cat owners with a product that will enrich both of their living environments so play behaviour and interaction is promoted.

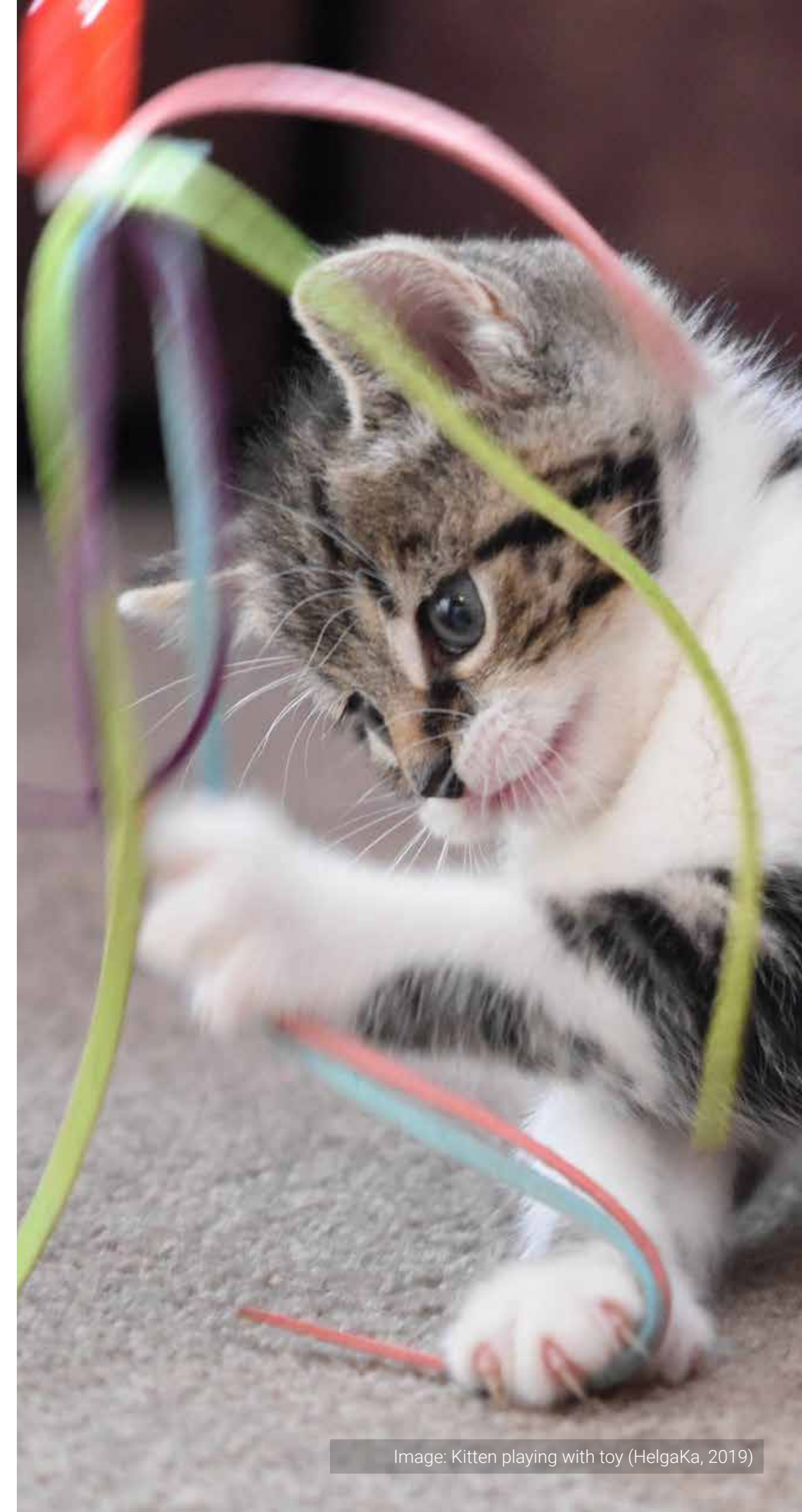


Image: Kitten playing with toy (HelgaKa, 2019)

7.0

Design Justification





DESIGN JUSTIFICATION

7.1 Introduction

The indoor living environment is a space that mainly considers humans as the primary users. There is little concern for the implementation of space that is centred towards indoor domestic cats, who are deprived of the great outdoors. They still retain their wild instincts due to the nature of their domestication therefore being kept indoors has the potential to cause obesity, behavioural problems, boredom, and inactivity. This has created the need for the current human centred environment to shift towards one that also reflects the behavioural needs of the domestic cat.

Several reasons why many cat owners have not been able to properly adopt cat centred spaces in their homes is because of the limitations in current options available. A large amount cat owners had issues with existing cat furniture that involved the general aesthetic, space limitations, bulkiness and difficulty in transportation for those living in temporary housing. Therefore, the final design had to consider the needs and values of both users living within this space.

7.2 Further Research

Currently, on the market for cat furniture, there are little to no design companies that focus on creating human-cat centred spaces. However, there are a wide range of companies that create cat furniture including Tuft + Paw, Go Pet Club, Catit, PawHut, Katris and more. Many of these companies design for pets in general and have a selection of cat accessories or furniture.

In general, cat furniture will have a surface for scratching and a platform for cats to jump onto. As the furniture raises in price, more platforms, resting spaces, and interactive features are added. The main function for them is to provide a space for cats to scratch and allow them to have a vantage point or hiding spot for them to feel safe. However, it is also important to consider other interactions humans and cats have with the furniture from the start to end of its product life. This includes assembly, disassembly, transportation, cleaning and playing.



7.3 Context, System + Scenario

People

There are two primary users that will be targeted for the design – the cat owner and cat. In particular, cat owners aged 20 to 30 years old will be pursued however, it is not limited to them as the demographic includes a wide range of people. On the other hand, cats come in a range of sizes and there are up to 71 breeds according to The International Cat Association (TICA, 2020). Within the 71 breeds, there are cats with longhair, shorthair and body mutations, for example Munchkin cats with short legs or Persian cats with a flat face.

Activities

There are several activities that will be undertaken when using the Cubicat. Firstly, the cat owners will assemble and disassemble it; transport it; use it as a seat, table or shelf; and clean it. Activities that the cats will undertake with the product includes playing, sleeping, sitting, scratching, marking, entering, climbing and jumping.

Context

As the Cubicat is designed for indoor cats, the main context it takes place in is an indoor setting, specifically housing in Australia. This includes separate housing, townhouses, semi-detached houses or apartments. These environments range from housing with several rooms, to units with limitations in space. The house is a place of security, relaxation and a representation of the residents therefore, they desire an interior that reflects themselves. Oppositely, cats have little concern about the aesthetics of their living space and instead, require a space that allows them to display their natural behaviours such as marking, jumping, hiding, climbing, and hunting. Therefore, the design must reflect how both users interact with the product and consider their needs and values within the indoor environment.

Technologies

On the current market for cat furniture, many do not incorporate technology. It is usually seen in automated cat toys which are developed to imitate the way prey moves such as mice, insects, or fish. However, these toys usually move in a repetitive motion therefore cats are able to easily understand the pattern it moves in. This results in cats quickly losing interest in the toy as it poses no challenge to them. Therefore, it was decided that it was not necessary to incorporate cutting edge technologies into the product itself. Instead, different types of manufacturing processes such as CNC routing and extrusion were chosen to be used for the production of the Cubicat. The exclusion of technologies within the product ensured that it was not overwhelming for both cats and people to use.

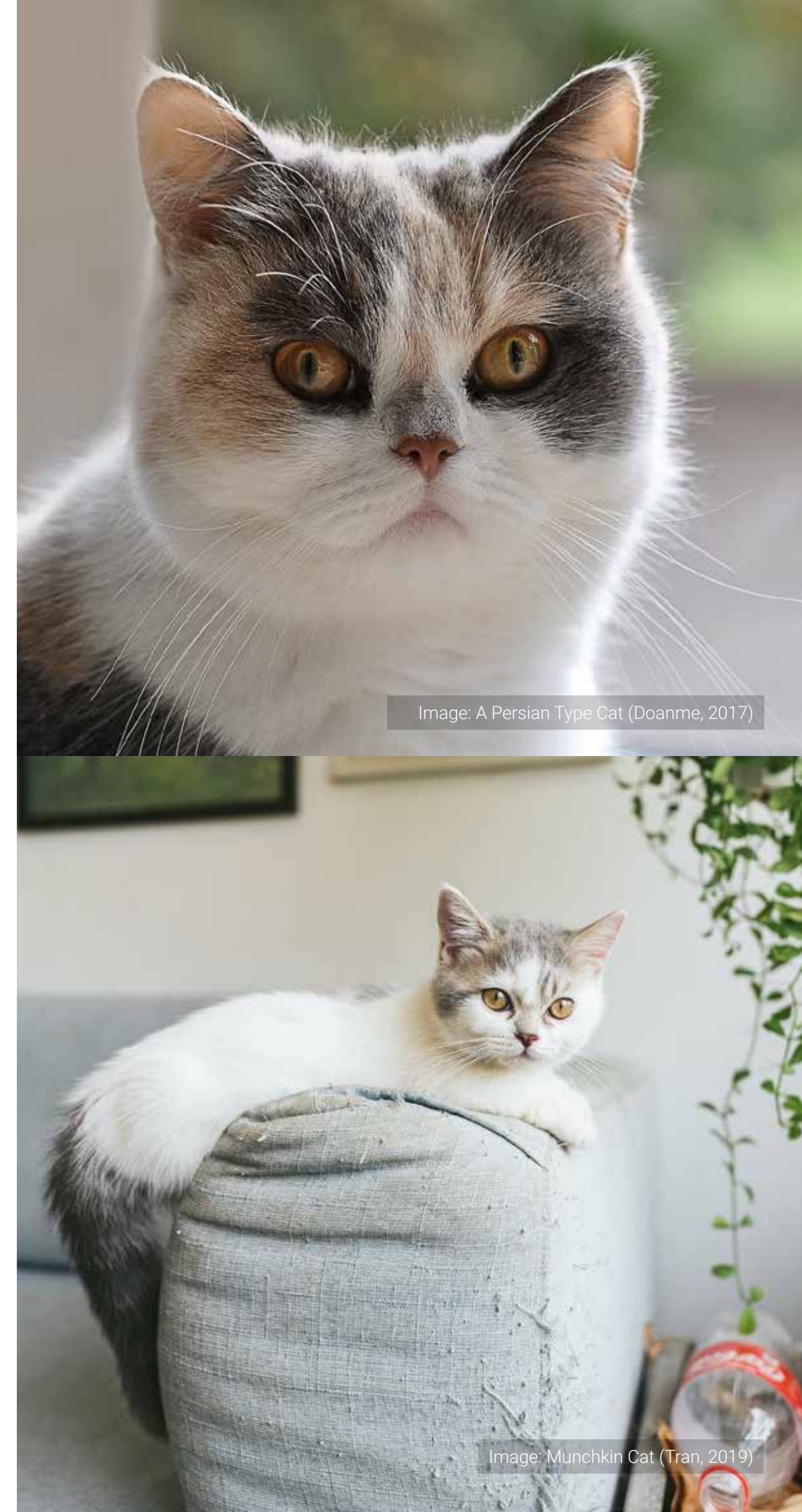


Image: A Persian Type Cat (Doanme, 2017)

Image: Munchkin Cat (Tran, 2019)

7.4 Design Process

The design process for this project followed the Design Council's Double Diamond framework. The first diamond was undertaken in semester one and began with understanding the context of the topic chosen. Research was conducted on existing literature to better comprehend problems occurring within the topic of domestic cats. Primary research was then conducted to find out whether the issues occurring within the literature were valid. The results from the research then paved the way in defining several opportunities that could be targeted to create a solution for.

This was followed by the second diamond where the development of ideas and concepts occurred. Sketches were constantly drawn for ideation and further research on the target audience was completed to better understand the context of the design. Rapid prototypes were then completed to understand the basic form of the product (refer to figure 22). The development stage was interconnected with the delivery stage and involved constant back and forth between the two. This was because the process involved several different concepts being developed and expanded on.

7.5 Design Direction

The direction of the design focused on encouraging physical activity within the indoor environment for cats. This was because indoor cats have limited space to display their innate wild behaviour which can result in a whole range of issues such as obesity, behavioural problems, boredom, and inactivity. The design also needed to meet the needs and values of cat owners.

