ENSC 501

Assessing Pet Rabbit Welfare Based on General Discussion on Human-Animal Relationship

By Yufei Ren

Supervised by Dr. Alice Hovorka

Examined by Dr. Allison Goebel

Queen's University, Kingston, ON.

2018

ABSTRACT:

Pets are popular worldwide, and more than half of human population keep pets. Cats and dogs have the highest percentage of being kept in households, and the population of rabbits is about one-tenth of cats or dogs. Humans' love for pets can be dated back to Holocene when humans started to domesticate animals. With the intensification of the relationship, domestic animals become pets shaped by humans. Pets are kept by human owners because of several proven health benefits and, most of all, humans' affection. Humans show affection and dominance to pets, and both have a direct link with the making of pets. Affection cannot be separated from dominance, and it is the reason for anthropomorphism, a tendency to attribute humans' mental states such as feelings, motivations and belief to nonhuman companions. Anthropomorphism contributes to human affection for young pets and drives humans to keep pets, but it may cause poor animal welfare. The core concept of animal welfare is the "five freedoms", including diets, housing, health, companionship and behavior. Good animal welfare in organic farms is related to ecological sustainability. The concept of five freedoms provides valuable references for a guideline for pet animal welfare. Despite the fact that rabbits are the third popular pets in the U.K., the status of pet rabbit welfare is not ideal. Inappropriate diets and housing, low percentage of insurance and vaccinium, attempt to change rabbits' natural behavior and insufficient research conducted in the area result in poor welfare status. Owners may improve rabbits' welfare out of affection and establish dominance to improve welfare.

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND

Pets are popular worldwide and a concern for pet animal welfare is rising. It is estimated that 57% of people own pets globally, according to an online survey of 27,000 people in 22 countries (Global GfK survey, 2016). Dogs are the most popular pets with a proportion of 33%. The second popular pets are cats, which account for 23%, followed by pet fish, which are the most popular in China, and pet birds, which are the most popular in Turkey (GfK, 2016). In the U.S., 55% of households have pets in 2017 (*Pet Population and Ownership*, 2017). The proportion is estimated to increase to 68% (about 85 million families) in 2018, which is up from 56% of U.S. households in 1988 (American Pet Products Association, 2017). The number of U.S. households that own a dog and a cat is 60.2 million and 47.1 million. The total number of dogs and cats is 89.7 million and 94.2 million. As a result, the total U.S. pet industry expenditures is constantly growing. The actual expenditure in 2017 is 69 billion dollars and the estimated statistics in 2018 is more than 72 billion (APPA, 2017). Over 61% of Canadian population own at least a pet, which surpasses the global average. The percentage of cat ownership of Canadians is 13% higher than global statistics, while their dog ownership is the same as the average. Cat and dog population has increased 25% (up from 7.0 to 8.4 million) and 18% (up from 6.4 to 7.6 million) from 2014 to 2016 (GfK, 2016; Canadian Animal Health Institute, 2017).

Rabbits are also desirable choice for companion animals because they make for quiet and adorable pets. Pet rabbit population is less than one-tenth of cat and dog population. In the U.S., it is reported to be only 6.7 million (APPA, 2017). As a result, pet rabbit

population is usually not counted separately. In the U.K., where animal welfare has been given much attention, rabbits are the third most popular with an estimated population of 1.1 million (PDSA Animal Wellbeing, 2017). However, the living environment of the third admired companion animal is not ideal. The portion of owners who are familiar with animal welfare is relatively low, with 8% of pet rabbit owners doing no research before taking a rabbit. 32% of rabbits are not registered with a veterinary, 35% live in inappropriate housing, 25% have an unhealthy diet, and 50% have no primary vaccination. 44% of owners would like to alter at least one of their pet rabbits' behaviour (PAW, 2017). All these factors contribute to poor pet rabbit welfare. The aim of the paper is to study how to archive good pet rabbit welfare based on a general discussion on the relationship between human and pet animals.

2. METHODS

This paper is approached as a literature review by mentioning two main points: a discussion of human-animal relationship and an assessment of pet rabbit welfare. The general discussion on human-animal relationship includes reviews of animal domestication history, pet pleasure, humans' dominance and affection for pets, the influence of anthropomorphism and animal welfare. These reviews were conducted on mainly scholarly books and journals in the field of animal studies, animal welfare, pet ownership and health and environment studies. The second part includes an assessment of current statues of pet rabbit welfare and a vision of a better relation between owners and their rabbits. Relevant

academic articles and surveys from journals that specialized in rabbits contributed to the assessment. Most related reference materials were retrieved from The Queen's University Catalogue.

3. DISCUSSION

3.1 Human-Animal Relationship

3.1.1 History of animal domestication

The history of keeping pets is linked to the process of animal domestication, which is considered as an ultimate stage of intensification in the relationship between animals and humans (Vigne, 2011). Dogs are considered as the first pet and the first domesticated species. The oldest genetically identified dog was found in Texas more than 9,000 years ago during the Holocene (Tito et al, 2011). The bone fragment provided even older records of domestication in Belgium, the Ukraine and Russia, which is believed to be 32,000 years old (Germonpré et al, 2009). The process of domestication over tens of thousands of years has a significant effect on human population size and alters human evolution. Initially, animals are dominated as a source of food. Domestication contributed in the transition of humans' way of living from collecting and hunting to breeding (Bjornstad et al, 2012). As humans intensified their control over dominated animals' survival and reproduction, the relationship between them has become more than a commensal way (Larson & Fuller, 2014). An ultimate stage of intensification in the relationship between human societies and animals can be identified as domestication (Vigne, 2001). The process of domestication

takes various forms, which can be arranged on a gradient of a transition between human societies and animals (Ingold, 1986; Zeder, 2006). With the intensification of the relationship, domestic animals become pets shaped by humans (Vigne, 2001).

