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**STRENGTHENING THE
HUMAN – ANIMAL
CONNECTION**

Taming the Lion Within

We are going to explore the world of *Felis silvestris catus*, the domestic housecat. “*A cat is, in some ways, like a miniature tiger in your living room,*” says Nicholas Dodman, DVM, board certified veterinary behaviorist, at Tufts University School of Veterinary Medicine. Based on what we know about the process of domestication, cats are not fully domesticated. For those of us that find cats fascinating creatures, I think that’s part of their charm.

Domestication of the domestic cat: Genetic material from nearly 1000 cats was analyzed, including domestic cats and the various wild subspecies from various areas of the world. DNA from domestic cats matched up with that of the Near Eastern wildcat subspecies (also called the African wildcat), *Felis silvestris lybica*, which lives in remote deserts of Israel and Saudi Arabia. In 2004, a burial site of a cat buried with a human, was unearthed. The site dates back to about 9,500 years ago but it is believed that domestication actually started about 12,000 years ago, with the appearance of the first agriculture societies. The storage of grains attracted mice and rats which attracted wild cats. The humans welcomed the cats because they protected the grain harvests. Over time, as with other domesticated species, people favored cats with more docile traits and less fear.

The main genetic differences between our domestic housecats and their wild relatives include: 1) domestic cats have smaller brains (this is true of all domestic species); 2) domestic cats have varied hair colors, patterns and coat length. (“White” color gene appears in domesticated species; it is typically not present in wild species because it would prevent them from being able to blend in with their surroundings). Coat color and length are the easiest things to change genetically. 3) domestic cats are less aggressive, less afraid of humans, more reward seeking. Interestingly, the skeletons are identical. All in all, *Felis silvestris lybica* didn’t have to change very much to become a housecat.

“*Cats, unlike dogs, are really only semi-domesticated,*” says Wes Warren, associate professor of genetics at the Genome Institute at Washington University. Several things support this, including the following: 1) Domesticated animals are initially smaller in size than their wild counterpart but they become widely varied in size over time. i.e. dogs range in size from Chihuahua to Great Dane; Horses range in size from miniature horses to huge draft breeds. This is not true of cats. 2) Pedomorphism also occurs in domesticated animals. They are selected to retain “Young” or “Infantile” characteristics. i.e. Dogs act like young wolves. Adult housecats have 3 juvenile behaviors (meowing, purring, and kneading their paws), but they are less neotenized than other domestic animals, and they can easily go feral and survive. Thinking of cats as being “semi-domesticated” helps us to understand their behavior in our homes.

Another big difference between domestic cats and other domestic species is that you cannot train a cat using positive punishment and negative reinforcement. i.e. In the modern dog training world we use kind and force-free methods of training but older style training used things like positive punishment (applying an aversive such as leash jerks, etc.) to decrease an unwanted behavior. Though not an ideal method of training, dogs can and do learn from the application of positive punishment, but you cannot train a cat this way and this makes them more like wild animals than dogs, horses and cows. The use of force, of any kind, causes a wild animal to panic

and try to flee/escape and the same is true of cats. The only way to train a wild animal is to use positive reinforcement and cats are the same way. By the way, could you imagine trying to train an Orca with anything but positive reinforcement? This is probably why people have thought cats weren't trainable. Those of us that know cats well, know that they are, indeed, trainable.

Feline social system: (based on the study of wild cats and free-roaming cats) Many sources say cats aren't social but they are social – just in a different way than humans and dogs are social. Cats' social system is based on the Mother cat and her young. They are facultatively social which means that if resources are abundant, females will live together and raise their young together. This is safer for the kittens as some females stay with the kittens while others go out to hunt. Cats are loners, however, when it comes to hunting.

Several cats can share a territory with "familiar" cats, but unfamiliar cats are driven out or attacked. They tend to have a "Core" area within the territory where they spend the bulk of their time. Scent marking is an important way for cats to communicate with other cats let them know they are using the shared area. These same rules apply to our domestic house cats, but some cats consider what they can see out their windows as their territory as well.