7.6 Design Validation

Validation was required for the design to ensure that it was successful. Continuous feedback was received from cat owners during the design process. This enabled it to develop as positive and negative areas could be better understood, further pushing the boundaries in creating the best possible solution. In addition, user testing was conducted with two different domestic cats that had varying personalities and ages – a ragdoll and a Burmese cross (refer to figure 23 & 24). These tests were completed with several different prototypes to understand if the cats would interact with it the way that it was intended to be used (refer to figure 22). Observations could



Figure 23: A Burmese cross cat doing user testing (Author, 2020)



Figure 24: A Ragdoll cat doing user testing (Author, 2020)

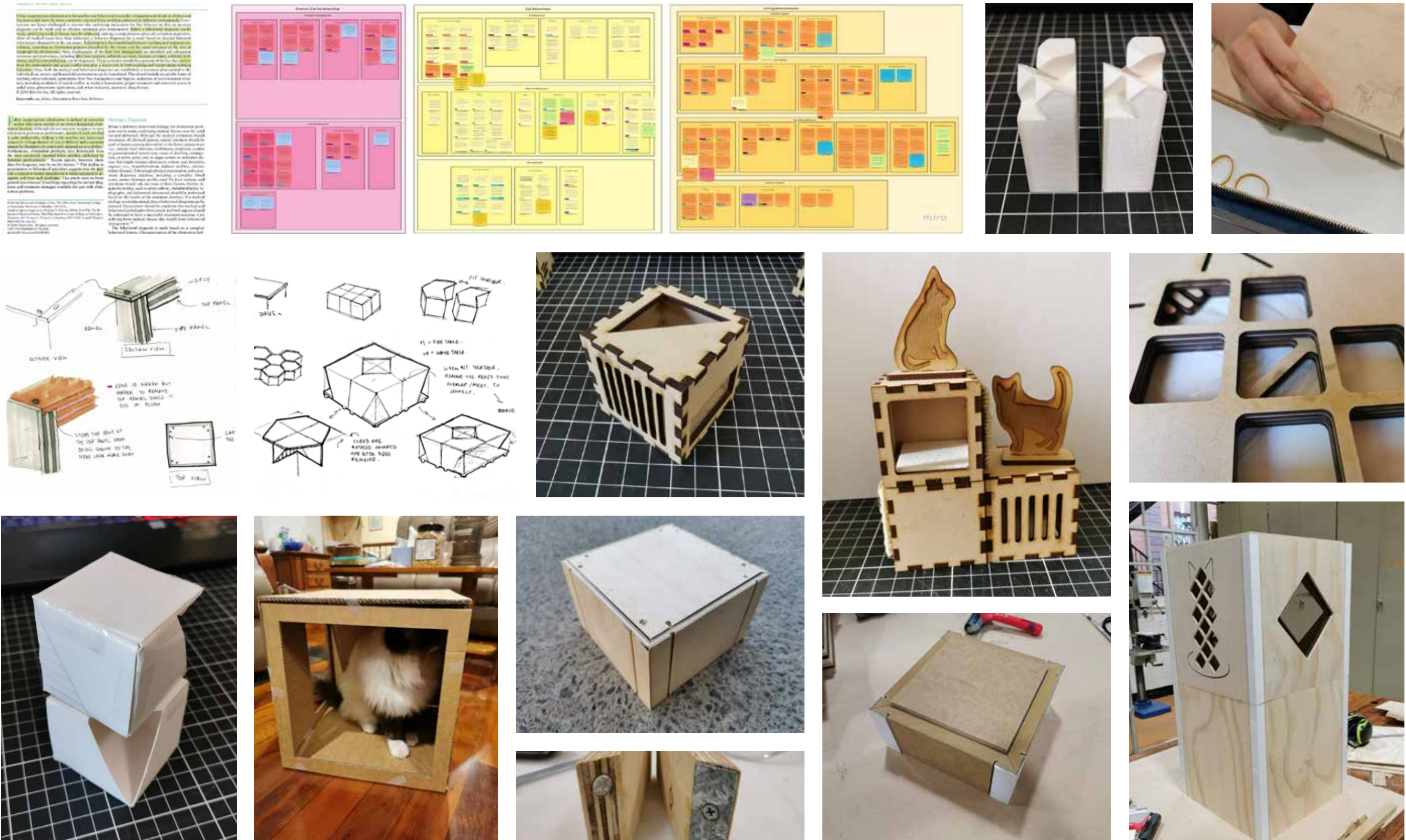


Figure 22: Design Process involving research, coding, sketching, prototyping & user testing (Author, 2020)

be made about how interested they were in it, how they entered it, if they felt secure in there and if they played inside or around it. From the beginning, the design was quite successful with the cats and further development was more focused on the human interaction with the product. Therefore, user testing was also conducted with people to understand assembly, transportation, and placement within the house (refer to figure 25). The information received from user testing was then used to inform the development and delivery of the design.

7.7 Business Case

When designing the Cubicat, it was necessary to consider its position in the current market to ensure that it had something that made it unique. To ensure successful implementation, different aspects of the design in relation to bringing it on the market was looked over.

7.7.1 Implementation

The Cubicat was designed to be easy to put on the market. There will be two methods available to purchase the Cubicat – online or through a pet store. Once the order has been placed online, the Cubicat will leave the warehouse and be delivered to the person's doorstep. Alternatively, cat owners can simply purchase it at their closest pet store if they prefer. As the Cubicat was designed to be flat packed, cat owners should have little difficulty transporting it to their home to assemble.

7.7.2 Value Proposition

Cubicat provides cats and cat owners with an indoor environment that works for both of them. Gone are the days where cat owners purchase unaesthetic carpet covered cat furniture because of their limitation in choices. It gives cat owners the freedom of customisability in their furniture whilst also creating space that incites curiosity in cats. It establishes an environment that allows cats to display their natural behaviour to the reduce the chance of developing behavioural issues and boredom. Cubicat creates an environment that both humans and cats can enjoy, allowing them to have the best of both worlds.

7.7.3 Business Model Canvas

The business model canvas was used to capture the business structure for Cubicat. Table 1 is a representation of an analysis of Cubicat.



Figure 25: User Testing (Author, 2020)

7.7.3 Table 1: Business Model Canvas

	ANALYSIS
CUSTOMER SEGMENTS	The customers involved with the Cubicat mainly involve cat owners ranging from 20 to 30 in age.
VALUE PROPOSITION	Cubicat creates a space for cats to act as they would in the wild. It is an interactive space for them to display their natural behaviours and play or "hunt" in. Cubicat also creates value for cat owners by eliminating the need for them to allocate space for it. Additionally, it improves on the generic aesthetic of existing cat furniture.
REVENUE STREAMS	Revenue will be obtained through cat owners making purchases of Cubicat online or through a pet shop.
CHANNELS	The channels will be operated through pet stores in Australia and be sold in store and on their online websites. Cubicat will be advertised through social media and have its own website that details the design.
CUSTOMER RELATIONSHIPS	Positive customer relationships will need to be built to maintain a strong bond with the customers who purchase Cubicat. This will be built through interactions with social media.
KEY ACTIVITIES	Human Furniture The cat owners have several key activities that they will complete with the Cubicat. Interactions mostly involve assembly, disassembly, transportation and using it as static furniture such as a seat, shelf, or side table. Cat Furniture Cats will interact with the Cubicat by using it as a place to play in. This allows them to practice their 'hunting' behaviour indoors and prevent them from becoming overweight or inactive.
KEY RESOURCES	The resources required to run the business include funding to manufacture the product and marketers it to inform consumers of it.
KEY PARTNERS	Partners that are required to run the business include various pet stores e.g. Petbarn or Bestfriends.
COST STRUCTURE	Top costs involve sourcing the material and manufacturers to produce the Cubicat.

7.8 Final Design Discussion

Cubicat was designed with a set of criteria that was formulated in semester one. It aided in informing the direction of the design and deciding if the final outcome was successful.

User Demographic

The design was tested with cats of different sizes to ensure that various breeds would be able to comfortably use it.

Cleanability

Throughout the design process, cleanability was a large consideration that needed to be adhered to because of the inconvenience people had cleaning vomit or urine on carpet covered cat towers. Therefore, the panels that make up the Cubicat were finished with a spray lacquer that sealed the plywood and waterproofed it, ensuring that it would be easy to wipe down once dirtied. The cushion element of the Cubicat had two different layers of cushion covers. The lower cover was made from polyurethane which prevented any liquid from seeping into the foam of the cushion.

Durability

Durability of the design was considered so that it could cope with hyperactivity and play behaviour displayed by cats. The aluminium connector parts ensured that the panels could be connected sturdily so that they would not wobble from a cat's movement within it. The spray lacquer also increased the durability of the plywood.

Comfort

Several elements were added to increase the comfort of the Cubicat for both cat owners and cats. This included incorporating an enclosed space for cats to hide in because they feel security in being in closed spaces. Two cushions were also added for both cats and humans to offer more comfort when resting or sitting on the Cubicat.

Ergonomics

The cut outs in the panels considered ergonomics to ensure cats of different sizes could enter the Cubicat and play inside it comfortably. User testing was conducted with both large and small cats to ensure that all cats could use it. The corners of the cut outs were also rounded to minimise the amount of sharp edges. Additionally, it was designed so that cat owners could efficiently assemble and disassemble it.



Image: Cubicat as a bedside table(Author, 2020)

Material

Each material chosen for the Cubicat was decided after consideration on aesthetics, context and activities that will be undertaken with it. The panels were made from a birch plywood because it is light in colour but still quite sturdy. In addition, plywood was chosen instead of solid wood as it has fewer grain and shrinkage issues. Aluminium was chosen for the connector parts because it is lightweight and can be extruded with a narrow wall thickness. The materials for the cushion covers – cotton, bamboo, polyurethane – all prioritised breathability to create comfort for the users resting on it. There were several layers of fabric so that the foam insert could be protected from furballs or urine.

Sustainability

Sustainability was considered throughout the whole design process to make sure that there was minimal waste generated during production and after the product lifespan. As the Cubicat can be disassembled, it allows for easy replacement of parts, only requiring cat owners to replace damaged components. The minimal number of manufacturing processes also reduces the amount of energy required for production.

7.9 Summary

In summary, Cubicat provides humans and cats with an interactive space that both users can enjoy. Semester one was dedicated to research on the behaviours of humans and cats within an indoor environment which led to the identification of a design intent and criteria. This guided the development of a design distinct from the current unattractive, generic products on the market. The Cubicat varies in the way that it is for humans and cats, customisable, saves space and creates places that encourages cats to play. Essentially, it is a new means of providing variety in the repetitive and human centred environment many indoor cats reside in.





Image: The Cubicat in use (Author, 2020)