3.1.2 Friends with benefits

The ancient Egyptians kept animals as pets, ranging from dogs and cats, to even geese. These pets were as popular and loved as pets are in the present day (Mark, 2016). In the Cambridge English Dictionary, pets are defined as animals that are kept in the home as a companion and treated kindly. 81% of pet owners believe their pet is good for their health. 33% believe their pet helps them exercise more (APPA, 2017). In fact, pet companion has proven benefits to humans' health and social well-being. Pet ownership ensures frequent human-animal interactions that can be beneficial to psychological and physiological problems (Matchock, 2015). For example, there is evidence that keeping pets decreases owners' blood pressure and provides care to children with learning disabilities (Nast, H. 2005; Shell, M. 1986). Owning a dog is associated with a reduced cardiovascular disease risk (Levine et al, 2013).

Besides physical benefits, pets play a key role in the improvement of humans' life quality. The definition of health has been broadened to include both physical and mental aspects of well-being, as well as a sense of social integration (McNicholas et al, 2005). Pet helps eliminate negative symptoms of PTSD, child sexual abuse, autism, loneliness and other mental health problems (Dietz et al, 2012; Vrbanaz et al, 2013; Lanning et al, 2014).

Pets provide emotional support to those who are at risk of social isolation and lack social interactions. They also help owners to have greater social contact between people (McNicholas et al, 2000; 2005; McNicholas, 2015). 71% of pet owners believe pets bring family closer (APPA, 2017).

3.1.3 Human Affection

Despite several health benefits, 85% of pet owners believe affection is a benefit (APPA, 2017). Most of pet owners regard pets as valued family members or friends. As early as the 1990s, human give their pets names, celebrate their birthdays or first met anniversary, feed them on human-made food, dress them, take them to veterinaries, give them human-made medicine, and bury them in special cemeteries after they die with all the ritual like human burials (Serpell, 1996). Owners are showing a greater affection today. Over 50% of pets sleep in bed with owners. 31% of the dogs are dressed and 10% have specially designed clothes. 1.8 million dogs go to work with their owner and 17.5 million dogs keep their owners company in pet friendly hotels (APPA, 2017).

Humans are showing a strong affection for pets, which is one of the main reasons why humans keep pets. However, human affection for pets is inseparable from dominance. Dominance is generally understood as humans' straight control and exploitation towards nonhuman animals. understood as humans' straight control and exploitation towards nonhuman animals. Owners satisfy survival demands of pets, like feeds, housing, and medicines. As a result, pet population has increased 15% since 1988 (*Pet Population and*

Ownership, 2017). Pets give owners a sense of the power of enabling them to grow and of the virtue of care (Tuan, 1984). It seems that affection has nothing to do with dominance. However, affection is not the opposite of dominance. Tuan argues that affection is "dominance with a human face", and in the case of pet keeping, dominance is combined with affection. Pets are fed and cared for in human's house. Bringing them into one's house means domain since people can control and play with their pets. Small pets like goldfish can be easily controlled. During the process of domestication, large animals were reduced to small ones, and finally to an ideal size for a pet (Tuan, 1984). The smaller size suited human purpose and helped dominance. In additional, pets of small size or young animals are docile and loveable. In this case, humans established both dominance and affection by diminishing pets' size and training young individuals.

Moreover, in modern society, the distance between humans and nature is growing. Living in urbanized and industrialized areas means less contact with wild or farm animals. It is hard to find an outlet for humans' affection. People in modern society are getting used to simpler and more isolated interpersonal relation, which contributes to stronger desire for contact like petting animals. Pets meet humans' need to love and engage in a world where family and neighborhoods are no longer the only two parts of their life (Nast, H. 2006). Pets provide owners an emotional outlet and owners seek for support from their pets. Even so the support comes from nonhuman companions, they still need to be social because lack of social support is linked to mental problems and distress (Budge et al, 1998). In this case, pets are usually shaped to whatever social characters owners want them to be, like a friend,

a family member, or a lover. Pets have malleable ability to act as different characters that provide dedicated support to their owners. Because of the strong connection to owners, both physically and mentally, they are more likely to become "products" of human affection and dominance.

3.1.4 Anthropomorphism

There is a tendency to attribute humans' mental states like feelings and motivations to animals. Pets are more likely to be affected by this way of thinking. As mentioned above, pet owners give names to pets, celebrate their birthday, dress them, and treat them as family members. The thinking that enables pets' social behaviour to be construed in human terms is defined as "anthropomorphism" (Park & Allaby, 2017). Humans have knowledge and experience of what it is like to be human beings. The self-knowledge is used to understand others' behaviour, and to contribute to further communication, cooperation or competition. Anthropomorphism probably origins from this human capacity (Humphrey, 1983). Anthropomorphism enables human ancestors to attribute thoughts, feelings, and beliefs to other species, which makes it possible for humans to domesticate animals and thus keep pets.

