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Editor’s Introduction

Welcome to the fourth issue of the Journal of Applied Companion Animal Behavior (JACAB).

Enjoy!

James O’Heare

Managing Editor, JACAB
Understanding Kennel Stress in Canines (Canis lupus familiaris)—A Review of the Literature

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Introduction

In 2008, the United States spent 43.2 billion dollars on pet products and services. This amount is expected to grow by more than six percent annually (APPA, 2008). Companion animals are very much a part of American lifestyles. People include dogs in everyday activities such as work, going for a stroll, vacationing, going on overnights with children, driving in the car, and shopping at pet-friendly stores. Research reveals human–animal bonded relationships have profound therapeutic effects on all aspects of our wellbeing (Beck & Katcher, 2003; Brown, 2004; Johnson, Meadows, Haubner, & Sevedge, 2008; Odendaal & Meintjes, 2003; Prato-Previde, Custance, Speizio, & Sabatini, 2003; Rossetti, DeFabiis, & Belpedio, 2008; Serpell, 1996). Health benefits for people emotionally attached to a dog are profound. Dogs experience similar health benefits in attached relations with familiar people (AVMA, 2009). This is due to improved nutritional and veterinary care when a dog is cared for adequately. The human–dog bond is a win–win situation. Bonding and wellness benefits promote empowerment and greater attachment to pets (Fine, 2006). It makes sense that dogs are beneficial in fulfilling a niche for people wanting companionship.

A growing number of people are adopting pet dogs from humane societies and rescue groups to fulfill a companion role. These animal welfare organizations are full of dogs in need of homes. Unfortunately, kenneled dogs (those contained in an enclosed system in such places as humane societies, rescue kennels, pet stores, research facilities, etc.) can experience stress related issues which can impact their immune response, sociability, and health (Bleicha, 2000; Hewson, Higy, & Bradshaw, 2007). Kennel stress (symptoms exhibited by a dog during a time of containment) is one of the reasons why dogs do not fare well in contained areas for long periods of time (HSUS, 2009). Examples of kennel stress in dogs include, but are not limited to, figure-eight spinning in the kennel, vertical jumping at the kennel gate, repetitive pacing, startle responses, stress defecation, appetite loss, exaggerated auto-grooming, coat moulting or sloughing, panting, paw sweating, muscle trembling, ears held in tension, spatulate tongue, flicking tongue, drooling, pupillary dilation, tense facial musculature, yawning, and distress whining (Abrantes, 1997; Aloff, 2005; Beerda, Schilder, VanHoff, DeVries, & Mol, 1999; Handelman, 2008; Rugaas, 1997; Scholz & Von Reinhardt, 2007).

Dogs who endure a stressful life in a kennel often have a host of other issues that surface. These issues are usually behavioral in nature (Hiby, Rooney, & Bradshaw, 2006; Stephen & Ledger, 2006; Taylor & Mills, 2007a; Wells, Graham, & Hepper, 2002). Some of the behavioral problems identified in the literature that result from kennel stress include inadequate socialization skills (Stephen & Ledger, 2006), autogrooming (Hiby et al. 2006), and vocalization (Wells et al., 2002). If animal caregivers understand the impact of kennel stress in dogs, they can intervene earlier. Early intervention could create opportunities for the dog to learn new coping skills and be more tolerant of the aberrant housing conditions a kennel offers. By decreasing kennel stress, dogs exhibit fewer behavioral problems while housed in the shelter (Scholz & Von Reinhardt, 2007). A better behaved pet can get adopted sooner (American Kennel Club, 2009). If kenneled dogs are better showcased for the community, they would have a good chance of getting adopted and being part of a family. Adoptive dogs who exhibit fewer maladaptive behaviors tend to stay in the home long term. Once a dog becomes situated in the home, owners are invested in their
new companion and can teach the dog coping skills and default behaviors to adjust to any new routines. This paper will review the scientific literature on kennel stress in dogs and address three key areas: 1) physiological issues pertaining to stress, 2) kennel structure and containment stresses, and 3) lack of socialization skills pertaining to kenneling.

Definition of Kennel Stress
Canine stress is a state in which a dog reacts to an endogenous or exogenous threat and focuses its energies on coping with a dangerous situation (Scholz & Von Reinhardt, 2007). There are many emotional states that could elicit a stress response, including arousal, fear, nervousness, and agitation/frustration. Stress is the response of an organism to a demand placed upon it to change or adapt (O’Heare, 2005). Kennel stress is elicited when a dog is contained for a period of time and exhibits signs of stress (Abrantes, 1997; Aloff, 2005; Rugaas, 1997). The stress response is divided into three general states: the recognition of a stressor, the biological defense against the stressor, and the consequences of the stress response (Moberg, 2000). Noise, immobilization, novelty, transport, or restricted housing conditions can elicit stress responses in behavioral, cardiovascular and endocrine parameters for dogs (Beerd et al., 1999).

Literature Review
Physiological Issues Pertaining to Stress
Humane societies and rescue groups across the country prepare pet dogs for adoption into family homes. Many of the animals who come into shelter systems are stray dogs. Not all animals get adopted right away. Unfortunately, when canines are housed in kennels for long periods of time, they can begin to show clear signs of stress (Hewson et al., 2007; Hibi et al., 2006; Tod, Brander, & Waran, 2005). Stress affects a variety of physiological systems in the dog’s body, including endocrine and sensory systems.

Cortisol is a hormone produced by the adrenal glands in response to stress and anxiety (Weber, 1998). This hormone can be measured in serum, saliva and urine. Noninvasive collection of cortisol is the best method as it does not lend to added stress for the animal (Rooney, Gaines, & Bradshaw, 2007). Cortisol levels are produced in response to all sustained arousal, not only that produced by stress (Hibi et al., 2006).

Studies on cortisol have been done on dogs experiencing stress caused by thunderstorms (Dreschel & Granger, 2009), search and rescue training (Ahrens et al., 2005), noise in shelters (Coppola, Grandin, & Enns, 2006), environmental changes (Haverbeke et al., 2008), and sled dog racing (Durocher et al., 2007). Dogs experiencing stress will produce elevated cortisol levels (Russell et al., 2007; Stephen & Ledger, 2006). Glucocorticoids and cortisol play a role in dog kennel stress, especially during crated transports (Hibi et al., 2006; Rooney et al., 2007). Transportation in a crate from one humane society to another or from one rescue organization to another is highly stressful for dogs. Dogs involved in interstate transfers will succumb to many stressful symptoms, such as stress whining, barking, urinary/fecal elimination in their crates, and panting (Rooney, Gaines, & Bradshaw, 2003).

Stress cortisol levels in dogs have been studied in relation to kennel stress. Hibi et al. (2006) found that dogs who were more active in their kennels harbored higher levels of cortisol. Hewson et al. (2007) found that female dogs exhibited more signs of stress than male dogs during kenneled situations.

Quality of life is always a consideration when we are studying kennel stress. Another study researched the correlation between number of days dogs were kenneled and urinary cortisol levels (Hewson et al., 2007). In looking at six different populations of dogs, the initial days in which they were kenneled showed the highest cortisol levels. As the dogs became habituated to their time in the kennels, their cortisol levels decreased. Analysis shows gaps in the literature regarding correlation between kennel stress and canine age, cortisol levels, and breed specificity.
Some humane societies experience noise at very high decibel levels (Coppola, Enns, & Grandin, 2006; Sales, Hubrecht, Peyvandi, Milligan, & Shield, 1997). Higher noise levels contributed to increased mobility in the dogs’ kennels. Arousal levels were higher when dogs were on display for adoption because of an increase in the volume of traffic of possible adoptive families walking through the kennels. The dogs were not as calm as when noise levels were lower. Other factors that caused an increase in noise levels among kenneled dogs were initial arrival times when employees would start their work day, and during dog feeding and kennel cleaning routines. External sources of noise that heightened kennel stress included outside vehicular traffic and trains crossing at railroad stations (Sales et al., 1997). Dogs were noticed to be quieter after the lights were turned off at the end of the day. A study showed that dogs spent more time resting in nonstanding positions (lying flat or sitting) when classical music was played. While heavy metal music was played, mobility in the kennel increased and barking was more frequent (Wells et al., 2002). Kenneled dogs who hear other dogs barking are stimulated by the vocalization and will maintain higher arousal levels and increased mobility in their kennels. The increased vocalization usually presents with barking and stress whining. Sales et al. (1997) found consistent data in their research and claimed that dogs are quieter at night when noise levels are lower.

Canine energy levels escalate and become more aroused when kennel employees come in to work in the mornings. This escalation may also be centered around learned patterns of associating employee arrivals with elimination and feed times. Although dogs in shelters are less mobile and quieter while hearing music being played, as previously mentioned, they also are calmer and have more down time after the music has stopped. Dogs will lie quietly in their kennels for a specific amount of time before they become escalated again. The behavior presented by a dog is individual, and dogs experience stress in different ways (Rooney et al., 2007).

Older dogs who exhibit pathological behaviors are not readily adopted (Foster & Smith, 2001). These types of dogs can be in kennels for many months, and sometimes years, especially if there is a no-kill policy. Dogs who are kenneled for long periods of time were witnessed spending greater than 50% of their time lying down in the kennel (Bergeron et al., 2002). Seventy-five percent of long-term kenneled dogs remained inactive (Bergeron et al., 2002). Dogs present poorly and exhibit more pathological behaviors, such as autogrooming, flank sucking and self mutilation, when they do not get adequate mental stimulation (McMillan, 2002). Ultimately, they do not showcase well in adoption centers. Animal welfare society staff are creative in adoption programs such as adoptathons and the use of large-scale geographic marketing strategies to get these canines adopted. Dogs are brought to communities for adoption for people convenience. Possible adoptive families do not have to travel far and have opportunities to see dogs who may not be showcased in their community.

**Kennel Structure and Containment Stresses**

The structure of the kennel can provide comfort for a dog and decrease stress levels. A platform built into the kennel can function in different ways. Platforms provide a surface to keep the dog from lying on the cement floor throughout the day (Feldhaus, 1980). This is especially helpful for older dogs, or dogs who present with arthritis or orthopedic medical problems. Feldhaus (1980) claimed that dogs spent more than 50% of their time on their platform bed. Some innovative humane societies that offer real-life home-like dwellings for animals report that dogs use the furnished kennels more than the nonfurnished. Another function of the platform is that the dog can move away from any elimination of urine or feces and not smear through it. Instilling a double kennel separated by a guillotine gate can allow the dog to move from one kennel to another during cleaning rituals, and also provide more space if the dog is mobile in their kennel (HSUS, 2009). These functions can help decrease kennel stress.
Kennel size has an effect on the mobility of the dog. Dogs housed in smaller kennels than in standard sized kennels showed decreased exercise activity (Clark, Calpin, & Armstrong, 1991; Hughes, Campbell, & Kenney, 1989; Neamand, Sweeny, Creamer, & Conti, 1975). When people were present, the dogs would increase activity, and, when alone, the dog’s activity would decrease. Female dogs can show more stress in the kennels than males (Beerda et al., 1999). Females exhibited more stress than males when space was restricted. When females were challenged, there was increased aggression, excitement, and uncertainty. There was a reported escalation in autogrooming, paw lifting, coprophagia and vocalization (Beerda et al., 1999). Although these results were reported, another study found no difference in stress levels between males and females in research conducted on urinary cortisol and kenneled dogs (Stephen & Ledger, 2006). Decreased spatial areas for housing at times when humane societies have high intake volumes of nonadopted dogs make for difficult choices in what dogs to present to the adoption floors.

Dogs housed alone were more inactive (Hubrecht, Serpell, & Poole, 1992) than those who were housed with another dog. Dogs housed with another dog showed less signs of stress and increased activity in the kennel. This approach may not work if two dogs are exhibiting dog–dog aggression, if one of the dogs has some medical impairment that by allowing another dog to be present in the kennel could be a detriment to their health, or if two dogs are intact and can breed. Dogs spent more time in runs and outdoor pens than they did in the kennels (Hetts, Clark, Calprin, Arnold, & Mateo, 1982). Greyhounds kenneled for air transport showed more signs of stress while they were in the cargo area of the plane than in normal conditions (Leadon & Mullins, 1991), but showed no effect on stress related to kennel size. Dogs who were contained in kennels and not allowed free access to movement exhibited more pathological behaviors (Hughes, Campbell, & Kenney, 1989). These pathological behaviors included licking the wire crate, barrier manipulating, biting and chewing on self, whining, and jumping at the sides of the crate.

**Lack of Socialization Skills Pertaining to Kenneling**

A well-socialized dog is a good fit for a family looking to adopt a pet (Thorn, Templeton, Van Winkle, & Castillo, 2006). Dogs with inappropriate social skills are a challenge when finding primary homes. Numerous signs of stress in these dogs can include autogrooming, lifting paw, vocalization, and repetitive behaviors (Beerda et al., 1999; Sonderegger & Turner, 1996). Many adoptive families want dogs without behavior problems. Dogs who are presenting with kennel stress need early socialization, exposure to novelty, and training, to offset the stress. Human interaction of play, grooming and petting can decrease stress and cortisol levels (Coppola, Enns, & Grandin, 2006).