8.0

Conclusion



9.0

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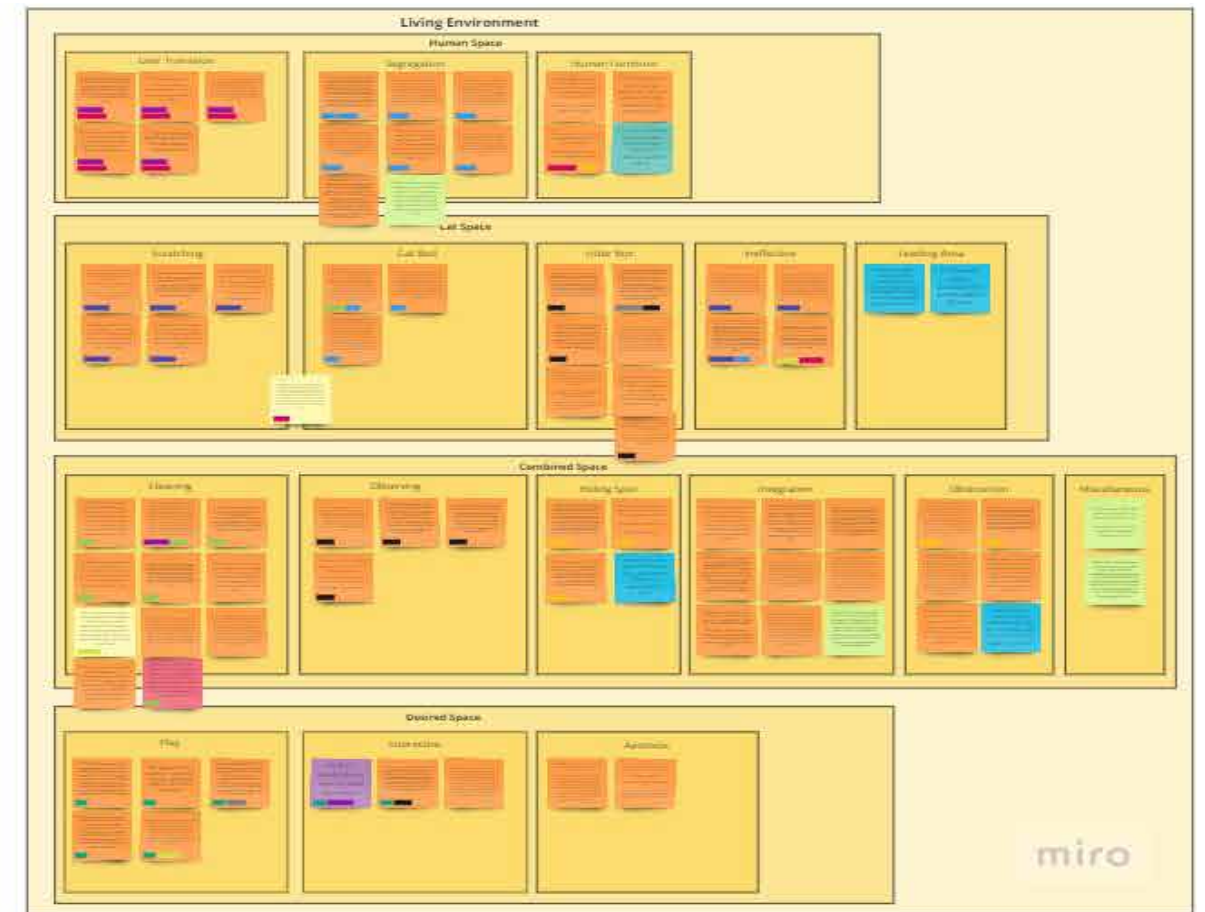
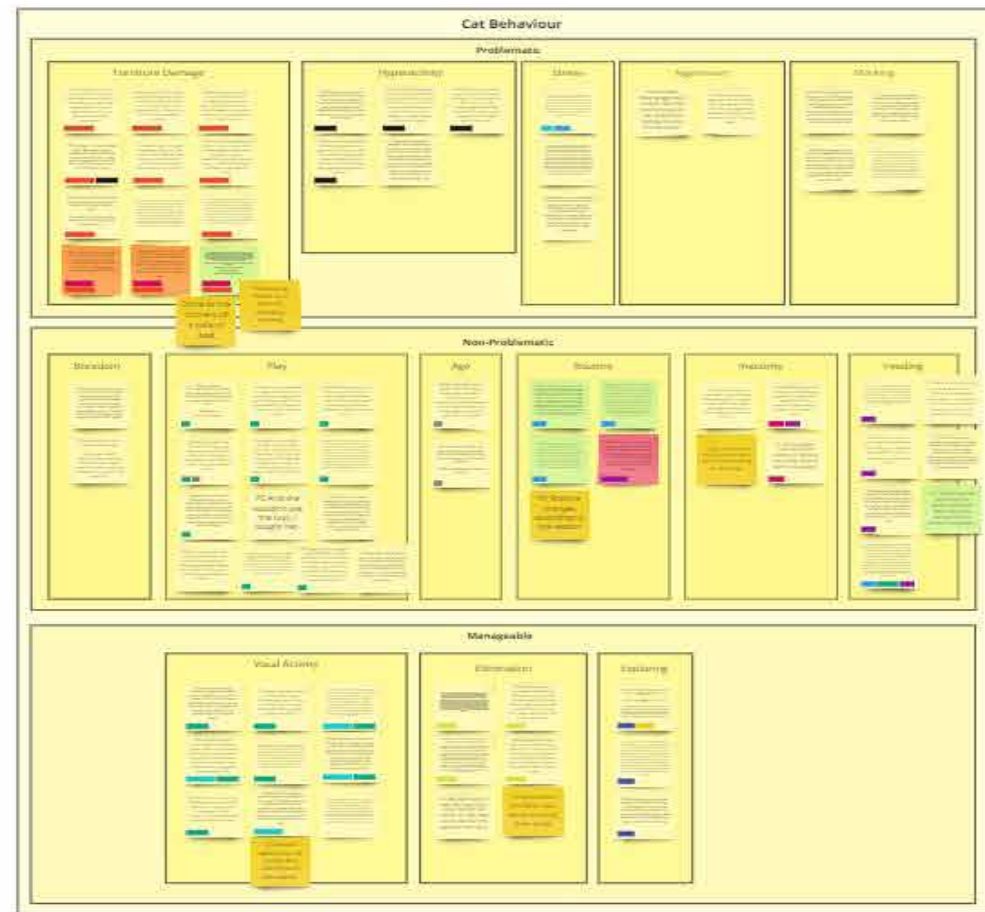
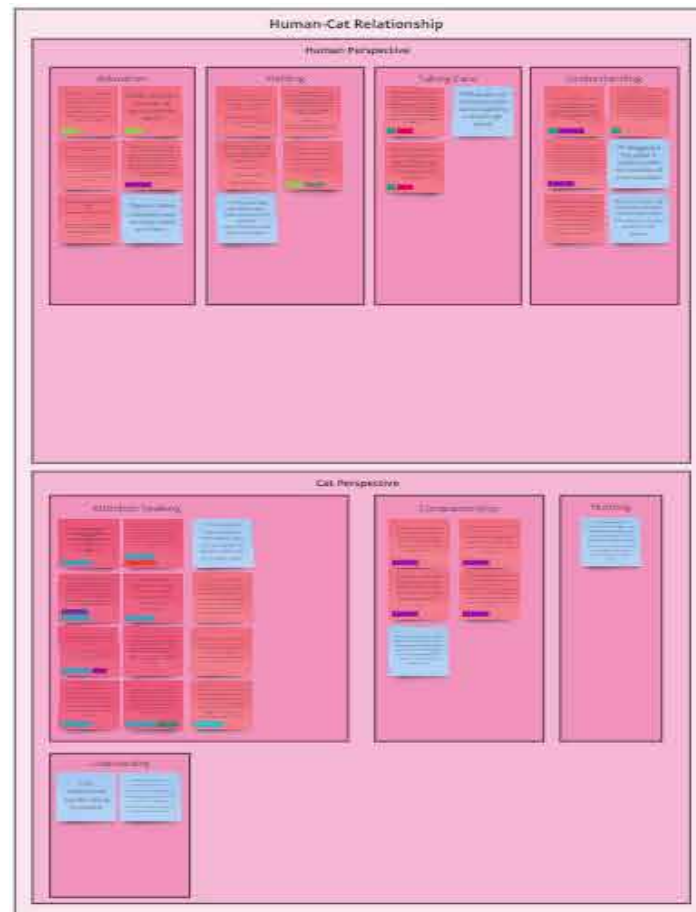
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Appendix





APPENDIX A - INTERVIEW AND OBSERVATION CODING



HUMAN-CAT RELATIONSHIP	
Human Perspective	Cat Perspective
<ul style="list-style-type: none"> • Adoration • Yielding • Taking Care • Understanding 	<ul style="list-style-type: none"> • Attention Seeking • Companionship • Hunting • Understanding

CAT BEHAVIOUR		
Problematic	Non-Problematic	Manageable
<ul style="list-style-type: none"> • Furniture Damage • Hyperactivity • Stress • Aggression • Marking 	<ul style="list-style-type: none"> • Boredom • Play • Age • Routine • Inactivity • Feeding 	<ul style="list-style-type: none"> • Vocal Activity • Elimination • Exploring

LIVING ENVIRONMENT			
Human Space	Cat Space	Combined Space	Desired Space
<ul style="list-style-type: none"> • User Transition • Segregation • Human Furniture 	<ul style="list-style-type: none"> • Scratching • Cat Bed • Litter Box • Ineffective • Feeding Area 	<ul style="list-style-type: none"> • Cleaning • Observing • Hiding Spot • Integration • Obstruction • Miscellaneous 	<ul style="list-style-type: none"> • Play • Interactive • Aesthetic



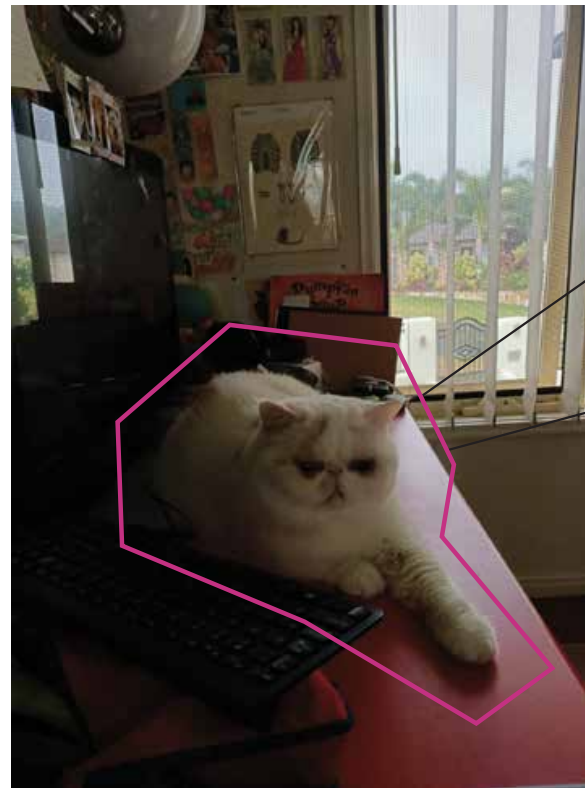
APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Cat Perspective
Attention Seeking
Disrupting P1 from doing work since he wants to be fed

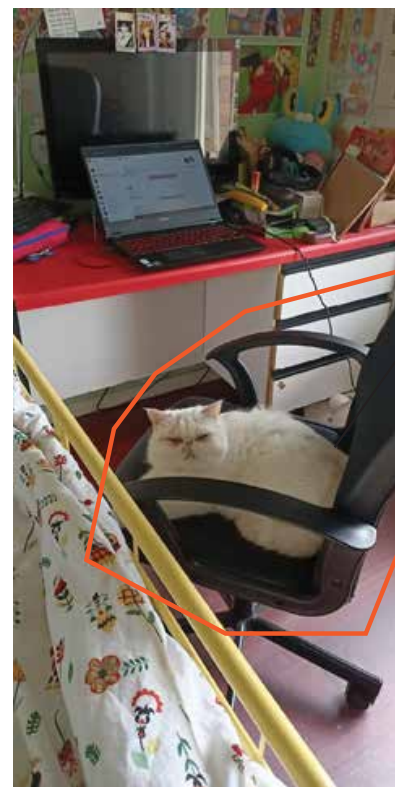
Human Space
Human Furniture
P1 has moved objects on desk to make space for cat

Human Perspective
Yielding
P1 lets cat do whatever he wants. Does not mind that cat has disturbed workspace.



Cat Perspective
Attention Seeking
Disrupting P1 from doing work since he wants to be fed

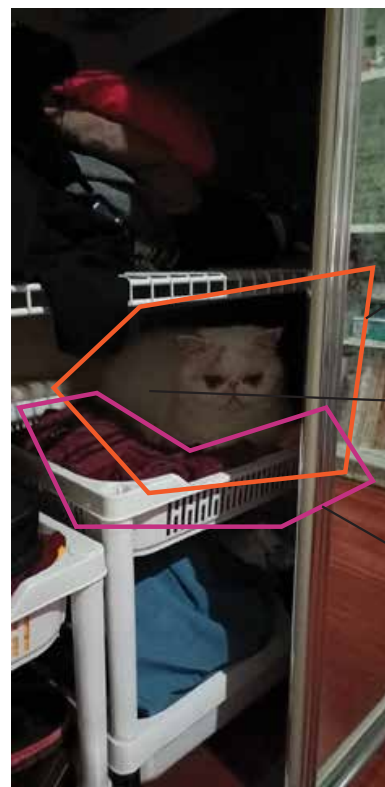
Cat Perspective
Attention Seeking
Can see that Callie has gotten comfortable in this spot and refuses to move until he is satisfied



Human Space
Human Furniture
May have taken a liking to chair due to soft material

Human Perspective
Yielding
P1 lets cat do whatever he wants. Does not mind that cat has disturbed workspace.

Human Space
Human Furniture
Human product in use by cat



Human Space
Human Furniture
Enjoyment of confined spaces. Chooses to rest on clothing which acts as soft bedding so it comfortable.

Human Space
Human Furniture
In a space that only leaves one side and head exposed. Possibly feels safer like this, ensures an escape route while still being in an enclosed area.