Why do humans have the tendency to treat pets as humans? Fisher (1996) provided an explanation that our drive to affection for baby pets might be caused by affection for our young. The suggestion links our innateness to anthropomorphistic, and hence the tendency for owners to assign human characteristics to pets can be viewed as a product of natural

selection (Bekoff & Horowitz, 2007). In other words, the ability to anthropomorphize enables humans to share additional affection for pets.

Anthropomorphism is beneficial on human sides. It helps understand the natural world and provide emotional reasons, namely, affection to dominance. However, it has relatively more equivocal effects on the animals. On one hand, the populations of domestic animals are increasing in contrast to wild individuals. In the U.S., for example, the population of pet dogs swelled in tandem with suburban population (Derr, 2004). Humans are investing in pets financially, emotionally, and culturally (Nast, 2006). On the other hand, from an animal welfare perspective, anthropomorphism has far less benign effects. Humans select animals with humans' favorite physical and behavioral characteristics. The most obvious and direct example is the small size of most pets. Large animals cannot be tamed easily and remain tame through their adult lives (Tuan, 1984). The process is defined as anthropomorphic selection (Serpell, 2003).

Tame animals with little wild nature are preferred. For example, sharp claws may hurt owners or damage furniture. Most pets get their nails cut regularly consequently. If the owner is careful enough, it does little harm. But in some extreme examples, pet's claws are removed forever so that they can be "well-behaved". Anthropomorphic selection brings pressure on nonhuman companions (Serpell, 2003). The English Bulldog is probably another extreme example of pressed animals. As a result of anthropomorphic selection, their bodies are powerful but crippled. The Bulldog must be born by caesarian section, and their nasal and respiratory system are crippled (Panckeri, K. A. et al, 1996). Indeed, the

effects of anthropomorphism to pets are not so positive as to human from an animal welfare perspective.

3.1.5 Animal welfare

Social interest in animal welfare has increased considerably in recent years. Animal welfare is a complex term. It is hard to define animal welfare in one straightforward way because the term includes both scientific, philosophical, ethical and political dimensions (Petrini & Wilson, 2005). In early approaches, it was mainly defined based on the elimination of negative living state, ignoring animals' ability to interact with environments (Ohl & Staay, 2012). Different understandings include different emphases on biological functioning and basic health, on animals' emotions and feelings and on the similarity between animal's housing conditions and their natural life environment (Fraser, 2008). The Office International des Épizooties (OIE) defines animal welfare as "how an animal is coping with the conditions in which it lives" (2008). Prevention of disease, veterinary treatment, nutrition of feed, ideal housing and management and humane handling and killing are all required in this definition, as indicated by scientific evidence (Fisher, 2009). In Webster's book (1995), he analyzed animal welfare which was based on the logic of the Five Freedoms: 1) freedom from hunger, thirst, and malnutrition, 2) from discomfort of bad housing and weather, 3) from pain, injury or disease, 4) from fear and distress, 5) freedom to express natural behavioral pattern. The five freedoms can be summed up in three keywords: the physical, health and behavioral needs of animals (Animal Welfare Act,

1999). The five freedoms suggest physical and mental requirements of animals in detail. They were primarily derived from the welfare of farm animals whose environment is controlled by humans. Similarly, pets' living environment is strictly controlled by owners. Therefore, the concept of five freedoms provides valuable references for a guideline for pet animal welfare.

Animal welfare is a key aspect of sustainability in term of ethics. The rise of social concern for animal welfare reflects societal values. Humans have developed a moral system, in which their interactions with others involve tolerance. It is normally accepted that one has obligations to animals they keep (Broom, 2001). Any procedure or system is not acceptable if animals are harmed. They must comply with our moral values to archive sustainable approaches to animal welfare management (Broom, 2001; Ohl & Staay, 2012). Animal welfare is also important in term of ecology. In case of farm animals, building organic animal husbandry systems is the preferred way to achieve sustainability. The core values of farm animal welfare in these systems are aimed for sustainability, and mainly refer to the ecological sustainability (IFOAM, 1998; Lund & Röcklinsberg, 2001). Good individual welfare in organic systems ensures good animal health and helps to build systems based on natural behavior. Health animals do not need additional life supporting functions. The organic systems make an efficient use of resources in this way and thus achieve ecological sustainability (Lund & Röcklinsberg, 2001). As defined in the five freedoms, pet animal welfare relates to health status and natural behavior as well. Health problems can lead to a high cost of medication. Owners may give up their pets if any cost

is beyond expectation, which is not sustainable either ethically or ecologically. Abandoned pets are potential dangers in local ecosystem. Free-roaming cats in Australia, for example, are linked to 35 vulnerable and engendered bird species, 36 mammal species, and several reptile species and amphibian species (EA & Dickman, 2010). Accordingly, pet animal welfare is connected to sustainability. What is more, as public concern about animal welfare is rising, and as the amount of media reports is increasing, some practices which used to be acceptable is getting unacceptable. For instance, if an organic farming system has a higher incidence of disease than traditional farms, the welfare is unacceptable, and the farm is not sustainable (Broom, 2001). The framework of animal welfare, as a biological function, provides reference for guild lines of pets' live.