Taylor and Mills (2007) found consistently that puppies who were housed together exhibited less disturbed behaviors, and were quieter for greater portions of the day when they had a kennel mate. Hetts et al. (1982) researched dogs with poor social skills. These dogs showed increased vocalization, and increased bizarre movements. Hubrecht et al. (1992) found that dogs grouped together in one kennel spent more time investigating the floor and experiencing their own levels of mental stimulation. Over time, the more solitary they became, the more they did not approach the front of the kennel (Taylor & Mills, 2007). One of the gaps in the literature is evidence on the correlation between the age of the dog and kennel gate approach.

Socialized dogs get more access to resources, such as more handling and engagement in human relationships, which can lead to quicker adoption rates. If dogs are well integrated into obedience classes and social play, there is a better chance for them to have opportunities to become more social with people (Sondreger & Turner, 1996). This in turn would increase the likelihood of them getting to the adoption floor, as many young families looking for a companion dog are attracted to dog sociability.
Research reveals a correlation between the behavior of a rescue dog and the length of time they spend in the kennel (Hughes et al., 1989; Taylor & Mills, 2007a). Dogs who have been housed for long periods of time in a kennel tend to spend more time in the back of the kennel and show less social greeting behavior at the front of the kennel (Hughes et al., 1989; Taylor & Mills, 2007a).

Dogs who were paired together in the kennel exhibited less travelling distance (mobility) in the kennel. Less than 6% of the dog’s time in a kennel was spent exercising (Hughes et al., 1989). When people entered the kennel area, the dog’s activity would escalate and they would become more mobile. When there was less people traffic, kenneled dogs were quieter (Hughes et al., 1989).

**Treatment**

There is minimal data on the use of medications to treat kennel stress. Veterinarians are prescribing medications to help stabilize the dog who exhibits significant signs of stress (Davidson & Plumb, 2008). Dog appeasing pheromone (DAP) has some evidence in reducing some of the behavioral indicators of stress in dogs (Tod et al., 2005). DAP is a dog pheromone that gets sprayed from an atomizer fixed on a wall near their kennel area. The dogs presented quieter in that environment.

Environmental enrichment is very helpful in restoring a calm dog from a highly aroused state (Wells, 2004a). The use of toys helps drop escalated dogs back to baseline levels (Wells, 2004b). Toys are best used with some supervision to monitor destructive activity and possible ingestion. Exposure to novelty, such as mental stimulation toys, is a good learning experience for kenneled dogs and helps to offset stress levels, decrease mobility in their kennels, and decrease vocalizations. A training program of desensitization and counterconditioning to novel situations utilizing positive reinforcement techniques can decrease fear or stress, as well as encouraging the human–animal bond process (Haug, 2004).

**Conclusion**

In a prominent and lucrative pet industry, it is important to know about our pets’ needs and provide the highest quality of life for the animal. Management of stress is challenging for most people and can be challenging for our companion dogs. Dogs who are kenneled can show numerous signs of stress. There are physiological issues that will need to be addressed, management of structural containment spaces, as well as training for social skills and desensitization to novelty. The longer the dog is kenneled, the more emphasis is needed to address these issues.

Being able to manage the dogs through awareness of their body language and identification of signs of kennel stress will put us one step forward in addressing and managing the stress of long-term kenneling. Decreased stress levels in dogs can promote stronger human–animal bonding. Treatment of dogs exhibiting signs of kennel stress include training, environmental enrichment, exercise, medication, and DAP. The more stable the dog’s physiological state, the better candidate they are for adoption. If we place more stable dogs in homes, owners should have a better chance of managing issues that surface with local support of veterinarians, behaviorists, humane societies and dog trainers. Better human–animal bonding and better trained pets can decrease social problems in the community related to ill-behaved dogs.

Research directions can address current gaps in the literature such as breed specificity and containment stress, the home use of DAP before and after kenneling and its effect on canine stress, exercise sessions before and after time in the kennel, and monitoring levels of stress by training the dogs and providing mental stimulation at routine times each day.
References


Effect of Multidog Play Groups on Cortisol Levels and Behavior of Dogs (*Canis lupus familiaris*) Housed in a Humane Society

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Abstract

Dogs waiting for adoption in humane societies face several stress-inducing stimuli. The aim of this research was to study the effect of multidog play groups on cortisol levels and stress-related behaviors in kenneled dogs in a humane society. Forty dogs were randomly assigned to an experimental group and a control group. The experimental dogs went to a 30-minute play group each day. Salivary cortisol specimens were obtained at baseline, 30 minutes after play group, and 3 hours after play group. Video recordings were conducted at the same time points for each of the groups. We found no significant difference in the cortisol levels between groups and across days. We did obtain significance with the video analysis for specific behaviors between groups and across days. Overall, there were fewer stress behaviors in dogs who had the opportunity to participate in play groups than in those who did not. Offering humane society dogs the opportunity to play can be a great outlet to release stress and improve conditions for animal welfare.

Keywords: animal welfare, canine play, kennel stress, salivary cortisol, social behavior, stress

Introduction

Canine stress is a state in which a dog reacts to an endogenous or exogenous threat and focuses its energies on coping with a dangerous situation (Scholz & Von Reinhardt, 2007). This stress is a response of an organism to a demand placed upon it to change or adapt (O’Heare, 2005). The stress response is divided into three general stages: the recognition of a stressor, the biological defense against the stressor, and the consequences of the stress response (Moberg, 2000). There are numerous emotional states that could elicit a stress response, including arousal, fear, nervousness, agitation, and frustration. Kennel stress is visible in dogs that are confined for a period of time and exhibit specific stress markers (Beersa, Schilder, Van Hooff, & DeVries, 1997; Beersa, Schilder, & Van Hooff, 1999; Blecha, 2000; Hiby, Rooney, & Bradshaw, 2006; Stephen & Ledger, 2006).

Although humane societies and rescue groups prepare dogs for adoption, not all dogs are adopted immediately, and when housed for long periods of time in kennels these dogs may manifest various stress-related symptoms (Hewson, Hiby, & Bradshaw, 1997; Hiby et al., 2006). The associated physiological events related to stress can impact immune response and overall health (Beersa et al., 1997, 1999; Blecha, 2000; Hewson et al., 1997; Hiby et al., 2006; Moberg, 1985). This so-called “kennel stress” can be severely deleterious (Taylor & Mills, 2007). It is identifiable by a number of overt behavioral symptoms, including backing away on approach, barking, figure-eight spinning, growling, vertical jumping, exaggerated autogrooming (air licking, flank or facial licking), repetitive pacing, panting, destructive ripping, distress whining, yawning, facial muscular rigidity, intense staring, rounded topline of the dog’s body with a lowering of the head, and/or hiding (Abrantes, 1997; Aloff,
A number of known factors elicit stress in shelter dogs. Among them are high noise levels (including other dogs’ barking) (Sales, Hubrecht, Peyvandi, Milligan, & Shield, 1987; Wells et al., 2002), arousal associated with potential adopter interactions (Hewson et al., 1997), arrival of shelter employees, feeding and kennel cleaning rituals, and ancillary noises associated with vehicle traffic, trains or sirens (Sales et al., 1987). Shelter dogs are described as “quieter” after kennel lights are off (Wells, 2004), and dogs are reported to rest while lying or sitting (versus standing) when they listened to classical (versus “heavy metal”) music (Wells et al., 2002). Kennel stress affects the dog’s endocrine system (altering hormone levels), and sensory systems (auditory and visual systems, in particular) (Blecha, 2000; Moberg, 2000).

One reported physiological marker of such stress is elevated cortisol levels (Beerda et al., 1997; Dreschel & Granger, 2009; Haverbeke et al., 2009; Horvath, Doka, & Miklosi, 2008; Russell et al., 2007). Corticoids appear to be produced in association with stress, and have behavioral effects associated with the maintenance of bodily functions. The sympathetic nervous system is activated and will increase glucose, blood pressure and heart rate (Chrousos & Gold, 1992). Cortisol release is affected by numerous conditions, including stress, exercise, fever, trauma, pain, and extreme temperature.

Dreschel and Granger (2005) evaluated stress in dogs in a study on exposure to a noise stimulus that was similar to a thunderstorm. Findings included significant increases in canine salivary cortisol levels related to fear of a thunderstorm noise stimulus. The dogs were also observed to exhibit such behavioral signs as pacing, panting, hiding, positioning near the owner, and whining. Another study on canine stress due to noise sensitivity showed increased vital signs in canines exposed to 1-minute increments of aversive stimuli, such as sound blasts, electric shock, an open umbrella, and restraint (Beerda, Schilder, Van Hooff, DeVries, & Mol, 1998). A number of studies report that cortisol levels in dogs increase with exercise and activity. Sprint-racing sled-dog teams were researched, and serum cortisol levels were significantly elevated after a few days of racing (Wakshlag, Snedden, & Reynolds, 2004). Alternating exercise and cage rest in sled dogs over a 12-week period showed elevated plasma cortisol levels. The external demands of racing placed enough stress on the dogs to cause the increase. Hinchcliff and colleagues (1993) conducted a study whose findings were contrary to other studies on cortisol being elevated from exercise. They found no changes in cortisol levels in long-distance sled-racing dogs. The findings suggested the dogs were not severely stressed by the demands of competing in the race. Cortisol levels can change in opposite directions depending on human interaction with the dog, which can be affiliatory or authoritarian (Horvath et al., 2008). In addition, Hewson et al. (1997) found that kennel-housed female dogs exhibited more stress symptoms than males. In essence, cortisol levels can vary and increase with numerous stimuli, including noise and exercise.

Play is motor activity performed postnatally in which motor patterns from other contexts may often be used in modified forms (Bekoff, 1972, 1998). The styles of play of domestic dogs can follow patterns of breed-specific jobs such as hunting, guarding, tracking, or other behavior patterns necessary for later survival (Beaver, 1994). While play may appear purposeless to the human observer, it is assumed to be a form of “practice” for living. When dogs play, they use the same forms of body language as those used for status battles, reproduction, and hunting (Aloff, 2005; Horowitz, 2006).

Play can ameliorate the effects of kennel stress (Bekoff, 1972, 1998; Horvath et al., 2008). Play has a calming effect, especially if it has an exercise component. So-called “object-
related” play with a person, such as tug-of-war or ball retrieving, can calm a stressed dog (Toth, Gacsi, Topal, & Miklosi, 2008). Hence, play interventions by caregivers may decrease kennel stress and the associated behavioral problems in dogs. Incidentally, this can lead to more timely and successful adoptions (American Kennel Club, 2009).

The purpose of this study was to test whether intraspecific play intervention lowers (1) stress levels in kennel-housed dogs (measured by the amount of stress-related behaviors manifested), and (2) canine salivary cortisol levels.

**Materials and Methods**

The experimental protocol was approved by Northeastern Illinois University Animal Care and Use Committee as well as the Longmont Humane Society Executive Board. Procedures were in compliance with the National Institute of Health Guide for the Care and Use of Laboratory Animals, as well as standards for humane care and treatment of animals through the United States Department of Agriculture (USDA).

Expanded Range HS Salivary Cortisol EIA Kits, sorbettes, and collection supplies were obtained from Salimetrics Laboratory in Pennsylvania. All other chemicals and supplies were obtained from Fisher Scientific Company in Massachusetts.

Forty dogs were selected from the Longmont Humane Society (LHS) and were randomly assigned to experimental and control groups. These dogs had been in the shelter through the initial screening phase and had acclimated to their surroundings for a minimum of 48 hours prior to being in the study. The dogs received a veterinary exam and were noted as being in good health. Each of the dogs was temperament tested, found to be stable, and kenneled on the adoption floor. The subjects ranged in age from 6 months to 13 years. There were a variety of breed types (purebred and mixed) in the study, including border collie, Australian cattle dog, American pit bull terrier, miniature poodle, German shepherd, labrador retriever, shiba inu, beauceron, Lakeland terrier, harrier hound, kelpie, wirehaired terrier, boxer, golden retriever, otterhound, American Staffordshire terrier, Rottweiler, and Lhasa apso. There were 18 females and 22 males in the study. Each dog was identified by their specimen number, which was attached to the dog’s collar and kennel, and handwritten on duct tape attached to their collar for the purposes of play-group sessions. The medication records of the study dogs were reviewed with the veterinary staff and evaluated for appropriateness for selection in the study. None of the dogs were on any corticosteroids.

The study was conducted over a 4-day period. The 20 experimental dogs took part in a daily 30-minute play-group session. The 20 control dogs remained in their kennels and did not take part in the daily play-group session. Specimens were collected from all dogs at baseline (each morning), 30 minutes after a play-group session, and 3 hours after a play-group session. Before each specimen collection, the dog was videotaped in their kennel for 1 minute for behavior analysis. The daily play-group sessions were also videotaped.

