

# Life Expectancy and Environmental Factors: Maintaining Behavioral Health

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## Introduction

I have not found any publications that studied the relationship between stress and longevity in dogs. However, the documented detrimental effects of stress on physiological and behavioral wellbeing allow the conclusion that appropriate management of distress will contribute to welfare and longevity of our dogs.

## Signs of Stress

Stress in dogs can be recognized by various physiological signs (Lindsay, 2000), such as:

- Pupillary dilatation
- Dilatation of blood vessels in the retina of the eye (change of eye color)
- Decreased pain sensitivity
- Decreased appetite and thirst
- Panting
- Increased perspiration on pads of the feet
- Increased heart rate
- Increased sympathetic arousal
- Frequent defecation, diarrhea
- Frequent urination
- Stronger startle and withdrawal reflexes

Behavioral signs include:

- Body language (ears back, tail tucked, body lowered)
- Conflict behavior (yawning, scratching, shifting eyes, scanning, pacing, etc.); compulsive disorder
- Escape behavior, scurrying, hiding
- Hyperactivity, hyper-reactivity
- Destructiveness, chewing licking
- Self-directed behaviors
- "Sexual" mounting
- Vocalization (high-pitched screaming, repetitive barking)
- Survival behaviors such as aggression (initially defensive, but may become offensive through conditioning with negative reinforcement)
- Inability to learn, focus
- Not accepting treats

## Consequences of Stress

Stress, especially if frequent or chronic (non-avoidable) and anxiety have detrimental consequences:

- Atrophy of lymphatic glands and immunosuppression
- Changes in red-cell and white-cell blood values
- Gastric ulcers
- Degenerative effects on the brain that reduce ability to cope (less inhibition by higher brain centers)
- Increase in cortisol secretion
- More frequent and irregular urination, loss of house training
- Decreased appetite

## Causes of Stress:

Stress can be caused as a result of genetic predisposition and the way we raise a puppy. Stress may also be caused by environmental conditions, including by how we manage the dogs, and by the nature of our interactions with dogs.



- Genetic predisposition: Some dogs are genetically predisposed to develop generalized fear or anxiety, sometimes very early in life. Others have a predisposition for developing specific fears, such as fear of loud noises (frequently late onset). Dogs that have been selected to be highly trainable are particularly prone to suffering from an inconsistent, unpredictable and uncontrollable environment.
- Early experience: A restricted early environment inhibits learning ability probably because of increased emotionality. Early removal from the litter has been shown in other species such as rats and cats to increase emotionality and anxiety (increased stress hormone turnover, decreased serotonin production). Severe disease in the first 16 weeks of a dog's life can also adversely affect emotionality (as evidenced by increased incidence of owner-directed aggression). Puppies that are not exposed to normal every-day stimuli between 3-14 weeks of age will be fearful and anxious as adults. If they are left in a restricted environment until 12-14 weeks of age, the chances of establishing normal responses are virtually non-existent. Psychological trauma in a fear period may result in generalized anxiety or specific fear.
- Traumatic experience: An adverse experience in a particular situation will cause anxiety and fear in that situation or to the aversive stimulus in the future (classical conditioning). Dogs can also suffer from post-traumatic stress syndrome.
- Environment: Unpredictable environment and social interactions, lack of consistent rules, loss of control over environment and over pleasant and aversive stimuli can result in learned helplessness.
- Motivational conflict: Strong opposing motivations resulting in conflict and conflict behavior. Frequently caused through inconsistent interactions and, especially, inappropriate use of punishment.
- Frustration: resulting from thwarted motivation, e.g., caused by social isolation, lack of exercise or lack of opportunity to investigate ("cabin fever").