Although pet rabbits are quite popular in some regions, the status quo of their welfare is not ideal. The PDSA report (2017) indicated that 8% of rabbit owners did no pre-purchase research, 94% did not spoke to a veterinary professional before owning rabbits, and 92% underestimated the minimum cost of rabbit ownership. According to Martin's study (2012), the state of UK pet rabbit welfare is not satisfied. 35% of rabbits live in inadequate housing, 25% have inappropriate main diet, 33% are not fed sufficiently, 44% are forced to change some of rabbits' natural behavior, and 50% have no primary vaccination course (PAW, 2017). Doing no pre-purchase research results in these poor living conditions. Lack of knowledge on rabbits' biological functions is essentially the primary cause of poor welfare.

3.2 Assessing Pet Rabbit Welfare

When it comes to rabbit welfare, the first thing to consider is the “five freedoms”. Statistic provided by PDSA has shown that owners lack scientific information and, as a result, do not make sufficient research. Several research groups especially focus on rabbits’ living condition in light of one or some of the five freedoms. However, the research on rabbit welfare assessment conducted up to the present has been fragmentary, and they are limited to several European groups (Trocino & Xiccato, 2010). Although the utilization of rabbits as lab animals and the rearing of rabbits for meat production are extensive, studies on pet rabbit welfare are more insufficient. In this case, existing studies on lab rabbits and fleshy rabbits can be considered as references, as long as they all refer to the five freedoms of animal welfare. It is imperative to assess pet rabbit welfare in the ground, namely, on the basis of the five freedoms.

3.2.1 Freedom from hunger, thirst, and malnutrition: Diets

Compared with other species, rabbits have unique double-digestion systems where the caeca and colons play a significant role (Portsmouth, 1977). A healthy diet for domestic rabbits consists primarily of fresh grasses or hays which is rich in cellulose. The process of digestion of chewed plant materials is dependent on the microbial activity of the caecum. Rabbits eat their soft feces of caecal origin to make a full utilization of nutrients (Lowe, 2010). The behavior of ingestion of soft feces is defined as cecotrophy. It is less common in pet rabbits because of efficient food provided by owners.

Rabbit owners are more likely to feed rabbits with right amount of food if they are familiar with the Animal Welfare Acts. However, around 40% of owners failed to do that (PDSA, 2017). Rabbits take high intake and a rapid transit of feed, so they eat more than their body size daily (Blas & Wiseman, 2010). Inappropriate main food, such as muesli-type foods, is another issue (Martin, 2012). More than 25% of rabbits took inappropriate diets, and around one third was fed less than the recommended amount (PDSA, 2017). Moreover, the nutrient requirement of pet rabbits is scarce while many researches and studies have been done for commercial rabbits. In a study on the nutrient level of feeds from Italian market (Ricci et al, 2010), six commercial feeds were determined. They are very heterogeneous in chemical composition. Three of them were feeds composed of whole seeds, cereal flakes, pellets and dries vegetables; two were composed of extruded kibbles, and one of pellets only. Two feeds exceeded crude protein recommended level. Half of the feeds have less fibre than the minimal crude requirements. Five feeds have an oversupply in digestible energy due to high starch content. Obesity can occur if high-energy diets are consumed for a long period. Phosphorus and calcium content were deficient in most feeds. These two elements play a key role in the prevention of dental disease and urolithiasis. One feed even showed a slightly higher content of aflatoxin B1 than the European recommended maximum. Analysis of the commercial pet food for rabbits was not very satisfying.

3.2.2 Freedom from discomfort of bad housing and weather: Housing

Rabbits prefer quiet places. They need a darkened area for sleep and an open area for exercise, so housing is vital to pet rabbits' health. It is important to avoid drafts but provide good ventilation and light (Lowe, 2010). These requirements can be achieved in both indoor and outdoor housing. However, neither housing situation is satisfying. 59% of pet rabbits live outside with 20% inadequate outdoor housing, and 41% live inside, with 15% inadequate indoor housing (PAW, 2017). In addition, equipment in hutches or pens is imperative. Wire net floor is never suitable for rabbit welfare because it damages rabbits' foot pads. The floor of cages could be bedded with suitable enrichment so as to stimulate hiding and rest behaviors. But poor hygiene is considered a problem while wire net cages are the best hygienic solution. It is interesting to find out that, if provided both wire net floor and floor bedded with straw, rabbits preferred the floor without straw (Orova, 2014). The contradiction verified the insufficient research conducted in area of rabbit welfare. More housing indicators are needed to accurately evaluate welfare.

3.2.3 Freedom from pain, injury or disease: Preventive Health

The concept of health is normally closely linked to welfare. Freedom from injury and disease can be intuitively reflected from health condition of pet rabbits. More than half of pet rabbits were neutered, and 50% have taken primary vaccination in UK (PAW, 2017). The top common reasons for neutering include the prevention of unwanted baby rabbits, prevention of behavior problems and health concerns (Edgar & Mullan, 2011). In stark contrast, only 16% of owners had their rabbits insured (PAW, 2017). An ill animal can result

in high veterinary costs. Pet insurance helps owners relieve the stress. Insurance data also provides key information for epidemiological studies. Microchipping is another method of identification which links pets and owners permanently. Microchipping helps locate lost pets and increases the likelihood of reunion with owners (Lord et al, 2007). The pet insurance industry origins in Sweden almost a century ago, but only about half pets in Sweden are insured today. The average in the U.S. is only 12% (North American Pet Health Insurance Association, 2015). In an internet survey in England, among 1183 responses received, about 74% of rabbit owners stated that their rabbits had no insurance (Oxley et al, 2015). Rabbits from rescue center had the highest frequency of insurance. Regarding microchips, nearly 80% of rabbits were not microchipped. The proportion of those who agree or strongly agree on compulsory microchipping is about one third. The proportions of vaccinated, insured and microchipped rabbits are worrisome. Insurance and microchipping can help improve animal welfare, although the cost might be unacceptable.