Human Perspective
Yielding
P1 lets Callie rest on clothes. Would result in fur stuck on clothing but it can be seen that P1 does not mind.

Human Space
Human Furniture
Resting spots are all above the ground, shows the importance of vertical environment for a cat.



APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Human Space
Human Furniture
Preference for soft bedding as a resting area

Cat Perspective
Adoration | Taking Care
P1 creates a 'nest' out of quilt so Callie can rest comfortably



Human Space
Human Furniture
Siting underneath a chair to observe the surroundings. Cats choosing to sit under spaces that have a 'roof' was often seen in the observations.

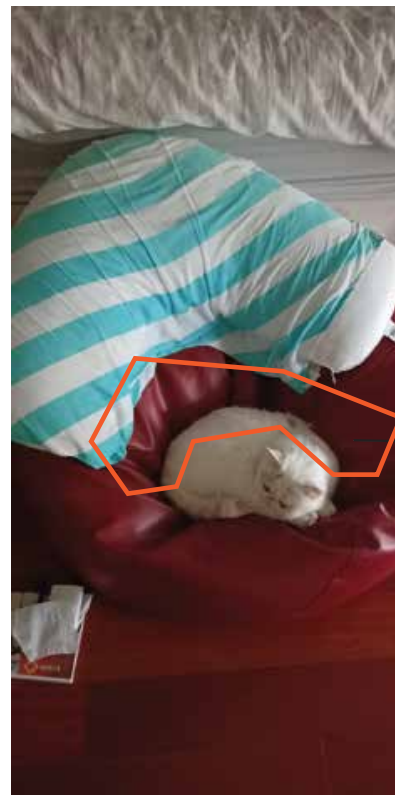


Non-Problematic Inactivity
Spends most of the day resting or sleeping

Human Space
User Transition | Human Furniture
Towels laid out on the bed so Callie can sleep there comfortably



Human Space
Human Furniture
Chooses surfaces that have something to lean on so they can stick to it.



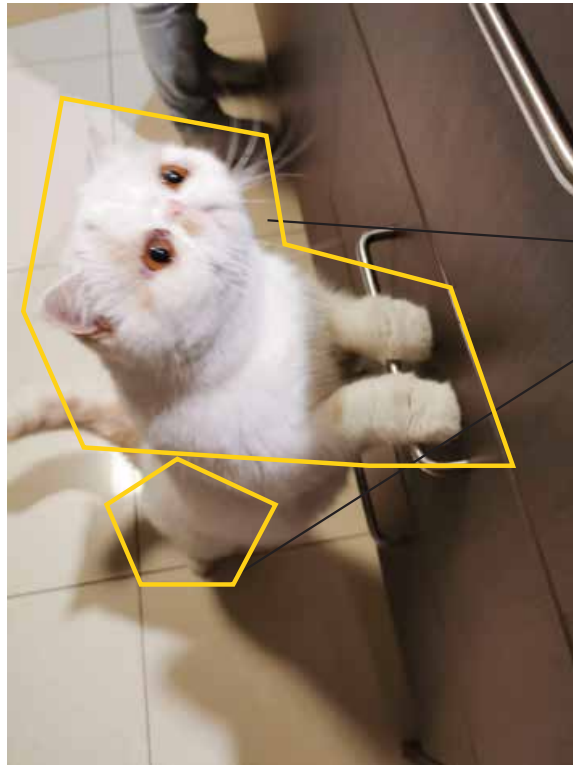
Human Space
User Transition | Human Furniture
Resting spot located on a bean bag. Is a spot were the cat can curl up into a ball while being surrounded by a 'bed.' Bean bag was not designed for use by cats but it may appeal to them as it is a soft surface that 'wraps' around them when sleeping.



Human Space
Human Furniture
Preference for soft bedding as a resting area. Choses to stick to one side of the chair.



APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Non-Problematic Feeding
 Callie begging P1 for food

He should be capable of jumping up on the bench but stands up on his back feet instead. Could indicate that the kitchen bench is one place he is not allowed to keep it clean.



Cat Space Litter Box
 Piece of corrugated cardboard laid underneath the box to prevent the ground from getting dirty. Owners chose this kind of material as it is convenient to deal with and easy to replace when necessary.

Scoop is separate from the litter box and laid out on newspaper to prevent contamination of other surfaces.

Litter box is in a room of its own to give the cat privacy when it is doing its business. Less interruptions.



Cat Space Feeding Area
 Use of a box to create an elevated feeding bowl - important for flat faced cats who struggle to eat on low surfaces

Cardboard used as a mat for the food bowls. Makes it easier to clean the area around the bowls. Prevents food from getting on the floor.



Problematic Furniture Destruction
 Callie scratching the corners of the bed. Owners have tried covering it to prevent further damage. Seems like this only occurs when the owners are on the bed therefore it may occur due to attention seeking. Also a place Callie spends most of his time so it could also be scratch marks as a form of territorial marking and cats tend to mark in those places.



Cat Space Scratching
 Parts of the cat tower has been damaged to the point where the carpet is coming off whereas some remain untouched. Scratching is prominent in the edge areas and less in the wide spaces.

On the top platform some items can be seen to be placed on it. Indicates that the cat does not jump up there much if the owners are placing their items on it.



APPENDIX B - PARTICIPANT 1 OBSERVATIONS



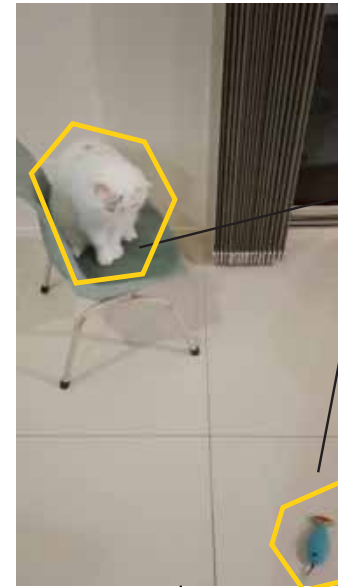
Non-Problematic Play
Biting to capture the toy. Also use of paws/claws to latch onto toy. Toys need to be safe to chew on so it does not get swallowed.

Toys
Imitation of a fish most likely for aesthetic purposes.



Cat Perspective Hunting
Cats are prone to catching things bigger than usual when they are in a hungry state but it is not seen here. Maybe since he is in an environment where he is fed often so he doesn't feel the need to hunt.

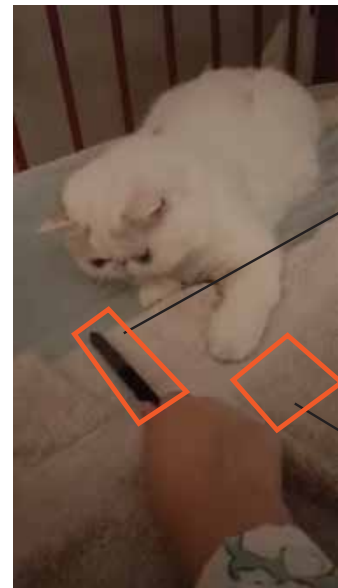
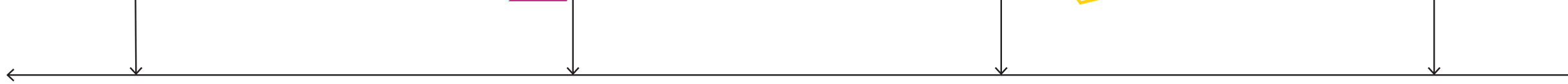
Human Perspective Taking Care
Responsibility of owner to play with cat so it does not get bored within an indoor environment.



Non-Problematic Play
Callie stays in one spot during the entire 'play time.' Even when baited with the toy he still does not move from his spot.



Non-Problematic Play
Still in the same spot at the end of 'play time.' He just turns his head to follow the toy.



Miscellaneous
Use of a pen to play with cat. Objects that move fast seem to catch their attention.

Combined Space Cleaning
Placement of a towel to keep tear stains off bedsheets as flat faced cats tear up a lot.



Human Perspective Understanding
P1 has put the pen underneath the towel to draw the attention of the cat so it may be likelier to play but the cat does not seem to be interested.



Combined Space Observing
Using the window sill as a spot to view the peacocks outside. Wildlife can draw the attention of the cat opposite to the way he reacts to toys which are an imitation. Tends to react to pigeons more than peacocks therefore it can be assumed that the size of the 'prey' influences his interest.



Combined Space Hiding Spot
Hides under the sofa when he knows he needs to go to the vet or groomers. Requires 3 people to get him out from under the sofa.





APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Combined Space Integration

Mat that separates the cat space from human space. Seems that it does not register to the cat as his spot.

Human Space User Transition

Was originally used by the owners but is now used by Goomba only. Toys are placed on the sofa in a bag and some are left in the open.

Problematic Furniture Damage

Scratching is only done at the corner of the sofa so maybe he finds it easier to scratch here or it is more stable.



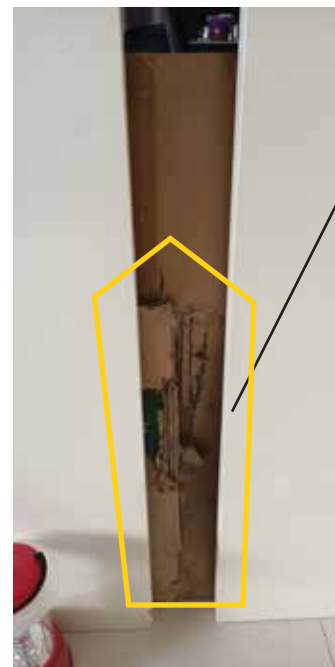
Human Space Human Furniture

Preference for soft bedding as a resting area



Problematic Furniture Damage

Scratching has been done to the corner of the sofa even though there is another scratching post in the room. Could be a means of information marking i.e. marking of territory or a way to attention seek since he seems to do it when the owners are sitting there.



Problematic Furniture Damage

Door where Goomba is separated from the rest of the house as he and Callie do not get along. There is a piece of cardboard in front of the door to stop him from escaping. Scratching has been done to the cardboard as he wants to be let out.

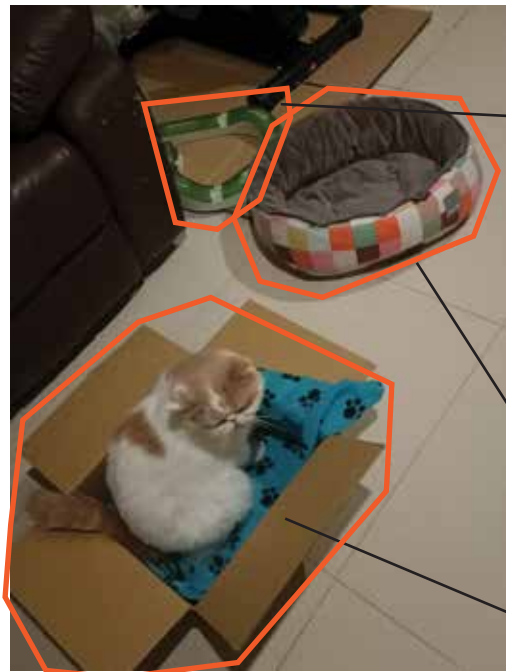


Human Space Human Furniture

Veranda where Goomba is allowed to be let out. As he is an indoor cat, this is the only place he is allowed out also, he is always supervised by someone while out. Has chosen to sit on the chair maybe because it gives him a better view of outside, gives him elevation in the space and may want to be on the same level as the owner.



APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Cat Space Cat Bed

Initially a cat tunnel toy but Goomba uses it as a bed in summer because its cooler. Also gives him something that wraps around him - enjoys to have something surrounding him

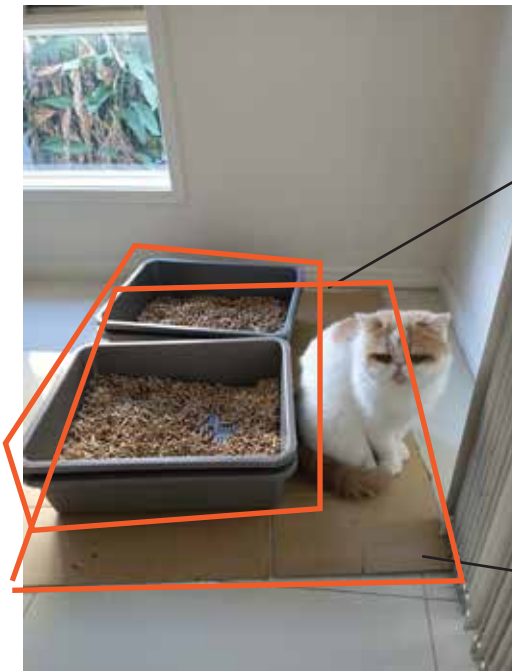
Cat bed that was used last winter however it is not used anymore since Goomba found the box the sleep in.