Hand sanitizer was used by handlers between specimen collections from different dogs, to prevent any possible spread of infection. The dogs were observed to see if there was any reaction to the smell of sanitizer on the handlers’ hands. The dogs did not seem to be affected by the sanitizer. Before the study, the team of five professional dog trainers/handlers (subinvestigators—SIs) attended a class and were informed of their role in the research. The USDA standards for humane care and treatment of animals were reviewed. The SIs were taught how to collect saliva specimens and properly store them, and completed a return demonstration of the collection protocol. The SIs worked in teams of two to collect specimens. The team kept detailed records of saliva collection times and play-group start and finish times. One of the professional trainers facilitated the multidog play-group session each day and used a timer to maintain the schedule. Handlers reviewed the behavioral signs of stress in the dogs. The dogs were desensitized to the
swabbing procedure, to prevent resistance or a stress response to specimen collection.

Many LHS volunteers helped each day with transporting dogs to maintain the rigorous schedule of the study. All dogs were allowed to eliminate outside. Control dogs were immediately brought back to their kennels without the benefit of play group. Experimental dogs were immediately brought to the play yard after elimination. Once the video recordings and specimens were collected on the dogs, all the dogs returned to their normal routines for the rest of the day.

The dogs’ morning meal was withheld until after the second swabbing for each of the 4 days until the study was completed. We were concerned that the dogs could become stressed if they were conditioned to expect a meal at a certain time and none was offered. To control for this, before the study, the dogs’ morning meal was withheld so that they would not notice any change in routine once the study began. Water was withheld 30 minutes before swabbing since drinking water could dilute the saliva and give false readings of cortisol levels (Salimetrics, 2009). Food was withheld 1 hour before swabbing since the presence of food could alter salivary pH and ultimately alter specimen results (Salimetrics, 2009). Canine saliva was collected using two sorbettes obtained from Salimetrics Lab (Figure 2). Once the sorbettes swelled from saliva saturation, they were placed in a prelabeled conical storage tube. The tube was immediately placed in a tube-organizer storage box in the freezer. The label read #1-1-1 for Dog 1, Day 1, Sample 1 and followed this pattern throughout the 4 days.

Enzyme-linked immunosorbent assay of saliva samples was done at the Northeastern Illinois University Biology Department Laboratory, according to the manufacturer’s protocol. The procedure used 96-well plate Expanded Range HS Salivary Cortisol EIA Kits. Cortisol samples were thawed on ice and centrifuged at 3000 rpm at room temperature for 20 minutes. The saliva was transferred to small prelabeled microfuge tubes. Samples that did not have enough saliva were diluted with the reagent in the kit to make up 25 µl of fluid. Mean cortisol levels (µg/dL) and standard deviations were compared individually and between groups. Cortisol level percentage change was assessed across samples.

The SI who completed the video recordings took precautions to be nonintrusive during videotaping. Behavior counts from the video analysis were conducted (blind) at the end of the study by two people who were not dog professionals. They logged the number of times specific behaviors were viewed on the videos. These behaviors included figure-eight spinning, vertical jumping, pacing, facial licking, panting, yawning, distress whining, and barking.

LHS has a unique outdoor play-yard area. The fenced area has three large attached yards, with three small fenced entrance areas. While it would be beneficial for the fenced yards to be larger, allowing the dogs even more room to run and maneuver freely, the current setup is conducive to exercise and play between all three areas, with the opportunity to close off sections to divide dogs for size and/or play-style appropriateness. During the play groups (Figure 6, Figure 7), the handlers continuously open and close the areas to support healthy interaction with groups of dogs that are best suited for one another. The small entrance areas provide a safe place for volunteers to enter with a dog, separate from the playing group. As the new dog enters, there is no risk of an escapee. In addition, if an altercation breaks out where dogs need to be separated, the entrance pens can be used for this purpose.

Operational definitions of behaviors monitored included the following:

Vertical jumping was scored as one point per episode of jumping at kennel gate or wall. After the dog had stopped the behavior and reached baseline, as evidenced by no jumping, the dog would receive another point when they started the behavior again.

Barking was scored as one point for each episode of vocalization. When the dog returned
to a nonbarking state, the measurement would begin again.

Facial licking (Figure 3) was scored as one point per episode. (This behavior is not associated with food or water, since there was none available prior to specimen collection times.)

Panting behavior was timed and received one point for every 5 seconds of panting.

Pacing behavior was measured as one point for each time the dog walked the length of the kennel and back.

Figure-eight spinning episodes (Figure 4) were exhibited when the dog jumped up and turned in a figure-eight pattern, usually bouncing off one of the two side walls of the kennel, spinning and then bouncing up against the opposite kennel wall. This behavior was counted as one point for each full figure-eight pattern observed.

Distress whining is a nonbarking vocalization that tends to be repeated during stress. This behavior was given one point per episode of whining.

Yawning and growling were given one point per episode of behavior.

The video analysis was initially conducted by two people who were not dog professionals. When dog professionals viewed the video recordings, it was noted the dogs were exhibiting other signs of stress in which they were not relaxed. These behaviors included air licking, flank licking, scratching, destructive ripping behaviors, backing away from stimuli, and a patterned behavior in which the dog showed facial muscular rigidity, a rounded topline, a hard eye stare, and an attempt to hide (Aloff, 2005; Handelman, 2008). The operational definitions for these behaviors included the following:

The dog received one point when they showed a four-step patterned behavior that was noted a number of times upon video analysis. We defined it as facial muscular rigidity, rounded topline of the dog’s body and lowered head, hard-eyed stare, followed by an attempt to hide.

Destructive ripping (Figure 5) behavior episodes were timed and scored one point for every 5 seconds.

Backing away to hide was given one point per episode. Growling was given one point per episode.

Air licking, flank licking and scratching behavior were given one point for every 5 seconds the dog presented this behavior. The scratching behavior was observed to be a very fast, continuous behavior on an inanimate object.

Three dogs were dropped from the study due to fearful behavior, tremoring, and anorexia. The final sample was n = 37.

Data analysis was completed with standard statistical analysis through testing with DataDesk (DataDesk®, Data Description, Inc., Ithaca, NY 14850, USA, www.datadesk.com). A chi-square analysis was conducted on the video recorded data.

Results

Refer to Figure 1 for the mean cortisol levels (µg/dL) of the dogs in the experimental and control groups over three samples (baseline, 30 minutes post–play group, and 3 hours post–play group) and across 4 days. Normality testing was done, and the data were not normally distributed. Although there were increases and decreases in the cortisol levels throughout the experiment, the differences in cortisol levels were not statistically significant over the three samples and across the 4 days.
Behavior frequencies are presented in Table 1. Overall, the behaviors can be divided into three categories according to their frequencies: high (counts = 86–170), medium (counts = 14–66), and low (counts = 6–7) frequency behaviors. We obtained significant differences in specific behaviors between groups over the 4 days. Of the 781 stress behaviors noted on video analysis, the majority occurred in the control group dogs who did not have access to the play group (control: 427 stress behaviors; experimental: 354 stress behaviors; $\chi^2 = 133.4$, $df = 14$, $p < .0001$). Analysis of the behaviors in each category gave the following results:

High frequency behaviors: $(\chi^2 = 66.1, df = 3, p < .0001)$

Medium frequency behaviors: $(\chi^2 = 38.22, df = 5, p < .0001)$

Low frequency behaviors: $(\chi^2 = 17.94, df = 4, p < .003)$
Table 1. Summation of stress-related behaviors ranked by total frequency of occurrence (orange = high frequency, blue = medium frequency, lavender = low frequency)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Control</th>
<th>Experimental</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical jumping</td>
<td>87</td>
<td>83</td>
<td>170</td>
</tr>
<tr>
<td>Barking</td>
<td>81</td>
<td>71</td>
<td>152</td>
</tr>
<tr>
<td>Facial licking</td>
<td>56</td>
<td>76</td>
<td>132</td>
</tr>
<tr>
<td>Muscle rigid/stare/hide</td>
<td>82</td>
<td>4</td>
<td>86</td>
</tr>
<tr>
<td>Panting</td>
<td>31</td>
<td>35</td>
<td>66</td>
</tr>
<tr>
<td>Pacing</td>
<td>22</td>
<td>31</td>
<td>53</td>
</tr>
<tr>
<td>Stress whining</td>
<td>17</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>Figure-eight spin</td>
<td>1</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Yawning</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Ripping</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Growling</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Back away</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Air licking</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Flank licking</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Scratching</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>427</strong></td>
<td><strong>354</strong></td>
<td><strong>781</strong></td>
</tr>
</tbody>
</table>
Figure 2. Handlers obtaining canine salivary cortisol specimens with sorbette swabs

Figure 3. Licking behavior

Figure 4. Spinning behavior

Figure 5. Destructive behavior (ripping blanket)

Figure 6. Play group
Long periods of confinement are known to cause stress in dogs (Beerda et al., 1997, 1999). Stress is manifested in both behavior and physiology. Much of the early work on canine stress centered on behavioral symptoms; however, recent reports suggest a link between canine stress levels and cortisol (Haverbeke et al., 2009). Kennelled dogs are exposed daily to several stress factors, such as confinement, loud noises, and visitors. Kenneling can lead to stressed behaviors. Although cortisol is a marker for stress, in this study cortisol levels were not significantly different between the control and experimental groups. On Days 2, 3 and 4, both groups showed a nonsignificant increase in cortisol levels at the 30-minute post-play sample collection.

Cortisol level is known to be affected by various factors, such as exercise, excitement, and arousal (Rooney et al., 2003; Rooney, Gaines, & Bradshaw, 2007; Stephen & Ledger, 2006; Taylor & Mills, 2007). It is possible that the heavy exercise during play may have resulted in higher levels of cortisol in the play group, whereas the anticipation of their morning meals could have increased the cortisol levels in the control group.

In addition, there were extraneous variables that may have further affected cortisol levels. Short of closing the shelter doors for the length of the study, it was challenging to control these variables. The shelter opened its doors to potential adopters late morning. At that time, families would come in to find a pet. Some of the dogs became very aroused as people walked past their kennels, talking and pointing to them. One early morning, the county had an administrative meeting that was held at the shelter without the knowledge of the researchers. Before our research staff began the study, a number of meeting participants stopped to see the shelter dogs after their meeting. All the dogs were quite aroused by the time we got there to conduct our research. On Day 3, unbeknownst to the research team, summer camp children had arrived at the shelter and washed kennel windows to perform an act of kindness for the dogs. This excited the dogs, even though we were promptly able to clear the children from the area.

Cortisol levels showed an increase on Days 3 and 4 in the experimental dogs, and a decrease on Days 3 and 4 in the control dogs, but the changes were not statistically significant. It is possible that the dogs became habituated to the kennel environment and routine of the study (Hinchcliff et al., 1993). As their stress level dropped, they may have shown lower cortisol levels.

Figure 7. Play group

Discussion

Long periods of confinement are known to cause stress in dogs (Beerda et al., 1997, 1999). Stress is manifested in both behavior and physiology. Much of the early work on canine stress centered on behavioral symptoms; however, recent reports suggest a link between canine stress levels and cortisol (Haverbeke et al., 2009). Kennelled dogs are exposed daily to several stress factors, such as confinement, loud noises, and visitors. Kenneling can lead to stressed behaviors. Although cortisol is a marker for stress, in this study cortisol levels were not significantly different between the control and experimental groups. On Days 2, 3 and 4, both groups showed a nonsignificant increase in cortisol levels at the 30-minute post-play sample collection.

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Play has long been known to be relaxing, for humans as well as animals. LHS uses play groups as enrichment, as an assessment tool, and to modify behavior. The role of the handler is to observe behavior and interfere only when necessary. The purpose of play groups is to allow the dogs the opportunity to respond and relate to one another in a social setting. For some dogs who have not been afforded this opportunity in their lives, a learning process is involved. LHS’s position is that dogs are the best teachers for one another when it comes to dog–dog interactions. The handlers provide support by interrupting posturing and displays that are disproportionate to the feedback being given by another dog. If inappropriate posturing or displays are successfully diffused or diverted by another dog, the handler does not need to interfere. Various aversives are used if needed to interrupt inappropriate behavior. Examples of the aversives used include a water squirt bottle, shake can of pennies, or an air horn. The dogs may respond differently to each aversive. The act of playing and socializing with one another is considered a self-rewarding behavior and therefore qualifies as positive reinforcer for social interaction. When the dogs communicate with one another to change or diffuse an interaction, they use a combination of positive punishment and negative reinforcement. The handlers use these techniques as well, to assist in changing or diffusing inappropriate interactions when necessary.