3.2.4 Freedom from fear and distress: Companionship and Housing

Rabbits are highly social animals. They live in large groups and have a complex social structure which cannot be duplicated under some rearing conditions (Noviello et al, 2016; Trocino & Xiccato, 2010). Male rabbits are territorial while female rabbits share space with other females (Vastrade, 1986). Pet rabbits are generally housed individually. 56% of pet rabbits lived alone and some owners planned to keep their rabbit on its own (EFSA, 2005; Edgar & Mullan, 2011; PDSA, 2017). There is a debate between owners about pet rabbits'

companionship. Group rearing is acceptable in general to satisfy rabbits' highly social behaviour, but pet owners may not be willing to adopt for two or more rabbits out of consideration for money and energy. Group housing of rabbit easily leads to poor hygiene if the owner is careless. Some studies show that group housing have several disadvantages, including high stress and increased injuries related to aggressive behavior (Szendrő et al, 2013). A low stocking density of rabbits contributed to less and smaller wound. As there are no predators for pet rabbits, living in groups is less beneficial. In addition, low rate of neutering may result in unwanted baby rabbits under group housing. Although lack of companionship was identified as one of the most serious issues by veterinary professionals (PAW, 2017), it is not clear whether housing individually is linked to poor welfare.

The presence and type of enrichment also has effects on rabbit social behaviour. In Trocino and Xiccato's study (2010), the presence of a wooden stick limits the presence of straw limits aggressive interactions in rabbit groups but results in smelling rabbits. Presence of wooden sticks limit faecal contamination but reduce the frequency of social activities. Presence of enrichment usually results in increasing hopping and allo-grooming, but they are also proposed for fattening (Trocino & Xiccato, 2010). Research on the effect of housing condition is not sufficiently supported and there is contradiction as well. More companion and housing indicators need to be evaluated for better welfare.

3.2.5 Freedom to express natural behavioral pattern: Behavior

Rabbits are behaviorally persistent excellent diggers. Some wild rabbits spend much

of their life underground and they only come out for grazing (Stodart & Myers, 1964). When leaving caves for grazing, wild rabbits are vigilant at all times. Detection of predators causes thumping the rear limb on the ground to make loud warning (Crowell-Davis, 2007). Like their wild ancestors, pet rabbits thump on the ground, dig on cushions on sofa, scratch and chew, occasionally or usually (Crowell-Davis,2007). Thumping back feet was the top unwanted behavior reported by owners. Other unwanted behaviors include digging on cushions on sofa, scratching furniture, chewing cables, etc. (PAW, 2017).

Reading rabbit behaviors helps owners learn their pets' feelings. Happy rabbits hop and dance. When frightened, pet rabbits run away and hide themselves under shelters such as sofa, bed and table. Sometimes rabbits become aggressive, using teeth and claws to defend itself (Crowell-Davis, 2007). Chewing and digging are also natural behaviors for rabbits. In addition, diverse types of housing result in variable behaviour patterns. For example, higher frequency of drinking water was observed in conventional cages in experiments (Aldonso-Carrillo et al, 2014). However, 44% of rabbit owners would like to change their natural behaviors (PAW, 2017). Diverse housing causes variable behaviour patterns. Understanding pet rabbits' natural behaviors helps to prevent unwanted problems and reduces pets' stress.

3.2.6 Brief conclusion of pet rabbit welfare situation

Overall, pet rabbit welfare is not ideal so far. Inappropriate main food, insufficient amount of feed and feeds that lack key elements leave much to be desired. The proportions

of vaccinated, insured and microchipped rabbits are worrisome, which may cause high medical cost and high miss rate. About one third of pet rabbits live with inadequate housing. Housing indicators such as the presence and type of enrichment in housing have pros and cons on rabbit, which is confusing to rabbit owners. Group housing has both positive and negative influence on rabbits as well, mainly due to insufficient research of companionship and housing matter. Several natural behaviors of rabbits have been listed as unwanted behaviors and 44% of owners would like to "correct" at least one of their natural behaviors. The poor situations may be concluded in three reasons: owners lack knowledge of rabbits' biological functions; cost of keeping a rabbit or rabbits is usually underestimated; insufficient research conducted in the area causes confusion rather than help owner understand their pet rabbits.

3.3 Rethinking human-rabbit relationship

Rabbits are shy and diffident. If they contact humans as soon as they are born, and continue to frequently contact humans, a positive relationship is developed. Getting used to human presence and contact, rabbits can be free from fear and anxiety, which improves their welfare. These baby rabbits are not from wild. They will probably live under domestic circumstances for entire life. It might be hard to think about pet rabbits as free within human houses, but pet rabbits are not wild animals. They cannot survive by themselves in the wild. Letting a pet rabbit go back to the wild is not setting free but abandoning. Because domestic rabbits are the result of human intervention, they have been already related to human being.