Since we know that unfamiliar cats are driven out, it is understandable why it can be difficult, sometimes, to add a second cat to the home. A study that appeared in the Applied Animal Behavior Journal, in 1999 (Kim Berry), showed that only 2 things really matter when adding another cat to the home: The length of time the cats are together and the individual personalities of the cats. The biggest change in affiliative behavior and lack of aggressive behavior occurred at about 6 months and after, so it can take quite a while for some cats to decide that the new comer is "ok". Knowing about feline social systems and the behavior of their wild counterparts, allows us to provide all of the things our domestic cats need to be happy and healthy (physically, mentally and emotionally).

Feline body language and communication: Cats can be quite subtle about communicating what they are feeling inside but there's quite a lot their various body parts and posture can tell us. Wide eyes tell us the cat is surprised, stimulated, or frightened, whereas half-closed eyes indicate the cat is relaxed/trusting. A slow blink is also a sign of trust. Transfixed staring signifies tension/aggression/intimidating. Dilated pupils indicate autonomic nervous system arousal and can be seen when a cat is surprised, stimulated, frightened, but also occur when light is low. Constricted pupils, on the other hand, are seen in a relaxed cat, bright light or offensive aggression. Ears have quite a lot to say as well. Ears forward indicate the cat is alert, relaxed and happy; turned to the side indicate the cat is alert or listening intently; Ears rotating back and forth can indicate the cat is agitated and nervous; Ears back indicate fear or preparing to fight. It is always important to look at all of the body parts together to get the full message. Tails are a good source of information on how the cat is feeling. The higher the tail, the better the mood. They will lower their tails when they are not content or when they are fearful. A twitching tip of the tail indicates the cat is less content, while a sweeping back and forth tail tells us the cat is REALLY not content. Cats on the offensive may hold their tail straight down in an inverted "L" position. Piloerection (hair standing up) is not a conscious choice - it indicates autonomic arousal such as when a cat is frightened.

An offensively aggressive cat may look like the following: stiff, upright stance (back end higher); tail stiff, lowered or inverted "L"; direct stare; upright ears with the backs rotated forward; piloerection; constricted pupils; directly facing opponent, possibly moving toward it; possibly growling, howling, yowling. A cat on the defensive, on the other hand, may look like the following: crouching, head tucked in; tail around the body; eyes wide, dilated pupils; piloerection; turned sideways; opened mouth hissing/spitting; might deliver quick strikes with front paws/claws out. A cat that rolls onto its back, in a social conflict situation, is preparing for an all-out attack as this exposes all of their weapons.

Scent plays a huge role in a cat's life. Cats have 200 million scent receptors in their nostrils, as compared with a human's 5 million. They have a vomeronasal organ in the roof of their mouth that contains ducts that lead to the mouth and the nose. This is a scent analyzer used primarily for analyzing pheromones (scent chemicals) from other cats, especially ones found in urine. The scent is collected in the mouth. The cat uses its tongue to flick it up to the vomeronasal organ and in the process, make an open-mouthed grimace known as the "Flehmen" reaction.

Cats communicate A LOT with other cats through odors. Scent glands in the paw pads, cheeks, hip/tail area but also through urine and feces. Given that cat do so much "talking" with smells/odors, it shouldn't be surprising that the number one behavior problem in cats is elimination problems. An environment filled with familiar scents is very comforting. This is why we see them rubbing their faces on objects, humans and each other. Scent is also used by cats to identify one another and when they rub against each other they transfer scent from one to the other which makes them smell similar. Rubbing is friendly greeting behavior and cats have also learned that it works well to get our attention. Rubbing is considered "friendly" marking whereas marking with urine is considered "Stress" marking.

Meowing, interestingly, is something cats have adopted as a way to communicate with humans. Other than mother cats and kittens meowing to each other, cats really don't do much meowing to each other. It "works" to get our attention and get their various needs met, such as requesting food, to be petted, etc. A study done at Cornell in 2003 showed that meows are tailored to the specific cat's owner. Owners could only accurately translate their own cats' meows and not those of other cats.

Purring signifies the cat is happy and content but cats may also purr when they are injured or sick, or even scared. Dr. Sharon Davis, board certified veterinary behaviorist at the University of Georgia, says "*Since cats don't know how to ask for help, purring may be more of a solicitation for care, or a self-soothing behavior when they are uncomfortable.*"

The old saying, "Scaredy cat" is quite true. Cats are very reactive. We know they are brilliant little predators but cats are also prey objects for other animals. High reactivity/low threshold for fear helps a prey animal stay alive.