Choses the box as a bed instead of a cat bed. Used to use the cat bed until he saw the box. May be more inclined to use the box because of the space or material.



Combined Space Hiding Spot

Likes to hide behind the sofa when he notices something is up i.e. cleaning his ears or taking a shower.



Cat Space Litter Box

Litter boxes are in the corner of the room, out of the way however, since they are in an enclosed area, it may cause the room to stink whenever there is poo. There are two litter boxes since one didn't seem to be enough as he pooped outside the box once. The problem seemed to have disappeared since another litter box was added.

Corrugated cardboard underneath the litter boxes to keep the ground clean, especially because they like to wipe their paws on the ground after pooping.



Human Space User Transition

Sofa that has turned into a cat bed. Owners don't seem to mind as they have laid out a towel for him to sleep on comfortably. Towels are also there because his fur is a little oily and flat faced cats are prone to making tear stains.



Human Space User Transition

Unused chair that is commonly used as a resting spot. Most likely because it is hidden by the backrest and table so they remain unseen. Also, it is an elevated spot, adding to the idea that cats prefer to be in higher spaces.



Human Space User Transition

Unused bed has turned into the cats' bed. Towels have been laid out because flat faced cats create tear stains, so it is to keep the mattress clean. Again, he is resting in a soft spot indicating that it is greatly preferred by him.



APPENDIX B - PARTICIPANT 1 OBSERVATIONS



Combined Space Observing

Observing the peacocks outside the house. Serves as a means to relieve boredom as viewing wildlife is a way to keep cats interested. Important for cats who are not allowed access to the outdoors.



Non-Problematic Playing

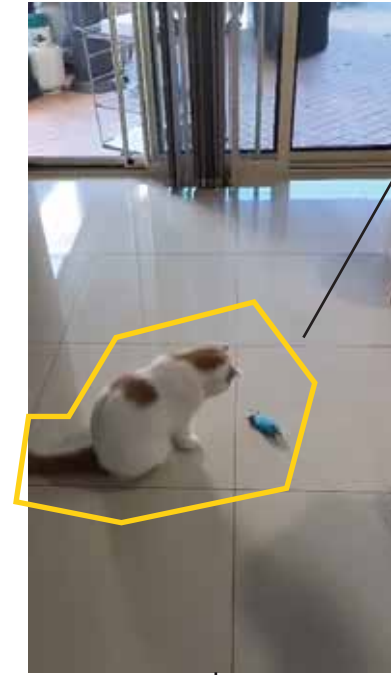
Playing with a fish toy.

Play behaviour seems to vary depending on the cat's personality, some enjoy it while some ignore it when the owner tries to play with them.



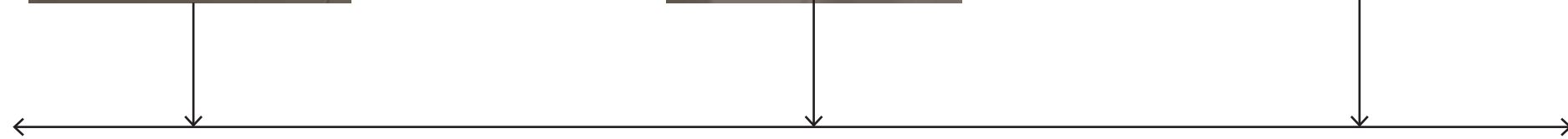
Non-Problematic Playing

Can see that Goomba enjoys playing and will chase after the toy



Non-Problematic Playing

After a while, he loses interest possibly because he has had enough or he has 'caught' his prey already. Play was done in one spot not enabling him to run around as much. His play experience could possibly be heightened if the owner moved around more.



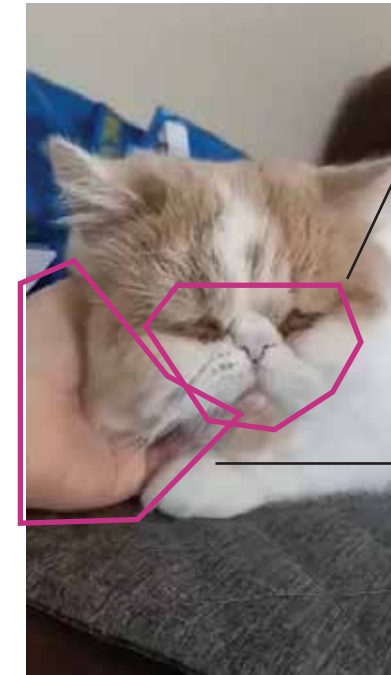
Cat Space Feeding Area

Corrugated cardboard on the floor to keep the ground clean. Located in a place with high traffic so cardboard is often kicked by owners causing the water bowl to spill over.



Cat Space Scratching

Scratching post is slanted possibly because of too much scratching and poor construction. The ramp probably does not give much support to the overall structure therefore causing it to slope.

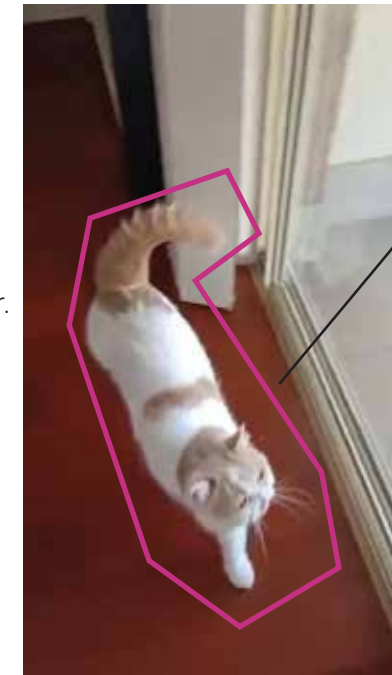


Cat Perspective Companionship

His face (eyes closed) suggests that Goomba enjoys being pet and the companionship of being with his owner.

Human Perspective Adoration

Owner clearly has some form of adoration for Goomba as explained by the petting.



Cat Perspective Attention Seeking

Knows to meow at the owner if he wants something - in this case, to go out.

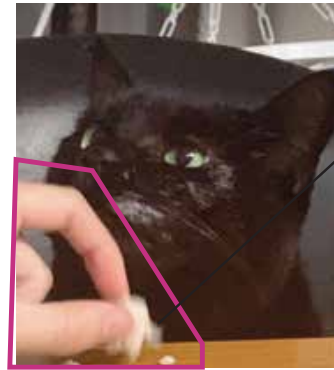


APPENDIX C - PARTICIPANT 5 OBSERVATIONS



Human Space
Human Furniture
Sitting on a chair at the dining table while the owner is eating dinner.

Cat Perspective
Companionship
Almost as if the cat wants to be part of the group during dinner time. Enjoying the company of humans.



Human Perspective
Taking Care
Knows the cat is waiting to be fed or not willing to eat unless fed directly. Can see the closeness when the owner feeds the cat part of their food.



Cat Space
Feeding Area

Food is left over in the bowl, indicating she is a cat that likes to feed over the day.

Cat Space
Litter Box

Area around the box is scattered with litter from the cat kicking it out while burying her poo and also when it gets caught on her paws, she brings it out with her. Litter box and scoop is placed on some newspaper probably because it is convenient to throw out when dirty, and to prevent the ground from getting contaminated.



Her feeding space is right next to her litter box which is not the best spot as it could contaminate her food. However, when living in temporary housing, the owner did not have much choice as the landlord said to put it there. Also the owner may feel it is better as it keeps all the cat's possessions in one place so she has her own area.



Human Space
Human Furniture
Sofa being used as a resting spot. As seen with Goomba & Callie, this space may seem appealing to cats because it is soft and has a lot of cushions. Also, this may be a spot frequented by the owner so she may want to spend more time here.



Cat Space
Scratching
Mat is used for scratching instead of a scratching post since this is only temporary housing so it would be inconvenient to take it back home on the plane. Mat is stuck down with tape which may cause leave some residue on the ground when removed. In the living room in front of a sofa. May cause obstruction for owner.



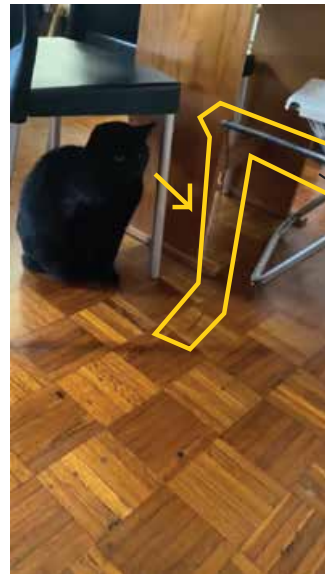
Non-Problematic
Playing
Mechanic toy that the cat does not play with.



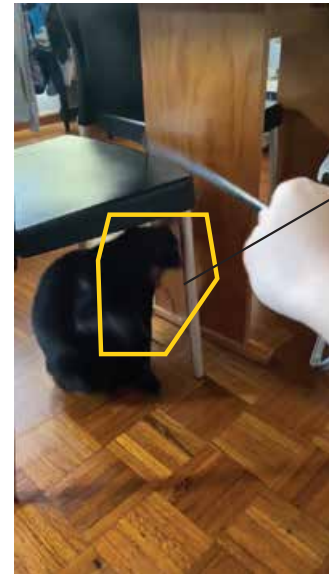
APPENDIX C - PARTICIPANT 5 OBSERVATIONS



Non-Problematic Play
 Biting to capture the toy. Also use of paws/claws to latch onto toy. Toys need to be safe to chew on so it does not get swallowed.



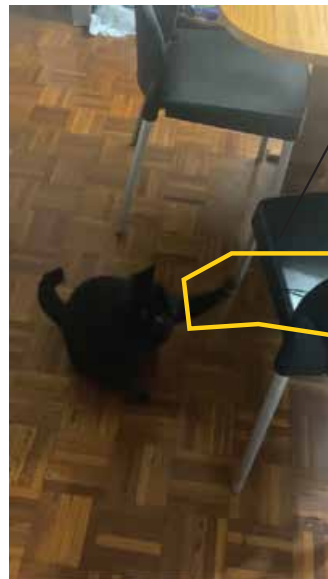
Non-Problematic Play
 Decides to observe the string while owner dangles it around her.



Non-Problematic Play
 She likes to try to grab the string with her paws and bite it to catch it.



Non-Problematic Play
 During the entire play through she doesn't move from her spot. She choses a spot that is covered (under the chair) to observe the way the string moves. It is observed with many of the cat participants that they prefer to stay under or on something.



Non-Problematic Play
 Owner makes the string disappear from the cat's sight to get her to 'attack.'
 When the string gets close to her, she pounces and tries to grab the string with her front paws.

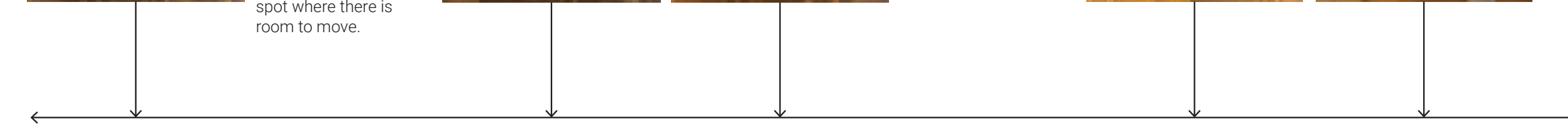
**Human Space
 Human Furniture**
 Playing in both videos have been done near the dining table possibly because it is a spot where there is room to move.



Non-Problematic Play
 By lowering the string onto her, it also gets her to 'attack' the string by biting and clawing at it.
 She decides to retreat underneath a chair - maybe part of their instincts to always try to have coverage or a vantage point.



Non-Problematic Play
 Owner needs to move along with the cat to continue to get her playing. Tries to make the string disappear from her sight again to make her pounce but it doesn't work. Seems like she only 'attacks' its when its close or goes to her.





APPENDIX C - PARTICIPANT 5 OBSERVATIONS



Cat Space Litter Box

After pooping she wipes her paws on the edge of the box, sniffs her poo. Was mentioned by P1 that their cats also sniff it.