As pet rabbits have lost part of their survival ability in the wild, it is owners' responsibility to "control" rabbits within houses. It is difficult to guarantee freedom from injury and disease if pet rabbits go out without carefulness. It's also owners' responsibility to make indoor environments suitable for rabbits. The House Rabbit Society (HRS), a nonprofit organization to rescue abandoned rabbits, raise their rabbits within the house. Knowing that rabbits are destructive due to the natural behavior of chewing and digging, they provided rabbits with rabbits' own space within the human house. In these rabbits' space, pens were large enough for humans to visit, and the design focused on controlling human rather than rabbits (Smith, 2003). These spaces were fulfilled with rabbit ideas, which means that most furniture was made of metal, electrical cords were covered in hard materials. Humans, rather than rabbits, that changed in rabbit's space.

Humans are trying to understand rabbits by studying rabbit biology and rabbit welfare. Pet rabbits learn about humans as well. Neither water bottle sipper nor litterbox exist in the natural environment. When Smith replaced water crocks with tube sippers, rabbits showed a range of responses to the sipper. Eventually, all figured out how to use it. The varied responses and activities seem to be transactional. Rabbits living in groups replicate each other's actions. If one rabbit suddenly begins to hop, others respond in kind (Harriman, 1994). Although these activities are not direct toward humans, rabbits respond to surroundings and enact relationship.

We can set up more positive relationship with rabbits than a simple dominance-or-freedom one. Humans share experience with rabbits. Rabbits may not be aware of the fact

that they are sharing something, but they do affect human behaviors with their own response and performance. Understanding welfare requirements of rabbits well is the first and most critical step. By sharing our affection, owners breed rabbits appropriately and protect them from suffering. Therefore, the relationship is positive to owners and rabbits.

4. CONCLUSION

Humans have a keen in keeping pets. The popularity of pets is somewhat linked to the process of animal domestication over the tens of thousands of years. With the intensification of humans' control and interfere, domestic animals become pets shaped by humans. Rabbits make for quiet and adorable pets. The characteristics stimulate humans' affection, although affection is inseparable from dominance. Pet rabbits are small tame mammals and become more docile during the process of domestication. Baby pet rabbits are born and fed by either experienced breeders or owners who have already kept pet rabbits. As a result, pet rabbits contacts humans early and they get used to humans. Owners keep rabbits within houses, protect them from any injuries and disease, and provide human-made implement such as water bottle sippers and litter boxes. Therefore, pet rabbits can be viewed as a "product" by humans. The fact that pet rabbits are produced by humans must be considered when assessing pet rabbits' welfare. Humans improve pet rabbits' welfare out of affection and establish dominance to improve welfare. Unfortunately, the current state of pet rabbit welfare is not ideal, mostly due to lack of education and research. Owners' affection is needed to motivate improved welfare, but welfare guild lines require human

dominance of pet rabbits.

5. SUMMARY OF MAIN POINTS

- Affection and dominance are inseparable. Pets are shaped by human affection and dominance.

- Affection helps improve pets' welfare, but good welfare requires human dominance.

- Anthropomorphism enhances human affection and dominance, and helps human understand the natural process. But it may cause poor pet welfare.

- Good animal welfare is related to ecological sustainability, especially for organic farms.

- The current state of pet rabbit welfare is not ideal, mainly due to lack of education and research.

- Pet rabbits are closely linked to humans since they are born. Owners' affection and dominance are needed to provide good welfare

Acknowledgments

I would like to express my sincere gratitude to my supervisor, Dr. Alice Hovorka for providing me with this opportunity, and for her continuous guidance and encouragement and support surrounding the thesis report. Her instruction inspired me, and her knowledge walked me through all the steps.

I would also like to thank to Dr. Allision Goebel for being my course coordinator and for her comments during the seminars.

Last but not least, I would like to thank my family for their support al through these years.

References

Alfonso-Carrillo, C., Blas, C. D., Ibáñez, M. A., García-Rebollar, P., García-Ruiz, A. I. & Martin, E. (2014). Effect of cage type on the behaviour patterns of rabbit does at different physiological stages. *World Rabbit Science, 22*, 59-69. https://doi.org/10.4995/wrs.2014.1396

American Pet Products Association [APPA]. (2017). U.S. Pet Industry Spending Figures & Future Outlook. Retrieved from: http://www.americanpetproducts.org/press_industrytrends.asp

Animal Welfare Act. (1999).

Bjornstad, G., Flagstad, O., Hufthammer, A. K. & Roed, K. H. (2012). Ancient DNA reveals a major genetic change during the transition from hunting economy to reindeer husbandry in northern Scandinavia. *Journal of Archaeological Science, 39*, 102. https://doi.org/10.1016/j.jas.2011.09.006

Broom, D.M. (2001). The use of the concept Animal Welfare in European conventions, regulations and directives. *Food Chain 2001*, 148-151. Uppsala: SLU Services.

Budge, R. C. Spicer, J., Jones, B., & St. George, R. (1998). Health correlates of compatibility and attachment in human-companion animal relationships. *Society & Animals, 6,* 219-234.

Canadian Animal Health Institute [CAHI]. (2017). Latest Canadian Pet Population Figures Released. Retrieved from: https://www.canadianveterinarians.net/documents/canadian-pet-population-figures-cahi-2017

Derr, Mark 2004 [1997]. *Dog's best friend*. Chicago: University of Chicago Press.