During the play time over the 4 days, some dogs initiated play with a play bow, some ignored each other, and some played chase. Some dogs mounted another dog. On Day 2, a fight broke out between five dogs and had to be interrupted by the lead person via a horn. There was loud vocalization and arguing for a short time. Two of the dogs had to be separated initially by a gate, but all the other dogs resumed playing as though nothing had happened. When the fight was over, there was a 1-inch pink scratch on the inside of the ear of the dog who had been mounting the other dogs. The rest of play group was uneventful. The cortisol levels in the dogs involved in the fight were elevated, as expected, 30 minutes post–play group. Their cortisol levels decreased dramatically 3 hours post–play group. On the other days, the play group was uneventful with the same mix of dogs.

Although there were no differences in cortisol levels between control and experimental groups, the experimental dogs were observed to be calmer after the play-group session at the 3-hour time point. Some of the experimental dogs were lying belly up watching quietly as people walked by looking for an adoptable pet. Although all of the dogs had access to bedding, it was observed that a number of dogs in the control group ripped apart bedding at the 3-hour time point. These dogs did not present relaxed behaviors, and the researchers regarded this behavior as stress.

The researchers did not note any correlation between either breed or sex of the dogs and either cortisol levels or stress behaviors. One dog was coprophagic in the kennel. This particular dog had a history of coprophagia. We did not consider this to be a stress behavior on video analysis. Although there were a few dogs who smeared feces in their kennels, most of their stools were solid. There were no unusual elimination patterns, such as diarrhea, which can sometimes be noted in times of stress. However, a number of dogs (toy breeds) had dry mouths. We attempted to stimulate saliva production through the use of food treats, by keeping them available in a pouch the handler wore, or allowing the dogs to smell food. Some of the dogs increased saliva production with this process, others did not. A small number of sorbettes had blood on them with specimen collection. In reviewing the analysis, the sorbettes tinged with blood did not seem to have an effect on cortisol level results.

**Conclusion**

In this study, we found that cortisol levels varied within groups and across days, but the differences between the control and experimental groups were not significant. Our studies suggest that cortisol may not be the best chemical to monitor for stress in canines, due to the various factors that can affect its level. Literature does show variability in other cortisol studies. The video analysis was helpful in this study in showing stress behaviors in dogs, even though cortisol levels were not significant. A larger sample size, an increased length of play time, and controlled shelter activity may give
more consistent results. One might say that an open shelter is a better test of what would really affect dogs, but it can be challenging to control for extraneous variables.

Monitoring for stress behaviors in kennel situations can be a first step in promoting behavioral health in shelter dogs. Awareness and education for shelter staff regarding kennel stress in dogs can bring about new levels of wellbeing for canines housed in humane societies. Improving behavioral health in shelter dogs can provide more adoptable pets, which, overall, improves the quality of pet behavior in the community.

Acknowledgments

We want to thank the Longmont Humane Society in Longmont, Colorado, their staff and volunteers, and all of the dogs who graciously gave to this study. We also want to thank CampBowWow, Denver, Colorado for funding the supplies for this research and for their dedication and support of scientific research. A heartfelt thanks to Nancy Dreschel DVM, Penn State University, for her expertise in canine salivary cortisol experimentation, her excellence in professionalism, and the many gifts of wisdom and kindness she gives to the animal behavior profession. Thanks to Sharon, Nancy and Mary at Salimetrics Lab for the laboratory support offered to us. Thank you Don Whittemore, for stopping your life, on a dime, to assist us with video and computer work, which took so much longer than we thought. A warm thanks to Richard and Dylan King for assisting in the many hours of video analysis and mathematical formulations. And lastly, thanks to Dr. Frederick Prete for statistical analysis assistance and supervision.

References


Correlates of Coprophagy in the Domestic Dog (*Canis familiaris*) as Assessed by Owner Reports

**Broox G. V. Boze, MS**
Biology Department at Colorado State University

**Abstract**

Coprophagy is a commonly observed behavior in domestic canids but little is known about the motivational mechanisms for feces eating in dogs. Some animals (rodents and lagomorphs) consume feces to recycle gut bacteria. Other animals do so when food is scarce or to aid predator avoidance through reduced foraging. Coprophagy is also seen in captive zoo animals, where poor welfare, stress and poor diet are believed to cause this behavior. Unfortunately, none of these situations describes the conditions under which coprophagy occurs in otherwise healthy canines.

This study uses a self-administered survey to determine what demographic, environmental, and behavioral variables are correlated with coprophagy, and to improve understanding of the motivational mechanisms behind the behavior. It was concluded that behavior and medical health are better predictors of coprophagy than environmental factors. Neutering drastically increases the prevalence of coprophagy for male dogs but spaying has no effect on females. This study shows that dogs with anxiety or oral disorders (pica and plant eating) engage in coprophagy more than their healthy counterparts, indicating that coprophagy may also be a comfort-seeking or pleasurable act that temporarily alleviates stress.

**Introduction**

Almost one-half of the domestic canine population consumes feces at some point in their lives (Boze, 2008, pp. 22–28). Coprophagy is not seen in wild canines except when bitches eat the feces of their pups (Houpt, 1982, pp. 683–691), coyotes (*Canis latrans*) eat the feces of an intruder and replace it with their own as a territorial display (Livingston, Gipson, Ballard, Sanchez, & Krausman, 2005, pp. 172–178), or ungulate feces are consumed for their antioxidant and immunostimulant properties (Houpt, 1982, pp. 683–691; Negro et al., 2005, pp. 807–808). The majority of feces-eating acts in domestic canines do not occur under these circumstances, nor does coprophagy aid in digestion or the health of the canine, making this behavior difficult to explain. Coprophagy has not been studied in feral dogs, and coprophagic events documented in wild canines are mentioned only in passing. For example, Zarnke et al. (2001, pp. 740–745), in a study of parvovirus and coronavirus transmission, observed consumption of frozen feces by wolves and suggested it may be the reason for increased antibody loads in the winter but did not explore that behavior.

There are two basic types of feces-eating behavior: caecotrophy, the ingestion of specific feces types (soft or hard pellets from animals whose digestive tract separates material into that which is complete waste and that which retains some nutrients or recyclable material); and coprophagy, a more general term referring to the consumption of feces from animals with only one type of feces. While coprophagy can describe the consumption of all fecal types, it can also be divided into subcategories, including autocoprophagy, where the animal eats its own feces, and allocoprophagy, where feces of a conspecific are consumed (Galef, 1979, pp. 295–299). For simplicity, coprophagy is used in this article to describe the consumption of all feces types, including that of other species.

Despite the frequency of coprophagic behavior in dogs, little is known about the motivating factors associated with it. Many owners, disgusted by feces eating, go to great lengths to prevent it. Owners will systematically add hot sauce or meat tenderizer to excrement to
deter consumption through taste aversion (Boze, 2008, pp. 22–28) or provide oral dietary supplements such as Deter® or Forbid® to aid digestion and make feces less desirable. Others try physical barriers like muzzles to prevent access to feces. Some owners even relinquish their pet or have it euthanized when attempts to prevent feces eating are unsuccessful. Unfortunately, veterinarians lack the necessary resources to advise clients, since the behavioral motivation is so poorly understood.

Myriad hypotheses attempt to explain this behavior, but supporting data are minimal. Adult canine coprophagy may be sustained by influences such as anxiety, boredom, and stress from limited territory or nutritional and psychological deficiencies. An imbalanced diet or pancreatic enzyme deficiency could trigger coprophagy as animals attempt to acquire the proper nutrients (Hart & Hart, 1985, pp. 123–124). In other cases, coprophagy is presumably sustained because the accompanying attention encourages the dog’s unwanted behavior (Wells, 2003, pp. 51–53). Coprophagy may also be an exploratory behavior that increases with age.

Coprophagy is well documented in both wild and captive primates. It is remarkably more prevalent and occurs under more varied circumstances in captive chimpanzees (Pan troglodytes) than in wild chimpanzees. This increase is attributed to poor habitat, welfare and lack of environmental stimulation (Fritz et al., 1992, pp. 313–318). Many animals become unresponsive to their captive environment and show decreased motor performance and motivation. To deal with the boredom, some individuals attempt to increase environmental stimulation by engaging in behaviors such as coprophagy (Fritz et al., 1992, pp. 313–318). Evidence suggests that dietary changes can reduce the frequency of coprophagy in captive lowland gorillas (Gorilla gorilla gorilla), but the mechanism leading to its development and maintenance is not completely understood (Lukas, 1999, pp. 237–249). While some animals include feces in their diet when food is limited or during certain life stages, others practice coprophagy as a part of their natural metabolic cycle. This is not the case for primates or canines.

This study uses owner-reported observations to identify the behavioral, demographic, and environmental factors associated with coprophagy in the domestic dog (Canis familiaris).

Materials and Methods
Participants and Distribution
A self-administered survey containing questions about canine demographics, environment, health, and behavior was completed by 632 dog owners. All 632 surveys were used in analysis and comparative studies. The canine population in this study was assumed healthy based on vaccination records and assessment of several common symptoms that are indicative of digestive disorders (dry heaving, chronic diarrhea or vomiting, pica, and food allergies). Rabies and distemper vaccinations were current in 95% of the dogs, and 85% of the dogs were spayed or neutered. A variety of pure-bred and mixed-breed canines from 2 months to 21 years of age were included in the sample, with slightly more females (56%) than males (44%).

Data were collected from three sources: dog parks, a veterinary hospital, and an online survey. Four hundred and sixty-six responses were received online using SurveyMonkey® software, and 166 were collected at Countryside Animal Hospital, and Pine Ridge and Fossil Creek dog parks in Fort Collins, Colorado.

A web-based electronic link to the survey was distributed through online message boards and chat programs devoted to specific breeds and general dog care. Message boards included Yahoo, Google, and America Online citations, along with www.dog.com, www.forum.dogs.com, and www.ILoveDogs.com.

Surveys were collected at physical sites on both weekdays and weekends, during daylight hours. Every individual who entered the park during an observational period was asked to complete a survey, and every individual asked to
participate did so to completion. Respondents were asked to complete a survey about animal behavior, with no indication the study was about coprophagy. Respondents having more than one dog completed a separate survey for each dog.

**Survey Design**

The survey contained 52 questions in four general categories (Demographics, Environment, Care and Feeding, and Behavior). A total of 15 questions were open-ended, 25 were multiple choice, and 12 used a rating scale.

**Demographics:** Owners reported the dog’s weight, sex, whether the dog was intact or not, breed, age, number of animals in the household (dog, cat, other), number of dogs in adjacent homes, and number and age of humans in the residence. Because only a few respondents included the age of household members, this question was discarded. Presence of other animals was also removed during analysis because of the small sample sizes for individual types of animals. Owners reported their dog’s breed, if known, which was classified by the standard American Kennel Club category for analysis. Other breed differences analyzed include face shape, leg length, herding and nonherding, sight versus scent hounds, dogs bred for guarding, and mixed-breed versus pure-bred dogs.

**Environment:** Owners reported their residence type and the area (in square feet) of both indoor and outdoor space available to the canine. They further reported the presence of a dog door in the home, percentage of time the dog spent outside, hours the dog spent alone per day, amount of human interaction with the dog (divided into several activity types), time spent exercising, and presence of toys believed to enrich the dog’s environment (Houpit, 1985, pp. 248–261; Loveridge, 1998, pp. 101–113).

**Care and Feeding:** Information was gathered on each dog’s vaccination record; presence of common disorders; types, proportions and frequency of feeding (dry or canned food, table scraps, other); and administration of vitamin or enzyme supplements.

**Behavior:** Owners reported the presence or absence of coprophagic behavior, their level of concern about the coprophagy, and the frequency with which their dog attempted to consume various types of feces.

**Statistical Analysis**

A chi-square test for categorical data showed no difference in presence of coprophagy between data collection locations ($\chi^2 = 3.270$, $p = 0.351$), and data were pooled for analysis. The focal animals of this research are coprophagic canines, with noncoprophagic canines serving as a control. Unless stated otherwise, binary regression was used to test the effects of continuous variables on the presence of coprophagy, and multiple logistic regression was used to test the effect of several variables on each other and coprophagy at the same time. All statistical analyses were carried out using SPSS for Windows (Version 11.5).

**Results**

**Demographics**

Both pure-bred and mixed-breed canines between the ages of 2 months and 21 years, with a mean age of $4.8 \pm 3.48$ years ($N = 632$), were included in this study. Logistic regression analysis showed that age was not a good predictor of coprophagy ($p = 0.763$, odds ratio = 1.001), with approximately equal proportions of coprophagic and noncoprophagic dogs in different age categories (see below). The hypothesis that puppies engage in exploratory coprophagy more frequently than adult canines is not supported by these data. Nor is there support for the hypothesis that coprophagy is more common in older dogs. Percentages of coprophagic canines in five age categories, with confidence intervals, are shown in Figure 1.
Figure 1. Proportion of coprophagic dogs within five age categories.

