Early Neurological Stimulation

breedingbetterdogs.com/article/early-neurological-stimulation

Parent Category:

Puppy Articles

Surprising as it may seem, it isn't capacity that explains the differences that exist between individuals because most seem to have far more capacity than they will ever use. The differences that exist between individuals seem to be related to something else. The ones who achieve and outperform others seem to have within themselves the ability to use hidden resources. In other words, it's what they are able to do with what they have that makes the difference.

In many animal breeding programs, the entire process of selection and management is founded on the belief that performance is inherited. Attempts to analyze the genetics of performance in a systematic way have involved some distinguished names such as Charles Darwin and Francis Galton. But it has only been in recent decades that good estimates of heritability of performance have been based on adequate data. Cunningham, (1991) in his study of horses, found that only by using Timeform data, and measuring groups of half brothers and half sisters could good estimates of performance be determined. His data shows that performance for speed is about 35% heritable. In other words, only about 35% of all the variation that is observed in track performance is controlled by heritable factors, the remaining 65% is attributable to other influences, such as training, management and nutrition. Cunningham's work while limited to horses, provides a good basis for understanding how much breeders can attribute to the genetics and the pedigrees.

Researchers have studied these phenomena and have looked for new ways to stimulate individuals in order to improve their natural abilities. Some of the methods discovered have produced life long lasting effects. Today many of the differences between individuals can now be explained by the use of early stimulation methods.

Introduction

Man for centuries has tried various methods to improve performance. Some of the methods have stood the test of time, others have not. Those who first conducted research on this topic believed that the period of early age was a most important time for stimulation because of its rapid growth and development. Today, we know that early life is a time when the physical immaturity of an organism is susceptible and responsive to a restricted but important class of stimuli. Because of its importance many studies have focused their efforts on the first few months of life.

Newborn pups are uniquely different from adults in several respects. When born, their eyes are closed and their digestive system has a limited capacity requiring periodic stimulation by their dam who routinely licks them in order to promote digestion. At this age they are only able to smell, suck, and crawl. Body temperature is maintained by snuggling close to their mother or by crawling into piles with other littermates. During these first few weeks of immobility, researchers noted that these immature and under-developed canines are sensitive to a restricted class of stimuli which includes thermal and tactile stimulation, motion and locomotion.

Other mammals such as mice and rats are also born with limitations, and they also have been found to demonstrate a similar sensitivity to the effects of early stimulation. Studies show that removing them from their nest for three minutes each day during the first five to ten days of life causes body temperatures to fall below normal. This mild form of stress is sufficient to stimulate hormonal, adrenal and pituitary systems. When tested later as adults, these same animals were better able to withstand stress than littermates who were not exposed to the same early stress exercises. As adults, they responded to stress in "a graded" fashion, while their non-stressed littermates responded in an "all or nothing way."

Data involving laboratory mice and rats also shows that stress in small amounts can produce adults who respond maximally. On the other hand, the results gathered from non-stressed littermate show that they become easily exhausted and are near death if exposed to intense prolonged stress. When tied down so they were unable to move for twenty-four hours, rats developed severe stomach ulcers, but litter mates exposed to early stress handling were found to be more resistant to stress tests and did not show evidence of ulcers. A secondary affect was also noticed.

Sexual maturity was attained sooner in the littermates given early stress exercises. When tested for differences in health and disease, the stressed animals were found to be more resistant to certain forms of cancer and infectious diseases and could withstand terminal starvation and exposure to cold for longer periods than their non-stressed littermates.

Other studies involving early stimulation exercises have been successfully performed on both cats and dogs. In these studies, the Electrical Encephalogram (EEG) was found to be ideal for measuring the electrical activity in the brain because of its extreme sensitivity to changes in excitement, emotional stress, muscle tension, changes in oxygen and breathing. EEG measures show that pups and kittens when given early stimulation exercises mature at faster rates and perform better in certain problem solving tests than non-stimulated mates.

In the higher level animals the effect of early stimulation exercises have also been studied. The use of surrogate mothers and familiar objects were tested by both of the Kelloggs and Dr. Yearkes using young chimpanzees. Their pioneer research shows that the more

primates were deprived of stimulation and interaction during early development, the less able they were to cope, adjust and later adapt to situations as adults.