### **Treatment of Stress and Anxiety:**

Treatment needs to be specific to the cause, or to the specific anxiety-related behavior problem (e.g., compulsive disorder or separation anxiety). However, there are some general measures that can help alleviate stress:

- Consistent environment: Absolute rules and predictable and consistent interactions empower dogs by giving them the ability to control appetitive and aversive stimuli. Obedience training and command-response-reward type interactions contribute much to stress reduction.
- No punishment: Punishment is a very complex technique and difficult to use correctly. In addition, punishment is only appropriate for a very limited number of problem behaviors. Alternatives to punishment include, e.g., avoiding triggers, removing the reward, giving acceptable alternatives, and teaching an alternate behavior (response substitution).
- Exercise: Physical exercise has a modulatory effect on stress hormones, increases brain serotonin, boosts the immune system and reduces impulsive behaviors. Exercise off the property also allows for investigation of novel stimuli. Regular (twice-daily) walks off the property greatly reduce anxiety and alleviate behavior disorders that involve anxiety.
- Outlet for normal behavior: Investigation, chasing (predatory behavior), chewing, play, social interactions, etc. are normal dog behaviors that need an appropriate outlet.
- Environmental stimulation: All sensory systems, in particular the vomeronasal organ, give input into the limbic system that controls emotions. A very monotonous environment will increase anxiety (this may be why meal feeding is better than free-choice feeding in dogs), a more complex (albeit consistent and predictable) environment will decrease it. Commercially available pheromones (DAP) can be used to reduce anxiety.
- Pharmacological treatment: Because of the limitations of and requirements for behavior modification techniques, temporary pharmacological intervention is often necessary to reduce the anxiety to a level where the animal can learn and behavior modification techniques can be effective.
- Specific treatment of behavior disorders: There are specific treatment protocols for anxiety-related behavior disorders such as separation anxiety, many forms of aggression, compulsive disorder, etc.

## Prevention of Stress and Anxiety

Sound genetic makeup, optimal raising conditions, sufficient socialization and exposure, canine-appropriate management, feeding and exercise, a complex and consistent environment, predictable social interactions, competent training methods and restraint on discipline, the avoidance of traumatic experiences and good health status, all contribute to an emotionally balanced dog.

Genetic basis for emotionality: Researchers identified four personality traits in dogs, i.e., aggressiveness, playfulness, curiosity/fearlessness and chase-proneness, the latter three traits forming the super-trait shyness/boldness. Heritabilities of chase-proneness and aggressiveness have been shown to be moderate, but those for playfulness and curiosity/fearlessness are high. Therefore, selection of breeding animals for temperament should be successful given reliable and valid tests to measure it.

Complexity of Early Environment: An animal's central nervous system only retains its genetically predetermined functions if exposed to environmental stimulation, especially early in life. A restricted early environment will result in an animal with abnormal sensory perception that is emotionally unstable. In addition to emotionality, the complexity of the early environment also greatly influences learning ability. A restricted early environment may result in reduced trainability. It is therefore important to provide an interesting, stimulating early environment. In addition it is also important that the early environment be predictable and consistent. If not, the animal will learn that its behavior has no impact on what is happening around it, and it will be in a state of learned helplessness. Such animals are exceedingly hard to train later on.

Effect of Neonatal Stress: Some degree of stress (e.g. handling, cold temperature) in the neonatal period of dogs may accelerate growth, reduce emotionality, and increase resistance to some diseases. Handling sessions from the first days of a puppy's life are therefore recommended (about 3 minutes/day are sufficient). In addition, puppies may be removed from the nest (best while someone else walks the mother) and placed on a cool vinyl floor for a brief time (30 seconds) before being put back into the warm nest. If done in the first few days after birth, this is expected to result in reduced behavioral and physiological reaction to chronic stress, an increased physiological reaction to acute stress, and reduced emotionality of the adult dog. Chronic stress is caused by unavoidable and long-lasting aversive conditions. Since they are unavoidable, the stress reaction does not result in coping, and just drains the animal's resources. Such chronic stress causes stomach ulcers and other impairment of health. A strong reaction to acute stress, however, is desirable. If a grand piano falls from the sky directly towards you, it may save your life to mobilize all your resources to get away from there. So both a reduced reaction to chronic stress and an increased reaction to acute stress are beneficial.

Socialization and exposure: The socialization period of dogs begins at about 3 weeks and extends to about 12 or 14 weeks of age. Socialization to dogs and to people has to occur during this time (it needs to be continued thereafter). If this opportunity is missed, the puppy will most likely always be fearful of dogs and/or humans. During the socialization period, the puppy should also be exposed to all situations that it is likely to encounter during its life. The best prevention of behavior problems is to take the puppy to puppy classes during that time. During the socialization period, the puppy can already learn some commands. It should learn a biting inhibition, and should start to learn to fit into a social group.