Coprophy correlates positively with sex and sexual status. The proportion of intact female dogs currently engaging in coprophagy is greater than that for intact males. Neutering appears to increase the proportion of coprophagic dogs from 34% to 55.8%; while spaying does not alter the proportion of coprophagy in female dogs (Figure 2). The effect of sex and sexual status on the presence of coprophagy was tested using multilayered chi-square analysis.
Although logistic regression shows that a dog’s weight is a significant predictor of coprophagy, it does not follow a linear trend. An in-depth analysis, with weight categories based on pharmaceutical standards (0–10, 11–25, 26–50, 51–100, and 101+ pounds), provides better detail (Table 1). Coprophagic dogs, averaging 53 pounds, are slightly heavier than noncoprophagic dogs, averaging 46 pounds. Of the 51–100-pound dogs, 59.2% are coprophagic, compared with 43.8% ± .02% of other dogs.

<table>
<thead>
<tr>
<th>Weight (pounds)</th>
<th>Number of dogs</th>
<th>Percentage coprophagic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–10</td>
<td>62</td>
<td>43.6</td>
</tr>
<tr>
<td>11–25</td>
<td>158</td>
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<td>51–100</td>
<td>239</td>
<td>59.2</td>
</tr>
<tr>
<td>Above 100</td>
<td>48</td>
<td>45.2</td>
</tr>
</tbody>
</table>

Two individual breed groups were analyzed to test for obesity versus size. Golden retrievers (N = 22) and labrador retrievers (N = 21) were the most common breeds in the study and were pooled for analysis. Individuals within these two categories that exceeded the standard weight specified for breed and sex were compared with those in the normal range (60–80 pounds for males, 55–70 pounds for females). There was no significant difference in coprophagy between overweight and average-weight dogs (p = 0.270, N = 23).

To test for effect of size within breeds, dogs were divided into the standard American Kennel Club groupings (hound, herding, toy, working, sporting, nonsporting, and terrier). Sporting dogs, the most common class in the 51–100-pound range, were more likely to be coprophagic than other dogs in the study, with a frequency of coprophagy of 67%. Other breeds demonstrated a consistent frequency of coprophagy, averaging 45.9%.
Environment

Coprophagy does not appear to be a territorial behavior for domestic canines. When tested as single variables, coprophagy is not altered by the presence of other canines in the dog’s primary residence ($\chi^2 6 = 4.617, p = 0.929$) or in adjacent households ($p = 0.229$, odds ratio $= 1.038$). The hypothesis that dogs engage in same-species coprophagy when feces are more readily available is not supported. Neither the amount of time spent outside ($p = 0.85$, odds ratio $= 0.99$) nor the frequency of feces removal from the yard ($\chi^2 4 = 2.860$, $p = 0.75$), both of which increase canine encounter rates with feces, is significantly related to coprophagy.

Table 2. Percentage coprophagy based on feeding schedule.

<table>
<thead>
<tr>
<th>Times fed per day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 or more</th>
<th>Free feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage coprophagic</td>
<td>43.1</td>
<td>50.8</td>
<td>53.6</td>
<td>42.8</td>
<td>46.0</td>
</tr>
</tbody>
</table>

Care and Feeding

The majority (89%) of domestic dogs in this study were fed dry food with supplemental wet food, table scraps or fresh meat. Dogs fed on a schedule (537 of 632, 84.9%) versus those that free-fed ate an average of 1.9 $\pm$ 0.53 times per day. There was no difference in the presence of coprophagy based on feeding schedule alone ($\chi^2 4 = 2.47$, $p = 0.89$); see Table 2. There was also no difference in coprophagy based on regular vitamin or enzyme supplements in the diet ($\chi^2 1 = 0.32$, $p = 0.57$), suggesting that coprophagy is not a dietary disorder.

Coprophagy appears to be associated with oral and digestive disorders. Coprophagic dogs also engage in pica, a disorder in which an animal has an appetite for nonfood items. Ten percent of coprophagic dogs consume foreign objects, compared with 4.7% of noncoprophagic dogs. While plant eating is considered a type of pica, it was separated from pica in this study and found to be more common in coprophagic dogs.

Anxiety disorders, often associated with pica, were reported more frequently in dogs consuming feces of other canines. This does not hold true for general feces eaters or canines who consumed herbivorous animal feces. The causes of anxiety in dogs who consumed canine feces are unknown. Table 3 shows the relationship of coprophagy with several symptoms associated with digestive disorders and unwanted behaviors (dry heaving, chronic diarrhea, vomiting, plant eating, food allergies, pica and anxiety disorders).
Table 3. Relationship between coprophagy and common disorders in *Canis familiaris*.

<table>
<thead>
<tr>
<th>Disorder</th>
<th>All feces-eating dogs (N = 632)</th>
<th>Dogs eating dog feces (N = 162)</th>
<th>Dogs eating feces of herbivores (N = 138)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p (% coprophagic with disorder, % noncoprophagic with disorder)</td>
<td>p (% coprophagic with disorder, % noncoprophagic with disorder)</td>
<td>p (% coprophagic with disorder, % noncoprophagic with disorder)</td>
</tr>
<tr>
<td>Dry heaving</td>
<td>0.115 (5.1, 8.4)</td>
<td>0.038 (1.4, 9.1)</td>
<td>0.081 (2.7, 10.9)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>0.571</td>
<td>0.734</td>
<td>1.00</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0.205</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Plant eating</td>
<td>0.017 (17.7, 11.2)</td>
<td>0.289 (12.5, 6.9)</td>
<td>0.313 (16.2, 9.4)</td>
</tr>
<tr>
<td>Food allergy</td>
<td>0.159</td>
<td>0.155</td>
<td>0.631</td>
</tr>
<tr>
<td>Pica</td>
<td>0.006 (10.6, 4.7)</td>
<td>0.734 (6.6, 4.6)</td>
<td>0.339 (9.5, 4.7)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.559 (14.1, 12.5)</td>
<td>0.037 (20.0, 8.0)</td>
<td>0.637 (13.5, 17.2)</td>
</tr>
</tbody>
</table>

Note. Shaded boxes indicate significant relationships (p < 0.05) between coprophagy and given disorder. p-values are for one-way analysis of variance.

Although human interaction is extremely important to the health and wellbeing of domestic canines (Houpt, 1985, pp. 248–261), no type or amount of human interaction—including exercise, training, or play—is significantly related to the presence of coprophagy (Table 4).

Table 4. Regression results for human interaction variables and their effect on coprophagy.

<table>
<thead>
<tr>
<th>Type of human interaction</th>
<th>Odds ratio</th>
<th>Significance (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time dog spends alone</td>
<td>0.934</td>
<td>0.218</td>
</tr>
<tr>
<td>Interaction time with human (independent of interaction type)</td>
<td>1.00</td>
<td>0.738</td>
</tr>
<tr>
<td>Amount of exercise</td>
<td>1.004</td>
<td>0.124</td>
</tr>
<tr>
<td>Amount of training</td>
<td>1.002</td>
<td>0.423</td>
</tr>
<tr>
<td>Time playing fetch</td>
<td>1.000</td>
<td>0.900</td>
</tr>
<tr>
<td>Time playing tug</td>
<td>1.002</td>
<td>0.398</td>
</tr>
</tbody>
</table>

**Discussion**

Behavioral and medical indicators appear to be better predictors of coprophagy than environmental ones. A survey-based study is limited to identifying correlated variables and cannot identify or prove causation of coprophagy.

**Behavioral**

Dominant behaviors are known to decrease in castrated males (Hart, 1991, pp. 1204–1205). However, coprophagic behavior did not seem to change with castration in males. Future research should address coprophagy in the context of dominant or control-seeking behavior, with physical observation of temperament and associated anxiety-related disorders in coprophagic dogs. Alternative experiments could be done in other species exhibiting well-established social hierarchies or easily observable aggression (cockroaches, rabbits, rats, etc).

The hypothesis that puppies engage in coprophagy as an exploratory behavior more frequently than older dogs (McKeown, Luescher, & Machum, 1988, pp. 849–850) is not supported. If age were a motivating factor for coprophagy, dogs less than 6 months of age and 6 months to 1 year would have exhibited greater
coprophagic behavior, but this was not the case (Figure 1). It is possible that puppies engaging in this behavior prior to 8 weeks of age would not have been captured by this study.

Environmental

None of the environmental indicators studied were significant predictors of coprophagy. Neither lack of human interaction nor poor environment (defined as lack of toys, minimal exercise and play) correlated with coprophagy. While sociality with humans (Houpt, 1982, pp. 683–691), availability of manipulatable toys (Houpt 1985, pp. 248–261; Loveridge, 1998, pp. 101–113), available space (Beerda, Schilder, Van Hoof, de Vries, & Mol, 1999, pp. 233–242), and exercise do not show positive correlation with coprophagy, they are important to general canine health and wellbeing. The results were surprising because data on treatments and prevention of coprophagy indicate that human interaction—through preventing access to feces, rewarding good behavior, and distraction—are the most effective ways to prevent coprophagy (Boze, 2008, pp. 22–28). However, the dog owners in this study were at a dog park, a veterinary office or an online email list about dogs, possibly biasing the sample toward more dedicated pet owners. This sample may not adequately represent the lower end of the spectrum, and another sampling methodology may better represent the more barren environments and less-than-ideal pet care practices.

It is difficult to determine if opportunity or availability of feces best predicts coprophagy because opportunity was defined as the frequency with which feces were removed from the yard. Opportunity is presumed to be inversely related to the frequency with which feces are removed. However, many owners remove dog feces from their yard, but other animals’ feces may be encountered outside the yard and/or on walks, which is unrelated to the rate of removal. It is therefore possible that availability and opportunity data only address the consumption of canine feces and not those of other animals. Data did show that dogs living with cats were more likely to consume feces (regardless of type) than those who do not live with cats. This is not seen in the previous test for opportunity because cats frequently excrete in different locations from dogs. Thus, opportunity may predict coprophagy but it cannot be systematically evaluated based on the frequency of feces removal from the yard. Because dogs consume many types of feces, future research should focus on types of feces and the locations in which dogs would have access to them.

Diet and feeding schedule are frequently regarded as primary causes of coprophagy (Hart & Hart, 1985, pp. 123–124; Meriweather & Johnson, 1980, pp. 774–775; Read & Harrington, 1981, pp. 984–991). More recent research on diet and coprophagy is limited. Westermark and Wiberg (2006, pp. 225–229) focused on pancreatic enzyme deficiency but found no relationship. The lack of relationship between enzyme supplements and coprophagy in this study is consistent with Westermark and Wiberg’s findings. There was also no difference in coprophagy based on the frequency of feeding. It is possible, of course, that diet affects coprophagy in ways that cannot be addressed by this dataset (e.g. nutritional content of food).

Medical

Vaccination histories were incomplete since unvaccinated dogs are indistinguishable from dogs with unknown medical histories. It could be assumed that owners who did not know if their dog had never been vaccinated would not affect the other variables significantly. Because this was used only for determining general health, it should not affect the analysis of coprophagy and its correlated behavioral and environmental factors.

Houpt (1982, pp. 683–691) demonstrated that it is not uncommon for female canines to eat the feces of their young, whereas males rarely do. This research found no effect of sex on coprophagy when tested as a single variable. It has been previously shown that spayed and neutered dogs demonstrate behavioral characteristics associated with normal sex roles (Hart, 1991, pp. 1204–1205). However, behaviors minimized with castration are more pronounced in males than females and can include urine marking, mounting other animals,
and aggressive fighting (Hart, 1991, pp. 1204–1205). Behaviors not altered by neutering include barking, hunting, playfulness, and affection seeking (Hart, 1991, pp. 1204–1205). Sexual status (castrated versus intact), like sex, when tested alone, did not affect the frequency of coprophagy. When sexual status and sex are tested as interaction variables, data support Hart’s 1991 finding that castration affects males more than spaying affects females. Castration increased the percent of comphagic males dogs from 34% to 55%, while spaying caused only a small, insignificant change in females.

Neutered males more affected by the hormonal changes associated with castration (Hart, 1991, pp. 1204–1205) may use coprophagy to search for testosterone. While beyond the scope of this research, the effect of testosterone on motivation for coprophagy could be tested with physical assays of testosterone levels in feces and consumption preference of both neutered and intact males.

In order to test for effects of medical health on coprophagy, dog owners were asked to report the presence of seven symptoms or behaviors that could indicate gastrointestinal and overall health (dry heaving, chronic diarrhea, chronic vomiting, ingestion of plant or dirt material, food allergies, pica, and anxiety or stress disorders). Definitions of stress disorders, while usually self-explanatory, were left open to owner interpretation. Because owners reported only the presence of a symptom or disorder, correlations with intensity were not possible; this may be illuminating in future studies.