Dietz, T. J., Davis, D. & Pennings, J. (2012). Evaluating animal-assisted therapy in group treatment for child sexual abuse. *Journal of Child Sexual Abuse, 21*, 665–683. DOI: 10.1080/10538712.2012.726700.

d'Ovidio, D., Pierantoni, L., Noviello, E., & Pirrone, F. (2016). Sex differences in human-

directed social behavior in pet rabbits. *Journal of Veterinary Behavior: Clinical Applications and Research, 15*(Complete), 37-42. https://doi.org/10.1016/j.jveb.2016.08.072

Denny, E. A. & Dickman, C. R. (2010). Cat impacts on native fauna. *Review of Cat Ecology and Management Strategies in Australia.* (pp. 21-26). Canberra: Invasive Animal Cooperative Research Centre.

Edgar, J.L. & Mullan, S. M. (2011). Knowledge and attitudes of 52 UK pet rabbit owners at the point of sale. *Veterinary Record, 168*. 353. DOI: 10.1.1.925.1893.

European Food Safety Authority [EFSA]. (2005). The impact of the current housing and husbandry systems on the health and welfare of farmed domestic rabbits. *EFSA Jounral,* 267, 1-137.

Fraser, D. (2008). Understanding animal welfare. *Acta Veterinaria Scandinavica, 50* (Suppl 1): S1.

Fisher, J. A. (1996). The myth of anthropomorphism. *In Readings in Animal Cognition*, 3-16, M. Bekoff and D. Jamieson (Ed.). Cambridge, MA: MIT Press.

Fisher, M. W. (2009). Defining animal welfare — does consistency matter? *New Zealand Veterinary Journal, 57*(2), 71-73. DOI: 10.1080/00480169.2009.36880

Germonpré, M., Sablin, M. V., Stevens, R. E., Hedges, R. E. M., Hofreiter, M., Stiller, M., & Després. V. R. (2009) Fossil dogs and wolves from Palaeolithic sites in Belgium, the Ukraine and Russia: osteometry, ancient DNA and stable isotopes. *Journal of Archaeological Science*, *36*, 2, 473-490. https://doi.org/10.1016/j.jas.2008.09.033

Global Gfk survey [GfK]. (2016). Pet ownership. Retrieved from http://www.gfk.com/global-studies/global-studies-pet-ownership/

Harriman, M. (1994). The anatomy of laughter. *House Rabbit Jounral,* 3(1), 8-9.

Horowitz, A. C., & Bekoff, M. (2007). Naturalizing anthropomorphism: behavioral prompts to our humanizing of animals. *Anthrozoos*, *20*(1), 23+.

Humphrey, N. (1983). *Consciousness regained.* Oxford: OUP.

International Federation of organic agriculture movements [IFOAM]. (1998). Animal Husbandry. *IFOAM Basic Standards for Organic Production and Processing* (pp. 27-35). Germany: IFOAM.

Ingold, T. (1986). *The appropriation of nature: essays on human ecology and social relations.* Manchester Univ. Press, Manchester.

Lanning, B. A., Matyastik, B., Ivey-Hatz, J., Krenek, N. & Tubbs, J. D. (2014). Effects of equine assisted activities on autism spectrum disorder. *Journal of Autism and Developmental Disorders, 44*, 1897–1907. DOI: 10.1007/s10803-014-2062-5.

Larson, G., & Fuller, D. Q. (2014). The evolution of animal domestication. *Annual Review of Ecology, Evolution, and Systematics, 45*, 115-136. DOI:10.1146/annurev-ecolsys-110512-135813

Levine, G. N., Allen, K., Braun, L. T., Christian, H. E., Friedmann, E., Taubert, K. A., …Council on Cardiovascular and Stroke Nursing. (2013). Pet ownership and cardiovascular risk: A scientific statement from the american heart association. *Circulation, 127*(23), 2353.

Lord L.K., Wittum T.E., Ferketich A.K., Funk J.A. & Rajala-Schultz P.J. (2007). Search and identification methods that owners use to find a lost dog. *Journal of the American Veterinary Medical Association*, *230* (2): 211-216. DOI: 10.2460/javma.230.2.211

Lowe, J. A. (2010). The Digestive System of the Rabbit. In Blas, C. D. & Wiseman, J. (Ed.) *Nutrient of the Rabbit.* 2nd edition. (pp. 294-314)

Lund, V. & Röcklinsberg, H. (2001). Outlining a Conception of Animal Welfare for Organic Farming Systems. *H. Journal of Agricultural and Environmental Ethics 14*(4), 391. https://doi-org.proxy.queensu.ca/10.1023/A:1013049601079

Mark, J. J. (2016, March 18). Pets in Ancient Egypt. *Ancient History Encyclopedia*. Retrieved from https://www.ancient.eu/article/875/

Martin, N. (2012). The state of UK pet rabbit welfare – what we can do about it. *Veterinary Nursing Journal, 27*(2), 66-68. DOI:10.1111/j.2045-0648.2012.00146.x

Matchock, R. L. (2015). Pet ownership and physical health. *Current Opinoin inPsychiatry, 28*, 5, 386-392. DOI: 10.1097/YCO.0000000000000183

McNicholas, J. (2015). The role of pets in the lives of older people: a review. *Working with Older People, 18*, 3, 128-133. https://doi.org/10.1108/WWOP-06-2014-0014

McNicholas, J. & Collis, G. M. (2000). Dogs as catalysts for social interactions: robustness of the effect. *British Journal of Psychology, 91*, 61-70. https://doi.org/10.1348/000712600161673

McNicholas, J., Gilbey, A., Rennie, A., Ahmedzai, S., Dono, J. & Ormerod, E. (2005). Pet ownership and human health: a brief review of evidence and issues. *BMJ, 331*, 7527, 1252-1254. DOI: 10.1136/bmj.331.7527.1252

Myers, K. & Stodart, E. (1964). A comparison of behaviour, reproduction, and mortality of wild and domestic rabbits in confined populations. *CSIRO Wildlife Research*, *9*, 144-159. DOI: 10.1071/CWR9640144.