Cat Space Litter Box

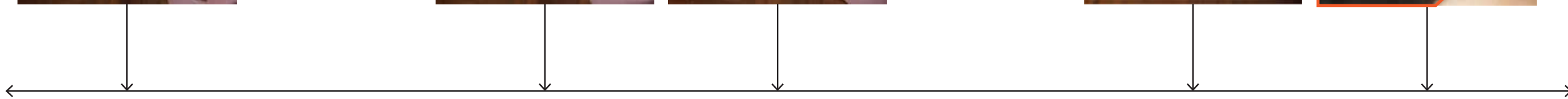
Turns to the side and continues to wipe the other paw on another edge of the box.

Walks out of the litter box.



Cat Space Litter Box

Shakes herself after exiting the litter area.



Cat Space Feeding Area

Food bowl is located next to sofa, food and water is put together. Her food is stored behind the bowl near the litter box.

Human Space Human Furniture

Allowed on the bed of the owner. She commonly sleeps on the bed at night - aligns with behaviour of other cat participants who prefer to rest on a bed or anything with soft cushioning.



Stress

She is scared of the vacuum cleaning - behaviour when meeting a minor stressor in the environment. Observes the stressor in the corner of the room.

Slowly walks around it - acts cautiously.



Stress

Runs and jumps on the bed and off it immediately, then rushes to exit the room.





APPENDIX C - PARTICIPANT 5 OBSERVATIONS



Non-Problematic Grooming | Stressor
After getting her nails clipped she starts grooming herself. As she does not like the process (required 3 people to clip her nails), this could be a response to a stressor.



Cat Perspective Companionship
Follows P5 when she leaves the room.



Cat Perspective Companionship
Observes the direction where P5 is.



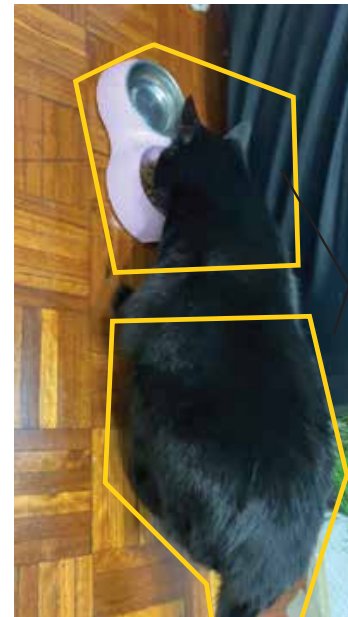
Non-Problematic Feeding | Sensitive
Starts grooming herself again, and reacts when she hears the rustling of packaging. Most likely relates this sound to food. Sensitive to sounds, relates sounds to actions or things.



Non-Problematic Feeding
Understands P5 is about to feed her so she runs towards her. Observed that she enjoys eating.



Human Perspective Adoration
P5 taps her on the ear - an action that suggests affection.



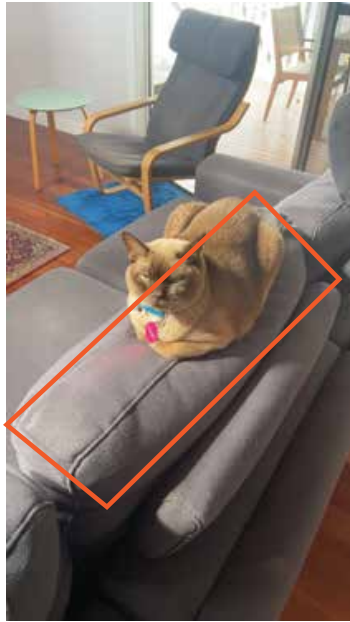
Non-Problematic Feeding
From the shape of her body, it is observed that she is overweight most likely from being overfed. She eats in a 'crouch' position but the depth of the bowl may prevent her from being in a full crouch, otherwise she may not be able to reach the bottom of the bowl.

Human Perspective Yielding
Overweightness in cats has a relation to the owners yielding to the cat's demands for food. They give in to their cat's 'cuteness' causing them to be overfed. The cats that were observed to not be overweight either had owners who followed a strict portioning routine or the cats were not food orientated - only eating when necessary.





APPENDIX D - PARTICIPANT 6 OBSERVATIONS



Human Space Human Furniture

Resting on the top of the sofa - as seen with the other cats, they also enjoy places that are soft and cushiony.



Cat Space Scratching

Top of the cat tower next to a window - allows her to observe the outside - important in relieving boredom when she is not allowed to leave the house anymore. a spot where there is sun in the morning so it appeals to her.



Human Space Human Furniture

One seater sofa - sometimes she can take the spot of the owner who wants that spot on the sofa.



Human Space Human Furniture

Another soft resting spot - most of the places she chooses to rest in are fabric based (warmth) or soft.



Non-Problematic Play

Eyes are dilated after eating - sign of excitement - she wants to play. Has chosen the carpeted area to rest on instead of the wooden floor.

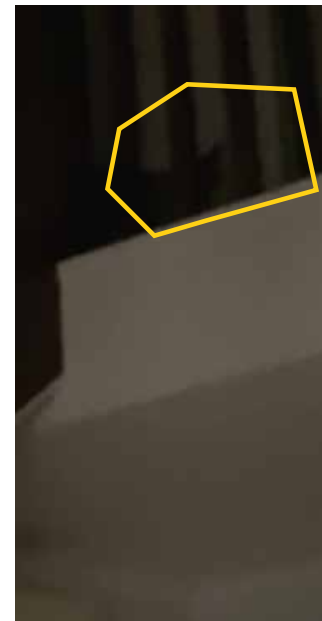
When P6 gets closer, she dashes away using her back legs to bounce away. Likely sign that shows the cat thinks the owner is playing with her.



Non-Problematic Play

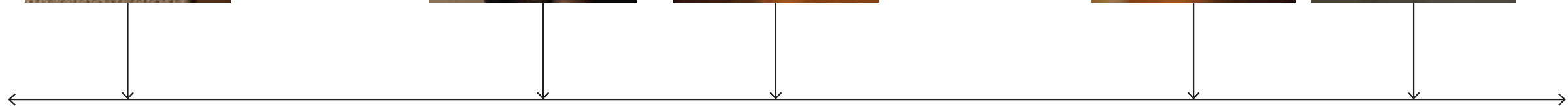
Runs to the sofa and tries to get behind it. Decides not to go that way and reverses backwards. Possibly because it was a bit narrow.

Dashes away when P6 gets closer again - more signs of cat in feeling excitement.



Non-Problematic Play

Dashed up the stairs and is now observing P6. High vantage spot to observe events that happen below her.

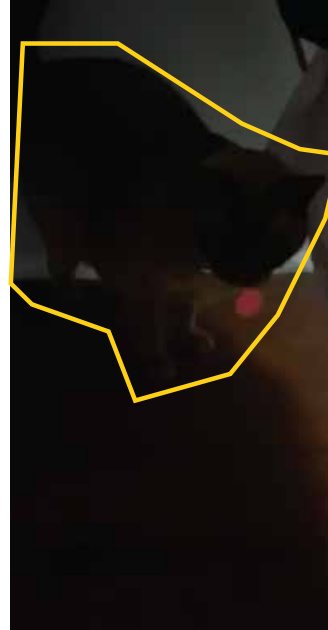
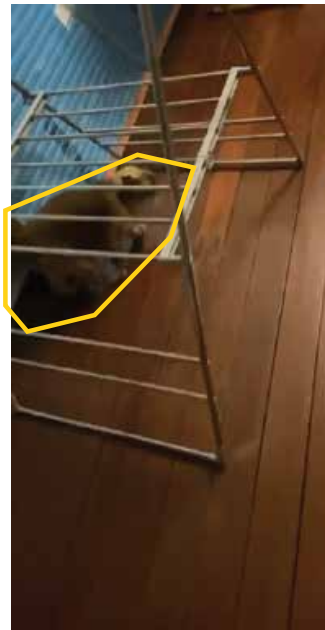




APPENDIX D - PARTICIPANT 6 OBSERVATIONS



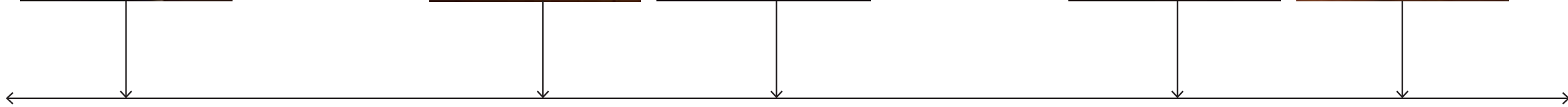
Non-Problematic
Goes underneath something when she is followed - could be part of a cat's instincts to head towards these kinds of spaces.
Dashes out from one spot into another which is also covered.



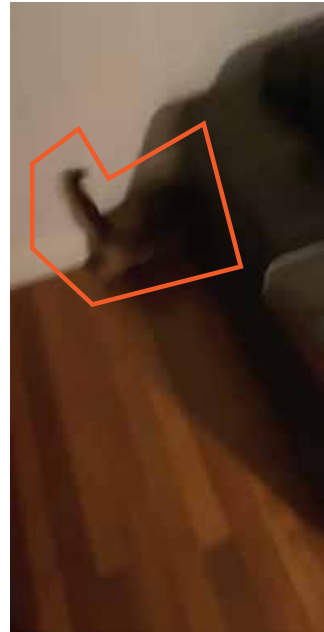
Non-Problematic
Dashes back into the same spot as before
Cat Space Scratching
Dashes towards her scratching post (sisal) and claws away at it. Height in proportion to the cat is good - lets her use it to stretch to her full height. Her eyes are dilated and she is scratching at her post - place to release her energy after eating.



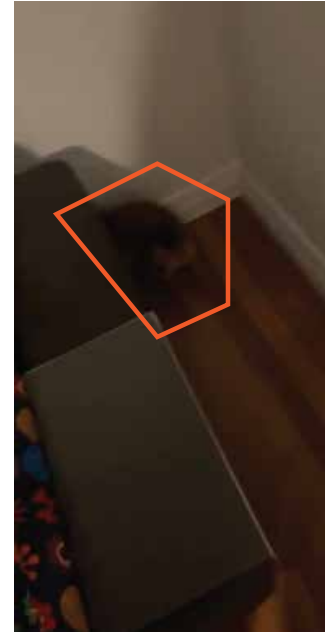
Human Space Human Furniture
Able to open a door which has been left slightly ajar with her head.



Combined Space Hiding spot
Dashes towards the back of the sofa and sticks her head out to observe.



Combined Space Hiding spot
When P6 comes closer, she turns around and dashes to the other side of the sofa.



Combined Space Hiding spot
Turns around and repeats the dash to the other side of the sofa. Possibly considers this a game of catch.



Combined Space Hiding spot
Repeats. She is still quite active for her age. Possibly because this was filmed right after she ate at night so she has a sudden burst of energy.





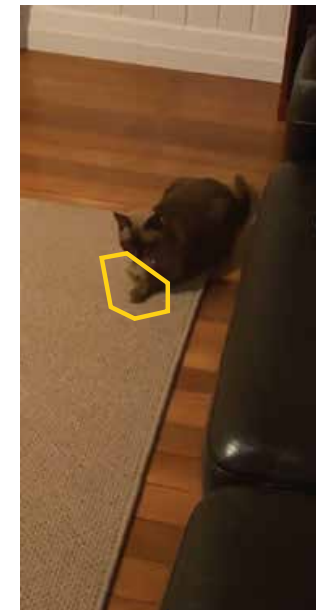
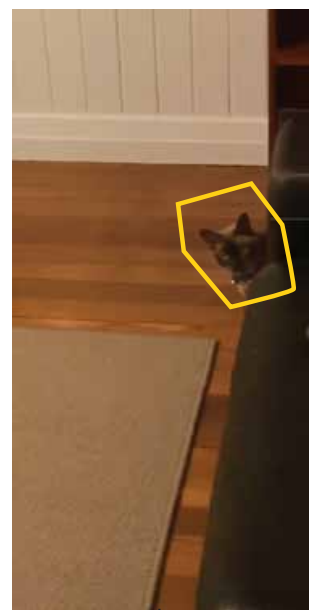
APPENDIX D - PARTICIPANT 6 OBSERVATIONS



Non-Problematic Play
 Shes acts really curious as to why P6 is following her around.
 Goes behind the sofa again to escape since she is currently obstructed by P6. Seems like a place that is commonly frequented in the house.



Non-Problematic Play | Exploring
 Easily goes behind the sofa. Possible that the owners left enough space for her to go through or she found the gap and just continued using it as a 'tunnel.'
 Exits the gap and observes P6 once again. Assumes that she is still wondering why P6 is following her.