Anxiety and stress disorders were more common in coprophagic dogs. The most common disorder was separation anxiety (a strong attachment to a single individual and distress when separated from that individual), often considered an extreme manifestation of the dog’s social nature (King et al., 2004, pp. 233–242). Dogs exhibited distress through increased urination/defecation, vocalization, and destruction. This research supports the inclusion of coprophagy to that list.

Behaviors associated with anxiety in dogs are similar to those of submission. Both anxious and submissive dogs will avoid encounters with other dogs and stay close to an individual they see as a “protector.” Future research should observe the focal canines and ask the owners about behaviors that represent anxiety and submission.

Dogs with oral disorders frequently engaged in coprophagy. Pica and plant eating are more common in coprophagic dogs. Within the more specific groups (dog-feces eaters, herbivorous-feces eaters), a similar but nonsignificant trend was seen, perhaps because of the small sample size. Literature suggests that the causes of pica are similar to those of coprophagy, but neither behavior is well studied. Suggested causes of pica include dietary deficiencies, boredom, an extension of juvenile behaviors, or attention seeking. None of these hypotheses have been experimentally tested. Beecroft, Bach, and Turnstall (1998, pp. 638–641) suggest that pica is related to cognitive and neuropsychological deficits and may be a symptom of anxiety as well. To fully understand coprophagy, additional investigation of pica and its relation to anxiety, submission, and boredom are necessary.

Acknowledgements

I would like to thank Janice Moore, Sarah Bevins, and Charles Stone for thoughtful discussions on the topic of feces eating. I would like to recognize Stacy Hines-Lambiasi for her help with data collection and Jennie Jamtgaard for introducing me to the concept of coprophagy and many hours of assistance and support. I couldn’t have completed this project without the statistical guidance of Michael Lacy and editorial help of Betsy Boze.
References


Behavior Science to Practice: Connecting the Dots

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Introduction

The goal of this collection of four papers is to increase veterinarians’ knowledge and practice of applied behavior analysis in their work with patients and clients. Applied behavior analysis (ABA) is the technology of behavior change based on the experimentally derived principles of learning and behavior. Three features distinguish ABA from other behavior technologies: 1) the primary focus is the functional relations between observable behavior and environmental events; 2) the primary explanatory principle is the law of effect, which states behavior is a function of its consequences; and 3) the primary interventional goal is to redesign the environment in order to provide the animal with an alternative way to achieve the same purpose served by the problem behavior, and to teach new skills to make the problem behavior less likely to occur.

ABA has its roots in Skinnerian behaviorism, which historically suffers a serious image crisis. This is partly due to the obstacles discussed below, and ultimately due to a shallow understanding of it. Addressing the elephant in the room, Staddon (2000) wrote, “Behaviorism is frequently declared dead. But, although services are held regularly, the corpse keeps creeping out of the coffin.” Behaviorism, more currently known as behavior analysis, continues to stand the test of time because it continues to pass the test of good science: it is based on testable hypotheses (verifiable); it explains a wide range of behaviors (inclusive); it has good predictive utility; it is parsimonious; and it is useful (brings about positive behavior change across species). As with all other sciences, the behavior analysis of today is not the same as 100 years ago. The study of learning has advanced due to the process of self-correction unique to science. This process is the result of systematic methods; public, peer review; and verification across independent researchers. Self-correction gives us confidence that, although any particular science finding may be corrected some time in the future, it is the best information we have today (see current findings on the relationship between environmental events and gene expression for a dramatic example of the self-correcting process of science; Massachusetts Institute of Technology, 2008).

Behavior analysis contributes an essential piece to the behavior puzzle, and ABA provides a behavior change technology no veterinarian working with behavior should be without. However, ABA is not well known or practiced, despite its longstanding science foundation and widespread, cross-species applicability. Instead, behavioral advice is often based on personal recipes derived from little more than untestable folk wisdom and everlasting cliches. Clearly, some personal recipes are effective. However, explanations about why they work are often phantasmagorical, and the result is continued poor practices (e.g., dropping a parrot reduces biting because the parrot concedes the dominant alpha role to its human owner). With all that ABA offers, what accounts for the difficulty connecting the dots from behavioral science to practice?
Obstacles to Connecting the Dots

Cultural Fog

In 1944, Gunnar Myrdal (Myrdal, 1944), wrote:

A handful of social and biological scientists over the last 50 years have gradually forced informed people to give up some of the more blatant of our biological errors. But there must be still other countless errors of the same sort that no living man can yet detect, because of the fog within which our type of Western culture envelops us.

Culture refers to the collective attitudes and behaviors that are characteristic of a group and socially transmitted from one generation to another. Generally, when it comes to understanding (explaining) behavior, Western culture has us looking in the wrong place, namely, inside the animal, independent of the conditions in which the animal behaves. Theology points to internal forces (the devil made me do it); biological determinism points to an individual’s genes (he inherited his stubbornness from his father); and some approaches to psychology point to the psyche (he has a weak superego). Yet the cultural influences that have us searching inside an animal to explain its behavior fly in the face of what each one of us knows, empirically, to be true: no-one keeps bumping into the same wall over and over again. If you bump into the wall when searching for the door, the consequence of that action (e.g., a headache or late arrival to the next location) produces a change in your behavior and you keep changing your behavior until you find the door. The next time you exit the room, you go directly to the door. As explained by Paul Chance (Chance, 2006), “Learning does not give the species the tendency to behave a certain way in a particular situation; rather it gives the individual the tendency to modify its behavior to suit a situation. It is an evolved modifiability.” Even bacteria (from the kingdom monera, although this taxonomy is in flux) change what they do as a function of outcomes. In 1906, Jennings (Jennings, 1906) wrote:

The movements of the bacteria are not unordered, but are of such a character as to bring about certain general results, some of which at least are conducive to the welfare of the organism. If a bacterium swimming in a certain direction comes against a solid object, it does not remain obstinately pressing its anterior end against the object, but moves in some other direction.

This ability to change one’s behavior based on experience may be “the crowning achievement of evolution” (Chance, 2006). Indeed, behavior is a tool used by each individual to affect, and be affected by, its environment. Behavior isn’t found inside the animal with behavior problems; it is found in the interplay between behavior and the conditions in which the animal behaves.

The Madness of Causes

Another obstacle to scientific thinking about behavior is what Matt Ridley calls “the madness of causes” (Ridley, 2003). He wrote, “when you catch pneumonia the bacterium is only an opportunist, your immune system usually needs to be run down first by starvation, hypothermia or stress. Is that the ‘true’ cause?” There are many causes of behavior, from the molecular to the environmental, and many sciences investigating them. Each one represents a different level of analysis with its own focus and methods. Each one contributes a different piece to the behavior puzzle—that is, the correlates of behavior. It is the nature of the problem that ultimately determines which disciplines we turn to for behavior solutions. This makes interdisciplinary work vital to the health and welfare of patients and clients.

In veterinary practice, three disciplines commonly converge around the subject of behavior. They are ethology, medicine and behavior analysis. Each discipline uses a different model for research and practice: the model matters. If you ask an ethologist, a veterinarian, and a behavior analyst why a parrot does a particular behavior, you will likely get three different answers. The ethologist typically focuses on the evolutionary model, with natural selection of adaptive genes as the primary
explanatory variable. She/he may reframe the question as, “In what way does the behavior improve this species’ survival in the wild?” The veterinarian typically focuses on the medical model, with biophysical or biochemical dysfunction as the primary explanatory variable. She/he may reframe the question as, “What underlying disease or disorder accounts for this behavioral symptom and what is the cure?” The behavior analyst typically focuses on the behavioral model, with behavior–environment interactions as the primary explanatory variable. She/he may reframe the question as, “What function does this behavior serve the animal, and how can we change the environment to change the behavior and teach new skills?”

Both ethology and medicine have essential roles in improving the lives of captive animals. Ethology informs us about the fit between a species’ natural history and the captive environment we provide. The medical model accounts for some devastating diseases with behavioral correlates. However, given a physically healthy animal, in a reasonably well-arranged environment, most behavior problems are the result of clients’ inadvertent reinforcement of the wrong behavior and insufficient knowledge of how to do otherwise. Even when ethological or medical issues are identified, behavior problems often exist independently of them. And neither the ethological nor medical models directly address the specific conditions under which an animal can learn. It is this piece of the behavior puzzle for which behavior analysis is best suited.

**Terminology Tumult**

Terminology tumult, fostered by the use of hypothetical, psychological constructs and vague labels, is also an obstacle to the widespread adoption of behavior science. The ABA definition of behavior is what an animal does, given certain conditions, which can be measured. External observers can’t verify private behaviors, such as thoughts and emotions, and so the main focus of ABA is necessarily overt, public behavior and environmental conditions. The focus on observable behavior does not discount animals’ cognitions and emotions. It represents adherence to the most fundamental standard of scientific practice: measurability. As measurement technology improves, it may be that internal correlates of behavior, such as changes in heart rate, can improve our work with certain species and behavior problems.

Behavior is not hypothetical, psychological constructs or vague labels. Constructs are concepts and abstractions, used to describe commonalities among observed phenomena. When a concept is incorrectly regarded as a tangible thing, it has been reified. The history of psychology is littered with reified constructs used to explain behavior (see Stephen Jay Gould’s *The Mismeasure of Man* for an excellent treatise on reified constructs). For example, it is common for people to state that an animal’s failure to learn a behavior is caused by low intelligence, screaming is caused by neurosis, and inactivity is caused by lack of motivation. But how can a concept cause behavior? Hypothetical, psychological constructs are only placeholders for neuro-processes not yet understood. Even when these processes are known, no account of behavior will be complete without behavior–environment relations.

The dominance construct is a prime example of the reification fallacy. In popular magazines and Internet sites, the various pseudo-causes of parrots’ biting are height dominance, cage dominance, food dominance, flock dominance, gender dominance, floor dominance, phone dominance, and Super Male (for the bird with more than a few dominances). But what behavior and conditions are described by this concept? If we teach a bird to step up reliably from all locations by delivering reliably positive outcomes for the bird, have we cured its dominance?

Even ordinary labels like mean, stubborn or friendly can be problematic. Friendly is not a behavior an animal can do. Friendly is an adjective that describes a class of behaviors under certain conditions. However, we can train a bird to step onto a stranger’s hand when requested, perch in a calm manner on that hand, and accept some petting. When a bird
demonstrates these behaviors, we call it friendly. Constructs and labels have the following inherent weaknesses:

- They cannot be tested; therefore they are unverifiable.
- They foster self-fulfilling prophecies; you will get what you expect.
- They provide excuses to get rid of the animal; it’s a defective bird.
- They increase the use of ineffective training strategies; “I’ll show him who’s boss.”
- They give a false sense of understanding the problem, when we’ve only given it a name.
- They end the search for actual causes we can do something about; we can’t change the bird’s genes, so game over.

Another reified construct is instinct (i.e., the ascribed “cause” of behavior that is inborn, performed automatically without learning). Instinct is often used to explain any behavior observed in the wild. However, it is clear that, in addition to the awesome innate behavioral repertoires of wild animals (i.e., simple reflexes and modal action patterns), they also have huge dynamic, learned repertoires that are maintained in the wild environment by the same principles that maintain behavior in captivity. Further, a plethora of recent research demonstrates the significant learning component in many behaviors once thought wholly innate; for example, Berger’s research with moose on the learned fear of predators (Berger, 2007), and Gros-Louis’ research on the learned vocalizations of male cowbirds (Gros-Louis, West, Goldstein, & King, 2006). Even as early as 1930, Kuo demonstrated the relationship between the early learning history of kittens and subsequent hunting of rats (Kuo, 1930).

**Conclusion**

Behavior is a natural phenomenon, part of the physical world; thus, our knowledge of it can and should be based on scientific methods. Behavior analysis is the scientific study of the natural laws that govern behavior change due to experience, i.e., learning. ABA is the extension of these laws to prevent and solve practical behavior problems. It is a technology of behavior change or, conversely, a teaching technology. Although learning is often treated as a process outside of an animal’s biology, it is the nature of animals to maintain, or change, what they do based on the outcomes of doing it. “Through learning, an organism can cope with changes in the environment for which its innate behavior is inadequate” (Chance, 2006). ABA is currently underrepresented in veterinary preparation and practice, compared with the medical and ethological behavior models. By removing the obstacles to connecting the dots from behavioral science to practice, veterinarians can add a sharp set of tools to their current toolbox, with which to humanely improve the lives of all species.

**References**


Functional Assessment: Predictors and Purposes of Problem Behavior

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Introduction

“Any intelligent fool can make things bigger and more complex... It takes a touch of genius—and a lot of courage—to move in the opposite direction.” Albert Einstein

Hidden in the complex world of behavior science is a simple fact, which is that there is never just behavior. Behavior doesn’t occur in a vacuum independent of conditions, or spray haphazardly from organisms like water from a leaky showerhead. Behavior always depends on the environment in some way. Influential environmental stimuli or events can occur before and after behavior, referred to as antecedents and consequences, respectively. Functional assessment is the process of developing hypotheses about the functional relations among antecedents, behaviors and consequences—the ABCs. The hypothesis generated from a sound functional assessment improves our understanding of behavior and our ability to predict it. Functional assessment also improves the interventions we design to decrease problem behavior, increase appropriate alternative behaviors, and teach new skills.