Feline aggression: We will focus on human-directed aggression as well as aggression between housemate cats. Some of the more common types of aggression, exhibited toward humans, are fear aggression, play aggression, petting-induced aggression and redirected aggression. Regardless of the type of aggression, it is always important to have a medical exam to rule out any medical issues, since illness, pain, etc., causes stress and stress contributes to aggression.

Fear aggression toward humans: This occurs when a cat is exposed to something it perceives as a threat. Genetics is a factor as some cats are genetically more shy or more reactive (lower threshold for fear). Punishment and inadequate socialization are common factors. The aggressive response can also be "self-reinforcing" when the cat learns that growling, threatening, etc., drives the stimulus away that was causing the fear reaction. Defensive postures are typical (crouched, leaning away, tail tucks, ears flat), as well as hissing, growling, swatting, biting and scratching. There is a better prognosis if it is of mild intensity, or when the cat has a higher threshold for aggression and when it is possible to avoid exposure to the stimulus. Treatment focuses on changing how the cat feels about the fear-inducing stimulus (i.e. classical counterconditioning and desensitization). Early intervention is best. The key, with fear aggression, is to avoid "Punishment" as this only serves to make it worse and can tear apart your relationship with the cat.

Play aggression: This is the most common type of aggression toward humans. It is typically predatory-type play with stalking, chasing, ambushing, wrestling, kicking, biting. Vocalizations are rare. Playing with the cat with hands and feet is a common factor. It tends to occur more often in homes with no other cats. Again, no punishment is important. Treatment includes: only using toys to play with the cat; scheduling predictable play time the cat each day; learn to anticipate the play attacks and redirect the cat with toys or other positive outlet. Adding a second cat can be a treatment strategy as well but careful planning to pick the right companion is essential.

Petting induced aggression: These are the cats that accept attention, and even solicit it, but then bite or scratch when they've had enough. They seem to have a certain threshold for the amount of physical attention they will tolerate. Petting can cause over-stimulation which can trigger aggression (arousal is a frequent cause of all kinds of aggression). It can also occur when touching areas the cat finds uncomfortable or irritating (typically from the shoulders on back, tail head area, and abdomen). Vocalizations may or may not precede aggression. Some cats with this behavior have what we call feline hyperesthesia syndrome. Also, rolling onto their back is not an invitation to pet their belly but rather a show of trust and contentment. Owners often say they didn't see the attack coming but these cats are often providing A LOT of warning signs – it's just that the humans haven't learned to pick up on them or they ignore them until it is too late. Warning signs: tail twitching, fidgeting, tenseness, leaning away, ears flattened, retraction of lips and hissing. Treatment should primarily be aimed at learning to read the cat's body language and their tolerance level and stay below that. Avoid touching the areas the cat finds irritating. Cats can be gradually conditioned to tolerate more petting time too.

Redirected aggression: This occurs when the cat sees or hears something that arouses him, but he cannot reach that stimulus and so he attacks someone else that is nearby or that approaches the cat (owner? Companion cat? Family dog?). It is more like a reflex in that it is done without thought. The extreme emotional arousal the trigger causes, shifts the cat into "hind brain" mode (emotional center of the brain) so there's lack of impulse control and they are acting without thinking. This is a common type of aggression and can be very serious as the bites are typically uninhibited. Common triggers include seeing a free-roaming cat through the window, unusual odors or sounds, unfamiliar people or environment, person intervening in a cat fight, approaching an agitated or defensive cat. These cats can stay emotionally aroused for hours or even days and so the "attacks" on the owner can seem to be "out of the blue". Treatment focuses on avoiding triggers, allowing an agitated cat time to calm down, medication to decrease the reactivity. Punishment makes this aggression MUCH worse.

Inter-cat aggression within the home: 75% of multi cat homes have some level of social conflict. The social tension may manifest as overt aggression or passive avoidance. It often begins when the cats are first introduced, especially if the introduction process didn't take into account the typical social system of cats (i.e. bring in the new cat and plunk it down in front of the resident cat). It can also develop among cats that formerly had good, affiliative bonds such as following a specific incident or due to gradual changes in the relationship. We know their relationship is good if they play, groom and sleep with one another.