Non-Problematic Play | Exploring
 Decides to crouch onto the carpet (soft, fabric surface).
Problematic Furniture Damage
 When on the carpet she naturally sinks her claws into it. Most likely a sign of comfort (kneading), not done in spite.

Problematic
 Sensitive



Human Space
Human Furniture
 Has the tendency to stay underneath something.



Cat Perspective Companionship
 Understands when she is called by the owner. A sign of trust when she is willing to leave her covered spot to go to the human.
Human Perspective Adoration
 Calling her so they can pet her. Something that suggests affection and adoration.



Human Perspective Understanding
 Slowly sticks hand out so they can pet her.



Cat Perspective
 Flinches backwards - possibly because the owner reached out too fast.



APPENDIX D - PARTICIPANT 6 OBSERVATIONS



Cat Perspective Companionship

Sticks her head forward so the owner can pet her head.



Cat Perspective Companionship

Allows owner to do continue petting her - a sign of trust between the two. Also, suggests the petting is comfortable.



Human Space Human Furniture

Goes back underneath the chair after getting pet. Observed that she prefers to stay underneath something because it gives her a sense of safeness.

Human Space Human Furniture

No cat furniture observed other than the scratching post. She mainly occupies human furniture such as sofas or beds, and chooses those that are soft. Owners have bought cat beds for her but she doesn't use them, this could be because she enjoys the company of humans who are also using the sofa/bed or, the human furniture is elevated off the floor unlike a cat bed which is placed on the ground (vantage point).

Human Perspective | Cat Perspective Understanding | Companionship

Mutual relationship of human and cat can be seen here. The human adores the cat, calling her so they can pet her whereas the cat trusts the human, letting allowing them to pet her head. There is a bond between the two.

Non-Problematic Play

Going behind furniture is a common behaviour when trying to escape from something or during play when the cat is excited.



APPENDIX E - PARTICIPANT 4 OBSERVATIONS



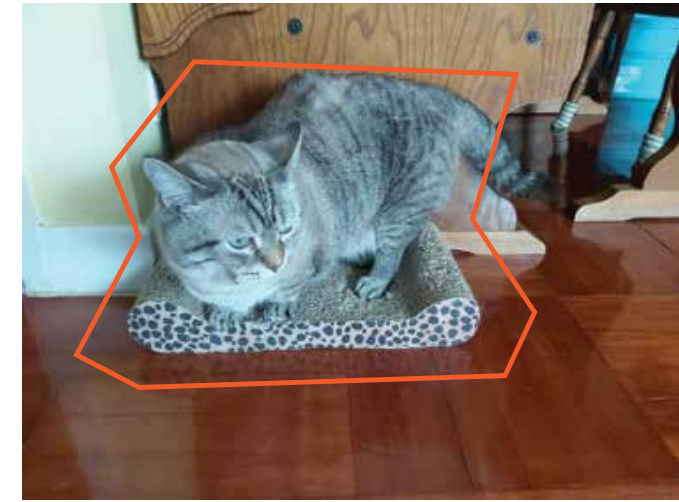
Combined Space Obstruction

Resting at the doorway of the kitchen because it is hot. The tiled floor helps keep him cool but the spot is in a high traffic spot.



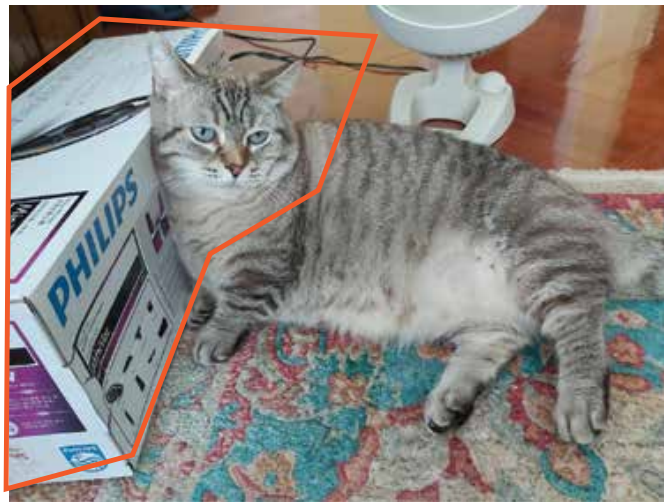
Cat Space Cat Bed

Aluminium board that is taken out during summer to help keep him cool. A spot he is commonly found when hot. The board is stored away during winter when it is not in use.



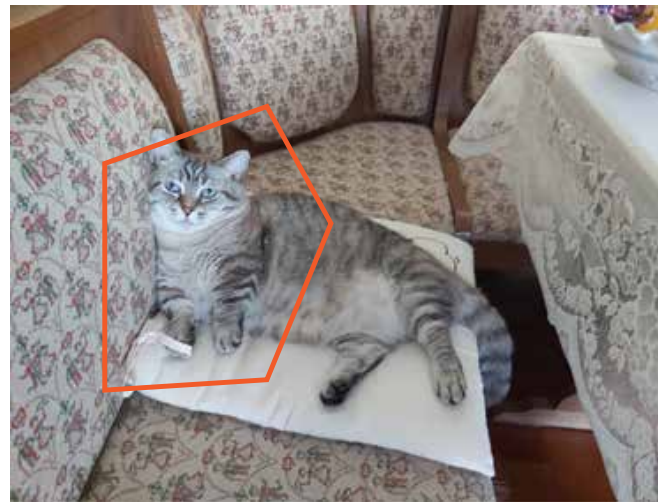
Cat Space Scratching | Cat Bed

Corrugated scratching bed. The only spot in the apartment that is designated for scratching. these kinds of scratching boards are quite light and can be pushed around by the cat. This product also works as a bed.



Combined Space Miscellaneous

Using a box to lean on while resting. It is likely that the box is cool to lean on in summer so he keeps sticking to it. Commonly found in this pose where he is leaning his head on something.



Human Space Human Furniture | User Transition

KK has gotten comfortable on a cushion most likely placed there by the owner. As a munchkin he is able to jump up on these places but it can damage his spine so he must be lifted off by the owner when he wants off.



Combined Space Obstruction

He is a cat that enjoys the company of humans so he likes to accompany them at all times. Sometimes he may choose a spot behind an office chair causing the owner the need to be careful if not, he could get rolled over.



APPENDIX E - PARTICIPANT 4 OBSERVATIONS



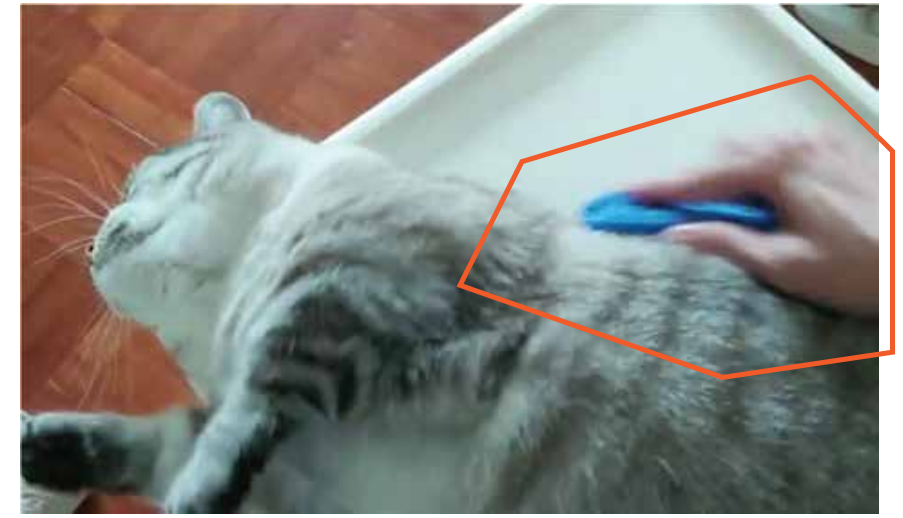
Combined Space Integration

Spot next to the window. He must enjoy sleeping there because it is made of marble which is cool. Can see that during summer, cats tend to select spots that are cooler in the house, spots seem to vary according to material and the temperature of the room.



Combined Space Integration

Another resting pose where he rests his cheek on something, in this case, a statue, possibly because it is also cool to touch.



Human Space Human Furniture

On a table while he gets brushed. While it seems he enjoys it, if the owner brushes in the wrong spot, he shows his dislike by trying to bite P4. As this spot is on a table, P4 must have carried him off it as Munchkins struggle with jumping down.



Cat Perspective Attention Seeking

Problematic Furniture Damage

Furniture damage at the corners of a sofa. The places he decides to scratch align with Goomba who also scratches the corners/edges. Possible because it is a stabler part of the sofa to scratch. This was mainly done due to attention seeking - more commonly seen in indoor only cats who are not allowed to go out. Therefore they get bored much easier, and demand attention from the owners.



Cat Perspective Attention Seeking

Cat Space Litter Box

Litter box inbetween the shower and toilet. It is quite small compared to the size recommended in research which is 1 and a half the length of the cat. Owner complains that the cat likes to kick litter out of the box for attention - this may be a combination of a small litter box and also because the cat knows what kind of actions to draw attention so he will repeatedly do them.



APPENDIX E - PARTICIPANT 4 OBSERVATIONS



Cat Perspective Understanding

Can understand when P4 says 'treat.' He responds with a meow when asked if he want a treat. He may also understand the actions of P4, he recognises this is process that happens when he is about to receive something he likes.



Manageable

He tried to go the packaging that was ripped off probably because it also smelt like the treat.

Cat Perspective Taking Care | Adoration

P4 calls him 'stupid' for wanting to eat the piece of packaging. Owner also needs to get down on the ground to feed him the treat. These types of treats may appeal to the owner because it allows you to 'hand feed' the cat and you can watch them upfront when eating.



Feeding Area

Feeding KK a treat (milk). The bowl looks quite deep so he may struggle to get to the bottom. It is observed that treats are commonly fed in the kitchen which may be because it is where the treats are located or the floor is tiled so it is easy to clean up is any food is dropped on the floor. Another reason may be because the bowl is only temporarily there unlike the food bowl which needs to stay in one spot - so it can be placed in an obstructive place.



Feeding Area

Food bowl is in the bathroom below the sink most likely because there is not much space inside the apartment. If the food bowl was placed in the living room, it would be quite obstructive and also, cats prefer to eat quiet place where they remain undisturbed. When the food bowl is put in places of high traffic, it can continuously be alerted from its surroundings preventing it from eating in peace.



APPENDIX E - PARTICIPANT 4 OBSERVATIONS



Human Space Segregation

Non-Problematic Routine

Owners place KK in a tent at night to prevent him from jumping around places since it is bad for the Munchkin breed. Also because he likes to knock things around at night which can become problematic without supervision.

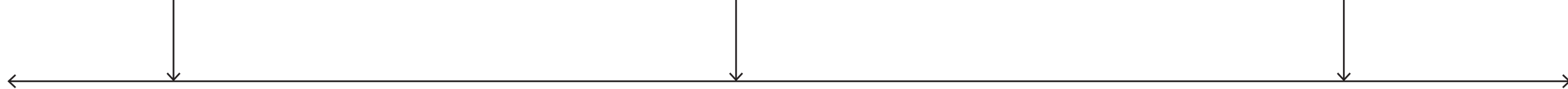


Non-Problematic Routine

As this is something that happens everyday for years, it has become a habit/routine for him and he does not need to be told to go inside.



Tent is put away in the morning as there is not much space inside an apartment. Litter box, aluminium board and food and water bowls must be moved each time.



Cat Space Scratching | Cat Bed

Corrugated scratching bed. He uses the cardboard as a seat and leans on a cupboard as he grooms himself. Noticed that many cats like to lean on things while sitting on their bum.



Combined Space Obstruction

At a doorway. Again, he likes to have his front paws on something while lying down. Common position in cats.

Cat Space Cat Bed

In winter KK sleeps in a tent. the inside has soft cushiony material which is similar to what the other cat participants enjoy sleeping on



Cat and Human Understanding

Mutual understanding between both cat and human. When the owner says something to him, he knows to respond with a meow.

Attention Seeking

Attention seeking was more common in cats who were not allowed outdoors. e.g. KK, Callie and Goomba often sort for attention whereas Cleopatra and Chelsea did not.

Different breeds face different issues e.g. Munchkin - jumping down places, Exotic Shorthair - tear stains & need to wipe eyes often.



APPENDIX F - PARTICIPANT 3 OBSERVATIONS



**Human Space
User Transition
Cat Space
Cat Bed**

Laundry basket was given to him to use as a cat bed since he took a liking to it.