Terminology Tumult Again

Respondent and operant responses are two basic types of behavior that depend on environmental events in different ways. Respondent behaviors are defined by their dependence on the presentation of certain antecedents, i.e., the stimuli or events that occur before the behavior occurs. Respondent behaviors are innate in the sense that they are performed automatically, given the presentation of the eliciting stimulus. For example, a puff of air directed at an animal’s eye automatically elicits a blink (A causes B). In contrast, operant behaviors are defined by their dependence on consequences, the stimuli or events that happen after they occur. Operant behaviors are not automatically elicited; rather, they occur at some frequency and are strengthened (increased) or weakened (decreased) depending on the consequences the behaviors produce (B is a function of C). For example, a parrot may increase the frequency of whistling as a function of the vocal responses from caregivers that whistling produces.

There is a lot of confusion about these two types of behavior that is beyond the scope of this paper. However, to correct two common errors, note that operant behavior is not the result of mechanistic, stimulus–response relations (that defines the respondent class of behaviors called reflexes) and respondent behavior is not always simple (e.g., modal action patterns such as food procurement, reproduction, care and rearing of young, and defense, which are a function of eliciting antecedents called releasers). The main focus of functional assessment is operant behavior, as so many problem behaviors are the result of poor antecedent arrangements and inadvertent reinforcement.

Antecedents, Behavior, Consequences

With operant behavior, the smallest unit of analysis is the three-term contingency antecedent–behavior–consequence, or ABC. No smaller unit has meaning because there is never just behavior. Behavior is defined as what an animal does, given certain conditions, which can be measured. Hypothetical, psychological constructs or vague, diagnostic labels are not themselves behaviors; they are descriptions of behavior that are often barriers to understanding and changing behavior. The main focus of
functional assessment is necessarily overt, public behavior and environmental conditions because external observers can’t verify private behaviors, such as thoughts and emotions. This focus on observable behavior does not discount animals’ cognitions and emotions. It represents adherence to the most fundamental standard of scientific practice: measurability. As measurement technology improves, it may be that internal correlates of behavior, such as changes in heart rate, can improve our work with certain species and behavior problems.

Consequences are the engine that drives the future strength of operant behavior, the very purpose of behaving; antecedents are the signposts that signal the behavior–consequence (BC) contingency immediately ahead. For example, an offered hand (A) may set the occasion for a parrot to step up (B), which results in attention (C). Over time, stepping up may increase as a function of attention, in the presence of an offered hand. The offered hand is a predictor of stepping up, and attention is the purpose the behavior serves. This parrot doesn’t step up because it’s sweet; it’s called sweet because it steps up. For another parrot, an offered hand (A) may signal a different BC contingency—stepping up (B) results in confinement in a cage (C). For this second parrot, stepping up may decrease as a function of confinement in the cage, and the offered hand may predict biting instead to serve the purpose of escaping confinement in the cage. This bird doesn’t bite because it’s territorial; it’s called territorial because it bites. Behavior is selected by consequences. Behaviors that produce desired outcomes are repeated; behaviors that produce aversive consequences are modified or suppressed. Behavior is a purposive tool, part of every animal’s biological endowment, used to affect the environment.

**Functional Assessment**

Functional assessment requires observation skills that clients can quickly develop. The following key questions help focus their observations on the ABCs:

- What does the problem look like in terms of actual behavior, i.e., what do you see?
- Under what conditions does your animal do this behavior, i.e., what events predict it?
- What does your animal get, or get away from, by emitting this behavior?
- Under what conditions does your animal not do this behavior, i.e., when is it successful?
- What do you want the bird to do instead?

The answers to these questions will improve clients’ understanding of the problem behavior and their ability to predict and change it. Examining the ABCs reveals that there are no problem behaviors; there are problem situations. The problem behavior is only one element of problem situations. The other two elements, occasion-setting antecedents and functionally related consequences, are environmental elements that can be changed. Through the process of functional assessment, caregivers are better prepared to take responsibility for their birds’ problem behavior and then change conditions that maintain it. Without this information, we may inadvertently make the problem behavior worse with a faulty solution. For example, it is not uncommon for a parrot to lower the volume of its vocalizations in response to soft human sounds. This observation has led to the commonly proffered advice to redirect a screaming parrot by whispering to it. The functional assessment looks like this: client enters room (A), the parrot screams (B), and the client whispers (C). From this functional assessment we can see that the client’s whispers follow the parrot screams and, therefore, may inadvertently increase screaming. A different, more effective strategy would be to whisper before the parrot screams to prevent it from occurring in the first place. This alternative functional assessment looks like this: client enters room whispering (A), parrot vocalizes with a lower volume (B), and client praises and opens cage door (C).

**Considerations for Designing a Behavior Change Plan**

Reducing problem behaviors is not the only goal when planning an intervention. A good plan is one in which the physical and social context of the environment is redesigned to provide the animal with an opportunity to preserve the
function served by the problem behavior with an acceptable alternative behavior, and to allow the animal to learn new skills that make the problem less likely to occur. The focus on preserving the function of a problem behavior with an appropriate alternative is fundamental to understanding behavior and respecting behaving organisms: if the behavior didn’t matter to the animal, it wouldn’t keep doing it. For example, the function typically served by biting is to remove someone’s hand—that is, to say no. Since all animals have a right to say no, our first goal should be to replace biting with an acceptable way to say no—for example, leaning away or squawking. Our second goal is teaching the bird that saying yes, by stepping up, yields even better outcomes.

O’Neill et al. (1997) describe four considerations to increase the effectiveness and efficiency of behavior change plans. First, behavior support plans should describe how the client plans to change the environment to promote and maintain appropriate behavior. This is accomplished by changing a wide range of conditions such as medications, diet, physical settings, schedules, exercise, training procedures, and the use of rewards and punishers. It is also important to describe in detail exactly who in the family will do what and when. To change animal behavior, we change what we do, including the environment we provide.

Second, there should be a clear link between the functional assessment and the intervention plan. For example, a functional assessment may reveal that a parrot repeatedly jumps off a perch and chews the floorboards to gain sensory reinforcement. Therefore, the intervention plan to reduce this behavior should identify what alternative behavior the animal can use to accomplish this goal in a more acceptable way (e.g., the bird can chew similar wood items on a variety of perches stationed in the room). The intervention should also identify new behaviors to teach the parrot (e.g., use stimulating puzzle toys). See Figure 2 for a diagram of the problem behavior, replacement behavior, and desired behavior paths. The main focus of an intervention plan should be on what an animal should do instead of the problem behavior, not on what it should not do. Thus the importance of asking, what do you want the bird to do instead?

Third, behavior change plans should be technically sound. A technically sound plan is one that adheres to the scientific principles of learning and behavior in order to make the problem behavior irrelevant, inefficient, and ineffective. A problem behavior becomes irrelevant when an alternative behavior provides the same, or more, reinforcement. A problem behavior becomes inefficient when, compared with the wrong behavior, the right behavior can be performed with less effort and fewer responses, and results in quicker reinforcement. And a problem behavior becomes ineffective when the maintaining reinforcer is reduced or withheld each time the behavior is exhibited.

Fourth, the behavior change program should fit the client’s setting and skills. The best strategy is the one that can be implemented effectively by the people responsible for the plan. Interventions should fit the client’s routines, values, resources, and skills. A good plan is effective in helping the animal and also results in reinforcing outcomes for the client, in both the short and long run.

The following form is included to structure clients’ understanding and prediction of the problem behaviors and design of a behavior change plan using the most positive, least intrusive, effective methods.
Functional assessment and intervention design (FAID) form

1. Observe and operationally define the target behavior.
   a. What does the animal do that can be observed and measured?

2. Identify the distant and immediate physical and environmental antecedents that predict the behavior.
   a. What general conditions or events affect whether the problem behavior occurs?
      i. Medical or physical problems?
      ii. Sleep cycles?
      iii. Eating routines and diet?
      iv. Daily schedule?
      v. Enclosure and activity space?
   b. What are the immediate antecedents (predictors) for the problem behavior?
      i. When, where and with whom is the behavior problem most likely to occur?
      ii. Does the behavior immediately follow a caregiver’s demand or request, or a person entering or leaving the environment?
   c. When is the animal most successful—that is, when doesn’t the problem occur?

3. Identify the consequences that maintain the problem behavior, i.e., the immediate purpose the behavior serves.
   a. What does the animal gain by behaving in this way, such as attention, an item or activity, or sensory feedback?
   b. What does the animal avoid by behaving in this way, such as particular people, a demand or request, items or activities, or sensory stimulation?
   c. To what extent does the animal’s natural environment support the behavior (i.e., what function might it serve)?

4. Develop a summary statement describing the relationships among the antecedent predictors, the behavior, and consequence for each situation in which the behavior occurs (Figure 1).

| Distant antecedents: This parrot was rehomed after spending its first 6 months loose in a dark basement with nine other parrots. It was malnourished and undersocialized. |
| Antecedent: When I offer my hand |
| Behavior: parrot bites |
| Consequence: to remove my hand |
| Prediction: Biting will continue/increase |

Figure 1. Functional Assessment Summary Statement

After the functional assessment summary statements have been developed, the primary caregiver can respond to the following questions to design the behavior change program.

1. Replacement behavior: What existing alternative behavior would meet the same purpose for the animal?
   a. Rather than ______________________________ (Identify the problem behavior)
b. This animal can _________________________
   (Identify the replacement behavior)
   Example: Rather than biting my hand, this parrot can lean away.

2. Desired behavior: What behavior do you ultimately want the parrot to exhibit?
   a. When ______________________________
      (Summarize antecedents)
   b. This animal ____________________________
      (Identify desired behavior)
   c. In order to ____________________________
      (Summarize “payoffs”)
   Example: When I offer my hand, this parrot can step up, in order to get a ride to the play tree.

3. What has been tried so far to change the problem behavior?

4. Preliminary strategies: Can I do something differently or change something in the environment so that the behavior doesn’t occur in the first place?
   a. I could make adjustments related to WHEN the problem behavior is likely to occur by:
   b. I could make adjustments related to WHERE the problem behavior is likely to occur by:
   c. I could make adjustments related to the ACTIVITY during which the problem behavior is likely to occur by:
   d. I could make adjustments related to the PEOPLE present when the problem behavior is likely to occur by:
   e. I could teach/reteach a behavior such as:
   f. I could adjust some aspect of the environment by adding, removing or changing an item or condition such as:
   g. Other adjustments that can be made are:

5. Training strategies: What skill(s) will the animal need to be taught in order to successfully demonstrate the replacement behavior?
   a. Who will provide the training?
   b. When will the training take place?
   c. Where will the training take place?
   d. How often will training take place?
   e. How and how often will opportunities for practice be provided?

6. Reinforcement procedures: What will I do to increase the occurrence of the replacement/desired behavior?
   a. Identify potential reinforcers: What preferred items, activities or people might be used as incentives in an intervention for this animal?
   b. Establish specific behavior criteria: What exactly must the animal do to earn the above reinforcers?
   c. Determine the schedule of reinforcement: How frequently can the animal earn the above reinforcers? Typically, continuous reinforcement (a reinforcer for every correct behavior) is best.

7. Reduction procedures: What will I do to decrease the occurrence of the problem behavior?
   a. I will ignore all occurrences, immediately attending to something else by:
   b. I will stop and redirect each occurrence of the behavior by:
   c. I will implement time out from positive reinforcement by:
   d. Other strategies:
8. Implementation details: What other details or explanations would help another person implement this plan accurately and consistently?

9. Tracking change: How can I monitor the animal’s behavior so I have a reliable record of progress and can continue or modify the plan as needed?
   a. Describe exactly how data will be collected and recorded.
      i. Frequency count of the target behaviors across the day.
      ii. Frequency count from ___:___ am/pm to ___:___am/pm
      iii. Timing duration of target behaviors.
      iv. Other.

10. Evaluating outcomes: This program will be considered successful if what outcome is achieved by both the animal and the caregivers, under what conditions?

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**Figure 2. Diagram of Problem Behavior, Replacement Behavior, and Desired Behavior Paths**

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**References**

Alternatives to Breaking Parrots: Reducing Aggression and Fear through Learning

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Introduction

There is irony in the practice of using force to reduce aggression and fear in companion parrots. Chances are human force was involved in producing the aggressive and fearful behaviors in the first place, at least from the bird’s point of view. It reminds me of the equally ironic practice of slapping a child for hitting a sibling. While I can’t be sure where these pervasive practices come from in our culture, I’m sure I know some of the reasons why they persist. First, force is a familiar strategy to many of us, having ourselves been forced to do things throughout our lives. It is our cultural legacy passed down from one generation to the next and often takes the form of seemingly benevolent reasoning such as “this hurts me more than it hurts you” or “a little pain for a lot of gain.” Second, force works in the short run, some of the time. This short-run and occasional effectiveness intermittently reinforces the user, which makes it very likely that force will be used more often in the future. It is not uncommon to see such a chain of events result in a teacher or caregiver who unwittingly grows to rely on force to the exclusion of effective, nonforceful strategies.