Managing for Success: Problem prevention includes managing the puppy for success, i.e., arranging the environment so that the puppy cannot do the wrong thing, and automatically chooses to do the right thing (e.g., house training, chewing). If appropriate behaviors are successful from the puppy's point of view from the beginning, it will repeat these and not try other behaviors (and if we have set up the environment correctly, if it ever tries other behaviors, these are not successful). This includes puppy proofing the house and appropriate confinement and supervision.

Exercise: Exercise off the property will satisfy the dog's innate motivation to explore new things, help with exposure and desensitization to stimuli, and facilitate socialization. Exercise off the property also decreases arousal and reactivity, reduces anxiety and reduces the risk of owner-directed aggression. Vigorous exercise also reduces anxiety through its effect on stress hormones and serotonin.

Environmental enrichment: Interactive toys and games, food dispensing toys, rotating the toys so they maintain novelty, and appropriate play serve to enrich the environment and provide mental stimulation.

Obedience training: Obedience training has an enriching effect as well. Furthermore, humane obedience training (lure training, clicker training) provides for predictable, consistent and stress-free interaction, and an opportunity for the dog to act upon the environment with predictable outcome. If we are consistent in training, the dog has a lot of control over the situation (i.e., over the rewards). In clicker training, they literally can make us click. Furthermore, command-control over the dog can help diffuse critical situations by telling the dog what to do, i.e., providing the dog with an appropriate way to cope with a stressful situation.

In addition to usual commands, a puppy should learn a bite inhibition, food bowl safety, the “off” (or leave-it and drop-it) command, to walk on a leash, to be alone for some time, and to accept a crate. A puppy should also learn appropriate play.

Consistent Rules: I don’t believe we have to dominate our dogs (I don’t think our relationship with dogs is one of dominance and submissiveness, but that is open to debate). However, we have to control the contingencies on the dog’s behavior. That means, we have to control consistently, which behaviors pay off for the dog (are rewarded) and which do not. The establishment and strict enforcement of rules are extremely important. If rules are not consistent, the dog can never figure them out, and cannot function within them to achieve success. This situation would be similar to you visiting with friends who play a card game that you don’t know. They ask you to participate and explain you the rules. You go along with it and after some time think you have the winning hand, put your cards down and claim that you have won. Now of course, your friends add another rule, etc. After two or three times of this, you will become frustrated, angry (as a conflict behavior!) and distressed. This is how our dogs must feel if we have no rules or constantly change them. They may either compensate for this by developing survival behaviors that yield short-term predictable consequences (such as aggression, escape or inhibition), or develop learned helplessness (i.e., they learn that their behavior has no effect on what happens around them). Enforcing strict rules therefore has nothing to do with dominance, but a lot with giving the dog a chance to operate successfully in its environment and achieve predictable outcomes. Particularly a highly trainable dog, i.e., a dog that is keen on operating on his environment, is in a state of compromised welfare if a consistent rule structure is not maintained.

### **Managing the older dog**

All the above also applies especially to older dogs that may suffer from declining cognitive function. Environmental enrichment, mental stimulation and teaching new behaviors (appropriate for the dog’s age, health and physical ability) such as scent discrimination or searching for a hidden treat or toy, may help prevent cognitive decline. There are now classes offered for senior dogs. It is important to maintain older dogs’ interest in participating in daily activities, social interactions, play and suitable exercise.



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Qualifications:

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1984	PhD (Animal Behavior) Guelph, Canada
1993	Certified Applied Animal Behaviorist (Animal Behavior Society)
1995	Diplomate, American College of Veterinary Behaviorists (ACVB)
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Professional Experience:

1982-1984	Research Associate, Federal Veterinary Office, Bern, Switzerland
1985-1997	Assistant Professor for Ethology, University of Guelph, Guelph, Ontario, Canada
1995-1997	Adjunct Faculty, animal behavior, Atlantic Veterinary College.
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Research Interests:

Conflict behavior and compulsive disorder in various species  
Canine aggression to household members  
Psittacine behavior  
Learning in dogs and training methods  
Behavior Development