Nast, H. (2006). Loving…Whatever: Alienation, Neoliberalism and Pet-Love in the Twenty-First Century. *ACME: An International Journal for Critical Geographies 5* (2), 300-327.

North American Pet Health Insurance Association. (2015). State of the Industry Report 2015.

Ohl, F. & van der Staay, F.J. (2012). Animal welfare: At the interface between science and society. *The Veterinary Journal*, *192*, 1, 13-19. https://doi.org/10.1016/j.tvjl.2011.05.019.

Orova, Z., Szendrö, Zs., Matics, Zs., Radnai, I. & Biró-Németh, E. (2004). Free choice of growing rabbits between deep litter and wire net floor in pens. *World Rabbit Science*, 13, 137.

Oxley, J., Previti, A., Alibrandi, A., Briefer, E., & Passantino, A. (2015). A Preliminary internet survey of pet rabbit owners' characteristics. *World Rabbit Science, 23*(4), 289-293. https://doi.org/10.4995/wrs.2015.3771

Panckeri, K. A., Schotland, H. M., Pack A. I., & Hendricks, J. C. (1996). Modafinil decreases hypersomnolence in the English bulldog, a natural animal model of sleep-disordered breathing. *Sleep.*

Park, C. & Allaby, M. (2017). A Dictionary of Environment and Conservation (3 ed.). Oxford University Press.

PDSA Animal Wellbeing [PAW]. (2017). PDSA animal wellbeing report 2017. Retrieved from: https://www.pdsa.org.uk/media/3291/pdsa-paw-report-2017_printable-1.pdf

Pet Population and Ownership Trends in the U.S.: Dogs, Cats, and Other Pets, 2nd Edition. (2017)

Petrini, A. & Wilson, D. (2005). Philosophy, policy and procedures of the World Organisation for Animal Health for the development of standards in animal welfare. *Revue Scientifique et Technique de l'Office International des Épizooties*, *24*, 665.

Portsmouth, J.I. (1977). The nutrition of the rabbits. In: Haresign, W., Swan, H. and Lewis, D. (eds). *Nutrition and the Climatic Environment.* (pp. 93–111) London, UK: Butterworths.

Serpell, J. A. (1996) *In the company of animals.* Cambridge: Cambridge University Press.

Serpell, J. A. (2003). Anthropomorphism and Anthropomorphic Selection—Beyond the "Cute Response". *Society & Animals, 11,* 1, 83 – 100. DOI: 10.1163/156853003321618864

Sharon, L., Crowell-Davis, DVM (2007). Behavior Problems in Pet Rabbits. *Journal of Exotic Pet Medicine, 16*, 1, 38-44, ISSN 1557-5063, https://doi.org/10.1053/j.jepm.2006.11.022.

Shell, M. (1986). The family pet. Representations 15(Summer), 121.

Smith, J. A. (2003). Beyond Dominance and Affection: Living with Rabbits in Post-

Humanist Households. *Society & Animals, 11*, 2, 181 – 197. DOI: 10.1163/156853003769233379.

Tito, R. Y., Belknap, S. L., Sobolik, K. D., Ingraham, R. C., Cleeland, L. M. & Lewis, C. M. (2011). Brief communication: DNA from early Holocene American dog. *American Association of Physical Anthropologists. 145,* 653–657. DOI: 10.1002/ajpa.21526.

Vigne, J. (2011). The origins of animal domestication and husbandry: A major change in the history of humanity and the biosphere. *Comptes Rendus Biologies, 334*, 3, 171-181. https://doi.org/10.1016/j.crvi.2010.12.009

Vrbanac, Z., Zecevic, I., Ljubic, M., … Zubcic, D. (2013)). Animal assisted therapy and perception of loneliness in geriatric nursing home residents. *Collegium Antropologicum,37*, 973–976.

Szendrő, Z., Mikó, A., Odermatt, M., Gerencsér, Z., Radnai, I., Dezséry, B., . . . Matics, Z. (2013). Comparison of performance and welfare of single-caged and group-housed rabbit does. *Animal, 7*(3), 463-468. DOI: 10.1017/S1751731112001760.

Ricci, R., Sartori, A., Palagiano, C., & Dalle Zotte, A. (2010). Study on the nutrient adequacy of feeds for pet rabbits available in the Italian market. *World Rabbit Science, 18*(3), 131-137. https://doi.org/10.4995/wrs.2010.7532

Trocino A., Xiccato G. (2010). Animal welfare in reared rabbits: a review with emphasis on housing systems. *World Rabbit Science, 14*(2), 77-93. https://doi.org/10.4995/wrs.2006.553

Vastrade, F. M. (1986). The social behaviour of free-ranging domestic rabbits (oryctolagus cuniculus L.). *Applied Animal Behaviour Science*, 16(2), 165-177.

Webster, J. (1995). *Animal welfare: a cool eye towards Eden.* Blackwell: Oxford.

Zeder, M. A. (2006). Central questions in the domestication of plants and animals. *Evolutionary Anthropology, 15*, 105-117.