Still, we’ve come a long way. Many cowboys would rather hang up their saddles than break their horses; puppies are often crate-trained rather than housebroken with physical punishment; and, instead of breaking our children’s spirits or their bad habits, we set them up to succeed and catch them being good. With the recent reduction of force where horses, dogs and children are concerned, what explains the recent acceptance of force by some to manage aggressive and fearful parrots?

Defining Force

Before answering the question posed above, I turned to Webster’s New World Dictionary to check my use of the word force. Force is defined as “the use of physical power to overcome or restrain a person; physical coercion … coercion is to compel submission or obedience by the use of superior power, intimidation, threats, etc.” Interestingly, one antonym for force is persuasion. Webster’s definition of the word break is surprisingly relevant, as well: “…to tame or make obedient with or as with force; to force one’s way through obstacles or resistance…” An antonym for break is to mend. Persuasive mending … sometimes Webster is so on the mark it’s scary.

People who advocate using force to decrease aggression and fear are captured well by Webster’s definitions. They force struggling, biting, screaming birds out of their cages, sometimes by grabbing one leg, and restrain the birds by wrapping them in towels or swinging them off their hands until they submit to being handled. This is absolutely analogous to the old horse-breaking practices of hobbling horses’ feet, slickering or sacking them out, and tying heavy bags of flour to their backs.

The birds so treated are frequently passed around in foreign venues from one stranger’s hand to another. Learned helplessness (discussed further below) and sheer physical exhaustion are often confused by trusting clients as their bird’s magically newfound willingness to be touched and held. The effects of this treatment are most often short lasting, and the birds subjected to this procedure typically return to their fearful and aggressive behaviors within a few hours or days.
Remarkably, physical harm is sufficiently probable with this strategy that one such practitioner does not work without the presence of a veterinarian (Parrot Chronicles, Nov–Dec 2002, at www.parrotchronicles.com/novdec2002/birdwhisperer.htm).

Far from a new or breakthrough strategy, the procedure of reducing unwanted behavior by physically preventing an animal from making a response has been well studied by behavior scientists (e.g., Baum, 1966; James, 1986; Morgenstern, 1973; Morris & Kratochwill, 1983; Page & Hall, 1953; Staub, 1968; Yule et al., 1974). The general term for this procedure is response blocking. With aggressive birds, the response blocked by physical restraint is typically biting. When used specifically to reduce extreme fear, this procedure is called flooding. With flooding, the subject is presented with the highly feared object or situation, which is not removed until the fear diminishes. The response that is prevented in this case is escape.

Most behavior scientists, teachers, and therapists agree response blocking of aggression or fear cannot properly be called teaching. The outcome of teaching is learning, and the process of learning new behaviors involves the learner’s choice to behave in a certain way to access certain outcomes or not. Our job as effective teachers is to arrange the environment and the outcomes in such a way that our birds choose to do what we want them to do. Response blocking and flooding eliminate the element of choice entirely from the behavior change process, and, although some behaviors may be reduced, no new behaviors are learned. The bird pulled out of his cage has not been taught to step up when requested, and the caretaker who pulled him out of his cage has not been taught to step when requested, and the caretaker who pulled him out of his cage has not been taught to step up. For the same effort and less hardship, we could be teaching the bird to do these basic behaviors.

The Behaviors of Aggression and Fear

As parrot caregivers, we sometimes find ourselves squinting to read and interpret the subtle and not so subtle meanings of our birds’ observable behavior. The behaviors of aggression and fear are overlapping and range from relatively mild (avoidance of hands) to extreme (severe biting). Fear itself can also be understood as a continuum from mild anxiety and agitation (darting eyes, crouching bodies and fanned tails) to extreme, seemingly irrational panic (shrieking, falling onto their backs, flailing feet). These are often the behaviors observed by caregivers who find themselves desperately seeking help for their parrot and themselves. And these caregivers are quite correct in assessing these behaviors as evidence of a crisis situation.

As is the case with all behavior, two processes are at work where aggression and fear are concerned: biology and learning. It is a bird’s biology that produces the innate behaviors associated with fear, such as rapid heart rate and increased blood pressure; however, experience is the best teacher of what to be fearful of in captivity. Of course, it is also a parrot’s biology, most notably in the form of powerful beaks, that accounts for their effectiveness as self-defenders, but it is critical to understand that serious biting is not a species-typical defense reaction in parrots. Given the choice between freezing, fleeing and fighting, a wild parrot’s first defense is to flee. It should be no surprise, then, that aggression in parrots is often the predictable result of what we do and the conditions we provide in captivity. There is no question that biting is an adaptation that results from pushing our birds too far, too fast or too forcefully. The good news is that learned behaviors can be unlearned and replaced with more appropriate behaviors—but only to the extent that we can effectively teach them. Any limitation and all the responsibility is ours as teachers. Still, you can count on your parrot’s extraordinary ability to learn, that is, to change its behavior based on the experiences you provide. They, like all sentient creatures, are biologically prepared to find reinforcement in the environment and adapt their behavior to get it.

Back to the Question

What then, explains the increase in the use of force to manage aggressive or fearful parrots? I believe there are three explanations, and it is
worth noting that not one of them has to do with a desire to cause harm by the practitioners or their clients. They are (1) understandable desperation to the point of absolute despair felt by the caregivers of aggressive and fearful birds; (2) practitioners’ and caregivers’ lack of knowledge about the negative side effects of forceful strategies; and (3) practitioners’ and caregivers’ lack of knowledge and skill with effective nonforceful strategies to replace their parrot’s fear with confident, adaptive behaviors.

Unbeknownst to many companion parrot caregivers and practitioners alike, the natural science of behavior has, in the course of the last 60 years, produced a highly effective teaching technology called applied behavior analysis (ABA), of which operant conditioning is a part. Positive reinforcement is the crown jewel of this teaching technology as it can be applied in endlessly creative ways and is so effective as to make the use of force obsolete. Additionally, the science of behavior has also revealed the predictable and detrimental consequences of many aversive strategies for changing behavior, including response blocking.

In my opinion, one of the greatest failures of behavior science in general has been the failure of behavior scientists to effectively disseminate their information to those who need it most—the teachers, parents and caretakers. Nowadays, with our unlimited ability to exchange information with one another, the responsibility to know and apply these fundamental principles of learning and behavior is shared among all of us. At the same time, we need to abandon debilitating practices and scrutinize unvalidated claims of expertise.

The Risks of Response Blocking
Response blocking is called flooding for a reason: when it doesn’t work, the animal sinks rather than swims. When it does work, flooding results in a rapid reduction in fearful behavior; however, it is just as likely to result in overwhelming stress, anxiety, and lasting generalized aversion to the people present during the flooding episode and to elements in the environment at large. Flooding can result in such intense resistance that physical harm can occur to the birds and people. Additionally, there is considerable research that shows the long-term detrimental effects of repeated exposure to uncontrollable aversive events with both animals and people (Mazur, 2002), as is the case with repeated flooding. Learned helplessness is one such dire outcome. Learned helplessness is the expectation that one’s behavior has little or no effect on the environment. This expectation results from repeated exposure to uncontrollable aversive events without opportunity to escape. Research has shown that animals subjected to this condition often suffer a loss of motivation so that they do not even try to affect their environment even when they can. They give up easily and show significant deficits in learning and performance. Physical problems are frequently observed as well—for example, rats developed ulcers, cats ate less, humans suffered increased blood pressure, and monkeys became ill (Maier & Seligman, 1976).

Another worry is the recent practice of demonstrating flooding on birds at bird club meetings. Aside from the blatant disrespect shown the already fearful animal by flooding it in such a casual setting, research suggests that short-duration flooding sessions, as is the case at many bird club demonstrations, can increase fears (Staub, 1968; Yule et al., 1974) and very likely increase associated aggression as well. This may account for the frequently reported short-term effects of these demonstrations with birds.

I and many other behaviorists (e.g., Burch & Bailey, 1999; Morgenstern, 1973), experienced bird trainers (personal communications: Martin, 2002; Morrow, 2002; Heidenreich, 2005) and bird caretakers believe that this procedure is not a humane method of dealing with aggression or fear, especially in light of the many validated positive alternatives. To better assess the ethics of this procedure, I challenge readers to think deeply for one minute about your greatest fear: Is it snakes? Spiders or rock ledges? The dark when you are alone? Bridges or tight spaces? Now, imagine being grabbed by your leg, wrapped tightly in a sheet and restrained in the presence of this feared stimulus or condition with no control and no possibility of escape. For
The Science of Alternatives

There are many alternative strategies to response blocking and flooding. Systematic desensitization is one highly effective and commonly used technique for reducing fears. With systematic desensitization, the bird is slowly presented with tolerable amounts or durations of the feared object or condition. The bird is never allowed to experience a high level of fear. When the bird shows comfort behaviors at one level on the fear hierarchy (such as preening or shaking tail feathers), the bird is rewarded with praise or other reinforcers and the feared object is moved one bit closer to the bird or the bird moved closer to the feared condition. This gradual process is continued until the bird shows no fear whatsoever when presented with the feared object or situation. Done perceptively, systematic desensitization can be relatively quick and remarkably successful. It is a joyful process to see fear melt away to be replaced with resilience and confidence!

Another strategy for reducing fear is called targeting. With targeting, the bird is taught through positive reinforcement to touch a designated object or part of an object such as the end of a chopstick. Once the bird has mastered targeting, you can facilitate your bird moving out of his cage by following the target stick. You can also target the bird to move successively closer to someone’s hand, where he can be rewarded for increasing the duration of hand perching. Few strategies are more thrilling than the gentle process of shaping a bird to your hand by rewarding small steps toward the final destination. An additional benefit is that targeting allows you to keep the rate of reinforcement high, which more quickly establishes you—the caregiver—as a reinforcer, as well, (Friedman, 2009).

Another strategy called differential reinforcement of alternative behaviors is a highly effective approach for reducing aggressive behavior. Paired with a careful reading of your bird’s body language to avoid those bites, differential reinforcement consists of rewarding the behaviors you want to see more while at the same time ignoring those unwanted behaviors. In this way, problem behaviors are decreased using positive reinforcement for appropriate alternative behaviors. For example, biting can be replaced with a vocalization to signal to you that your bird feels uncomfortable with what you are doing; lunging can be replaced with picking up a foot toy; and charging can be replaced with going to a designated perch.

Teaching plans should always begin with the most positive, least intrusive methods available to us, not only because they are highly effective but also because they are more humane. Simply: because we can. In the great majority of cases, building trusting relationships gradually through the skilled application of positive reinforcement will get you to your goals with no risk of distress or harm. By teaching adaptive, desirable behaviors to your bird, you will replace aggression and fear with competence and confidence. With each new behavior learned, teaching the next behavior will happen faster and more easily, as your bird learns to learn from you. Your bird’s trust will grow in proportion to your skill as a teacher. Aversive procedures like response blocking threaten this outcome for you and your bird. The goal is to empower not overpower your bird.

In Closing

Over 60 years ago, B. F. Skinner coined the term operant conditioning to convey a type of learning with which individuals have power to “operate” on their environment to produce or avoid particular outcomes. He used this concept in contrast to classical or Pavlovian conditioning, which focuses on behaviors that are not choice driven but automatic, like salivating, eye blinks and goose bumps. The observations that all animals are active participants in learning and their behavior is the result of intelligent choices based on outcomes
have stood the test of time and scientific inquiry. They are perhaps the most fundamental and important discoveries of the science of behavior, applicable to improving the lives of all creatures.

Response blocking and flooding have no place in our work with companion parrots because force is the one strategy that renders animals absolutely and indisputably choiceless. Such lack of control over one’s environment has been shown to be associated with short-term effects and long-term learned helplessness. No new behaviors are learned because in fact none are taught.

Far from a breakthrough procedure or show of skill, response blocking or flooding to gain a parrot’s submissiveness is nothing short of parrot breaking. The use of this strategy is, sadly, an example of the prophetic phrase “when everything old is new again.” Those who use these strategies appear to be ignorant of both the dire side effects of response blocking and the highly effective, well-validated alternative teaching strategies that make use of positive reinforcement. Although no harm may be intended by practitioners or their clients, the risk of harm is very real and totally unnecessary. This is ignorance our humanity cannot afford. Be neither drawn in by promises of quick fixes nor dazzled by showmanship; do not steal what is a bird’s to give. As so plainly stated by Burch and Bailey (1999) in reference to dogs, “We owe it to them to treat them the same way we’d like to be treated.” Do we owe parrots less?

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