Overt displays of aggression include growling, hissing, screaming, spitting, attacking, chasing and biting. Passive displays are often not recognized by owners and include staring, blocking and hiding or aloof disregard and avoidance. Conflict may have elements of fear, anxiety, self-defense and territorial defense. Conflict between house mate cats is a common cause of relinquishment. Other consequences of social conflict include urine retention, undesired elimination outside the litter box and urine marking. Typical causes include: 1) new cat in home; 2) redirected aggression, 3) personality conflict, 4) social maturity.

With redirected aggression, one tragic event can either cause short term tension or it can start a series of aggressive encounters that persist long term or permanently destroy the relationship. Examples of triggers are

listed above. From that moment of the “redirected” attack, the cats may not get along. Cats are poor at reconciliation and this has to do with them being typically solitary and independent. They also don’t do appeasement displays, as dogs and humans do. Tight social bonds are not essential and so they may not have a good reason to mend the soured relationship. Separation may be necessary and slow re-introduction with behavior modification for both the aggressor and the victim.

For more information on how to add a cat to a home - see my handout titled “How to add a cat” under the “resources” tab on my website.

Feline personalities: Their personalities are about 50% genetics and 50% life experience. Socialization plays a part. Researchers have identified 3 main personality types and each one is on a gradient. “Alert” type describes high or low levels of alertness and curiosity. “Sociable” type ranges from anti-social to gregarious. “Equable” describes evenness of mood. They range from calm/even-mood to one that flies off the handle at the littlest provocation. Some personality types don’t function well at all in a multi cat home.

Social maturity: this occurs somewhere between 2 and 4-5 years of age. When they reach this age they may start to control the social group or their activities. They may contest resources or access to resources. Owners of these cats often tell me, “The cats lived together perfectly well for the first 3 years of their lives”. Studies have shown that the cats that are more familiar with each other or those that are less evenly matched often exhibit passive aggression. They may deny the other cat access to an area; frequently involves staring at the victim; victim cat will typically leave the room or spend increasing time away from the family. Either the aggressor or the victim may also exhibit “marking” with urine. Cats that are less familiar with each other and those that are evenly matched often exhibit active aggression. This is far more risky as injuries can occur. If one cat is willing to defer to the other, the aggression will resolve. If one cat refuses to tolerate the other or if neither cat is willing to be the lower-ranking cat, aggression will intensify.

Urine marking is a “Red flag” for some forms of aggression. It can involve squatting and urinating or defecating or standing and spraying vertical objects. It is exhibited in either the active or passive aggression by either the aggressor or the victim. Treatment of the aggression or social tension involves checking their health to rule out any underlying medical stressors. Separating the cats unless supervised; plenty of resources near each cat’s “core area”; plenty of vertical space; NO punishment; humans be calm – our behavior influences the cats.

A behavior modification plan can be put together to help repair the feline bond. Anxiolytics are sometimes helpful. Medication, pheromones or natural supplements may help reduce anxiety and distress.

Feline Housesoiling: please see handouts titled “Feline Housesoiling”, “Environmental Enrichment in Cats”, and “Feline Lower Urinary Tract Disease”. These handouts are on my website under the resources tab.

Behavior Wellness: This is new terminology that addresses the mental and emotional health of cats. In the home environment we’re focusing on environmental enrichment to maintain a desired quality of life for our cats. In the vet clinic environment, we’re talking about “Low Stress Handling” and “Fear Free Clinics”. This info is new to the veterinary world but is catching on. More and more clinics are making strong efforts to make the clinic setting lower-stress for cats. This is important because 58% of cat owners say their cat hates going to the vet. Simple things like going to the clinic at quieter times of the day, keeping cats in separate area than dogs, covering the carrier with a towel, leaving cat in carrier and just taking top off for exam and vaccines, using feliway diffusers in the exam rooms and on personnel clothing, lowering the lights, calm voices and less talking, all contribute to a less stressful veterinary clinic experience. Talk to your vet about these things.