Leaps into the basket by lifting his front 2 paws and springing into it with his back paws.



Non-Problematic

Turns his body then first puts his buttocks on the ground, followed by his tail curling around his body.



When he is in a comfortable position, he will rest his head on the side of the basket as done by other cats.



**Cat Space
Cat Bed**

Another position commonly used by him when sleeping - curling his body and hugging his legs

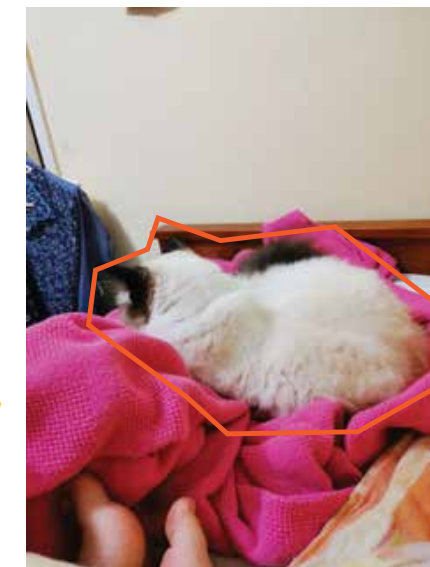


**Non-Problematic
Inactivity**

Likes to rest on a bed during the day where he spends most of his time. When it is hot he is often found in this position which is only done when cats feel safe as it exposes their belly.

**Combined Space
Observing**

A place on the veranda where he is allowed out. Gives him a place to observe birds outside. Is a place he likes to go during summer at night because it is cool. Will often walk onto the roof to get a better view.

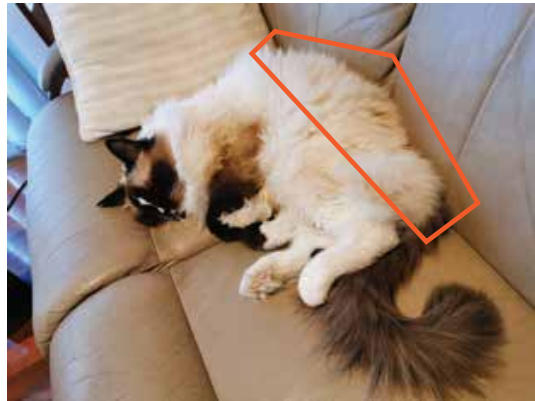


**Human Space
Human Furniture**

During colder months, he begins sleeping on the bed as it is warmer. Although the owner previously bought a cat bed for him, he prefers the human bed possibly because it is elevated or he wants to be closer to P3.

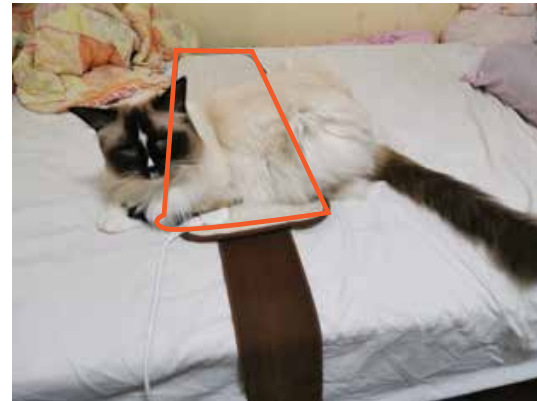


APPENDIX F - PARTICIPANT 3 OBSERVATIONS



Human Space Human Furniture

Likes to rest on the sofa when people are in the living room, will rest at the top sometimes to give him a nice vantage point. Tends to like stick to something when lying down.



Human Space Human Furniture

Resting on a bed. Even when on a soft surface, he will chose to rest on something such as a mat or a heat pack.



Cat Space Ineffective

Corrugated cardboard scratching board that he does not use. Does not register with him that it is for scratching even when catnip is rubbed on it.



Combined Space Hiding Spot

Goes underneath the bed when he is spooked by something or when it the temperature is hot, because it is quite cool underneath the bed.



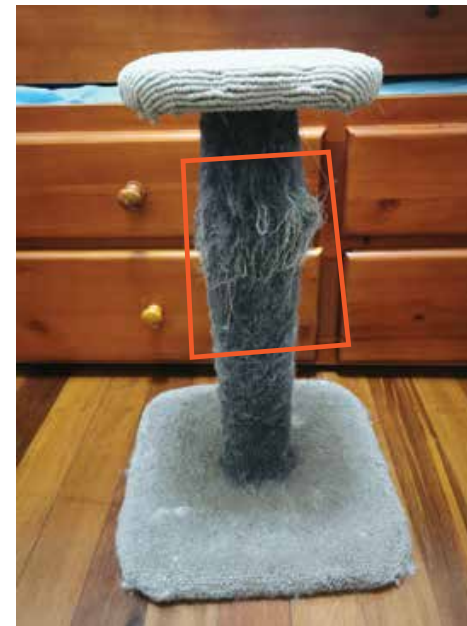
Combined Space Observing

Rests his front paws on the window sill or bedside table to get a view of outside. As his tail sways around when obseving, the room has needed to be closed off to sleep.



Combined Space Observing

Does not normally go underneath this bed but he caught a lizard and was keeping watch of it underneath the bed.



Cat Space Scratching

His scratching post is in a place in front of drawers which can be obstructive sometimes. The carpet has almost been destroyed completely however it is still in use because it still does its job. Scratching is focused on the top of the post because he is a large cat.



Non-Problematic Inactivity

Sometimes he hugs his scratching post. A place he likes to rest often because he enjoys company with P3 who spends most of their time in there. Belly facing up pose is a sign of comfort indicating his trust.



APPENDIX F - PARTICIPANT 3 OBSERVATIONS



Human Space
Human Furniture

Decides to crawl under the blanket when it was lifted up. As seen with other cats, they all enjoy spaces that are enclosed and soft. Long haired cat so there is always fur on the bed - requires extra vacuuming.



Cat Perspective
Hunting

Views the toy as prey - he hides behind a wall crouching down waiting for the right moment to pounce.



Cat Space | Combined Space
Feeding Area | Obstruction

Mat on the floor to catch the food that falls out. He has 3 bowls - dry food, wet food and water. The mat gets kicked sometimes and causes the water to spill out and go everywhere.



Cat Space | Combined Space
Feeding Area | Obstruction

Although the mat catches his food, it is annoying to clean underneath it and troublesome to vacuum.



Cat Space

Backpack that was purchased for him to go on walks. He went straight in most likely because he was curious about something new and it was an enclosed space.



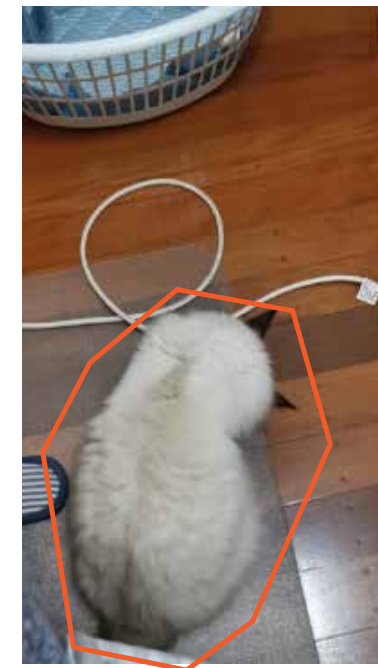
Observing | Exploring

Looking outside the window by stretching his body. Only possible because he is a large cat. He likes to explore spaces messy spaces in the house.



Observing | Exploring

Reverses out of the curtain when he has observed enough.



Cat Perspective
Companionship

Has his back turned to P3 while he grooms himself. A sign of trust that has been developed. Always likes to sit in this spot while meowing for attention.





APPENDIX F - PARTICIPANT 3 OBSERVATIONS



Non-Problematic Play

When playing it can be seen that he likes to latch onto it with his claws and chew on it, similar to what other cat participants have been observed to do.



Non-Problematic Play

He latches onto the toy with his claws and doesn't let go of it even when tugged. His tail swishes from side to side when he is playing.



Non-Problematic Play

One the toy is free from his claws, he will observe it and pounce when he sees an opportunity.



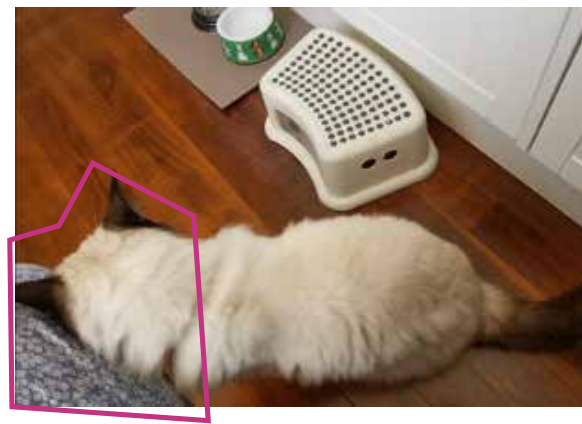
Non-Problematic Play

The toy is off the bed now and he is looking for it. Always makes sure to wait for the right moment to pounce i.e. when its close, about to disappear from his sight.



Non-Problematic Play

Follows the 'prey' into the basket - a place where the toy was about to disappear from his sight. Again, he leaps with his back legs and grabs the toy with his front claws, followed by biting it.



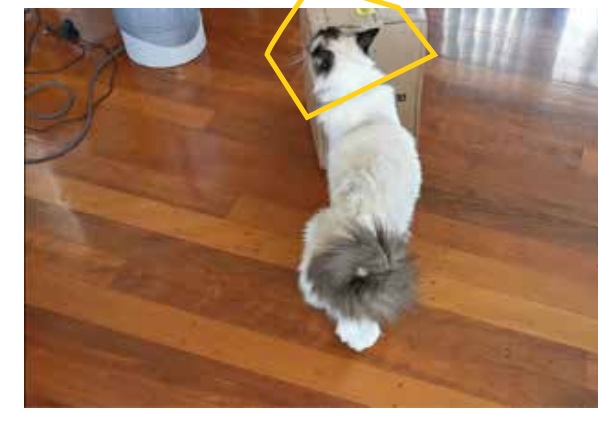
Cat Perspective Companionship

Noticed P3 was going to feed him so he rubs their leg with his cheek - a 'happy mark.' This is usually only done when the cat wants to mark their territory or when the cat thinks you are part of their group.



Cat Perspective Attention Seeking | Understanding

Vocalisation when he wants to exit. The amount of meowing varies depending on the person. He doesn't bother when he knows the person won't open the door but will continuously meow when its a person who will do as asked.



Exploring

When there is something new in the house, he first sniffs it, then walks around it. He will then rub it with his cheek to mark it.



APPENDIX F - PARTICIPANT 3 OBSERVATIONS



Cat Space
Litter Box Manageable
 Elimination

Placed in the corner of the bathroom away from the other things. He likes to sniff the litter before entering the box.



Manageable
Elimination

Cautiously walks around the box to find a good spot.



Manageable
Elimination

Sits in the litter box to urinate.



Manageable
Elimination

Uses his paws to cover the urine with litter. This process can cause the litter to come out.



Manageable
Elimination

Makes sure to walk around it as he sniffs it.



Manageable
Elimination

Wipes his paws on the corners of the litter box to clean them.



Manageable
Elimination

Shakes himself similar to what Cleopatra does. When he comes out, litter that was stuck on his paws also comes out.





APPENDIX F - PARTICIPANT 3 OBSERVATIONS



Human Space Non-Problematic
Human Furniture Play

Likes to play with the bathroom mat. Always causes the mats to be out of place. Likes the use his back legs to scratch at the mat. This action is also done with the scratching post.



Human Space Non-Problematic
Human Furniture Play

When he is hyper, he will dart around on the mat and use his paws to grab the mat.



Human Space Non-Problematic
Human Furniture Play

Bangs himself on the shower door and scares himself. Surprised by the sudden loud sound causing him to rush away.



Human Space Non-Problematic
Human Furniture Play

Also a place where he likes to rest. Most likely because it is soft - similar to what the other cat participants enjoyed resting on.



Cat Space
Scratching

For a cat of his size, the scratching post is a little small, but this choice was most likely made because P3 does not have much space inside the house. He usually sleeps in this room on the bed or in his basket and when he wakes up, he will use the scratching post to stretch.



Manageable
Exploring

When wondering around the house he will always choose the narrower path, or go around instead of through an open area. This space, underneath the table is enclosed so this is likely why chose this path.