While experiments have not yet produced specific information about the optimal amounts of stress needed to make young animals psychologically or physiologically superior, researchers agree that stress has value. What also is known is that a certain amount of stress for one may be too intense for another, and that too much stress can retard development. The results show that early stimulation exercises can have positive results but must be used with caution. In other words, too much stress can cause pathological adversities rather than physical or psychological superiority.

Methods of Stimulation

The U.S. Military in their canine program developed a method that still serves as a guide to what works. In an effort to improve the performance of dogs used for military purposes, a program called "Bio Sensor" was developed. Later, it became known to the public as the "Super Dog" Program. Based on years of research, the military learned that early neurological stimulation exercises could have important and lasting effects. Their studies confirmed that there are specific time periods early in life when neurological stimulation has optimum results. The first period involves a window of time that begins at the third day of life and lasts until the sixteenth day. It is believed that because this interval of time is a period of rapid neurological growth and development, and therefore is of great importance to the individual.

The "Bio Sensor" program was also concerned with early neurological stimulation in order to give the dog a superior advantage. Its development utilized six exercises which were designed to stimulate the neurological system. Each workout involved handling puppies once each day. The workouts required handling them one at a time while performing a series of five exercises. Listed in order of preference, the handler starts with one pup and stimulates it using each of the five exercises. The handler completes the series from beginning to end before starting with the next pup. The handling of each pup once per day involves the following exercises:

1. Tactical stimulation (between toes)
2. Head held erect
3. Head pointed down
4. Supine position
5. Thermal stimulation

Tactile stimulation

1. Tactile stimulation - holding the pup in one hand, the handler gently stimulates (tickles) the pup between the toes on any one foot using a Q-tip. It is not necessary to see that the pup is feeling the tickle. Time of stimulation 3 - 5 seconds. (Figure 1)
2. Head held erect - using both hands, the pup is held perpendicular to the ground, (straight up), so that its head is directly above its tail. This is an upwards position. Time of stimulation 3 - 5 seconds. (Figure 2)
3. Head pointed down - holding the pup firmly with both hands the head is reversed and is pointed downward so that it is pointing towards the ground. Time of stimulation 3 - 5 seconds. (Figure 3)
4. Supine position - hold the pup so that its back is resting in the palm of both hands with its muzzle facing the ceiling. The pup while on its back is allowed to sleep. Time of stimulation 3-5 seconds. (Figure 4)
5. Thermal stimulation—use a damp towel that has been cooled in a refrigerator for at least five minutes. Place the pup on the towel, feet down. Do not restrain it from moving. Time of stimulation 3-5 seconds. (Figure 5)

These five exercises will produce neurological stimulations, none of which naturally occur during this early period of life. Experience shows that sometimes pups will resist these exercises, others will appear unconcerned. In either case a caution is offered to those who plan to use them. **Do not** repeat them more than **once** per day and do not extend the time beyond that recommended for each exercise. Over stimulation of the neurological system can have adverse and detrimental results. These exercises impact the neurological system by kicking it into action earlier than would be normally expected, the result being an increased capacity that later will help to make the difference in its performance. Those who play with their pups and routinely handle them should continue to do so because the neurological exercises are not substitutions for routine handling, play socialization or bonding.

Benefits of Stimulation

Five benefits have been observed in canines that were exposed to the Bio Sensor stimulation exercises. The benefits noted were:

1. Improved cardio vascular performance (heart rate)
2. Stronger heart beats
3. Stronger adrenal glands
4. More tolerance to stress
5. Greater resistance to disease

In tests of learning, stimulated pups were found to be more active and were more exploratory than their non- stimulated littermates over which they were dominant in competitive situations.

Secondary effects were also noted regarding test performance. In simple problem solving tests using detours in a maze, the non-stimulated pups became extremely aroused, whined a great deal, and made many errors. Their stimulated littermates were less disturbed or upset by test conditions and when comparisons were made, the stimulated littermates were more calm in the test environment, made fewer errors and gave only an occasional distress sound when stressed.

Socialization

As each animal grows and develops, three kinds of stimulation have been identified that impact and influence how it will develop and be shaped as an individual. The first stage is called early neurological stimulation and the second stage is called socialization. The first two (early neurological stimulation and socialization) have in common a window of limited time. When Lorenz, (1935) first wrote about the importance of the stimulation process, he wrote about imprinting during early life and its influence on the later development of the individual. He states that it was different from conditioning in that it occurred early in life and took place very rapidly producing results which seemed to be permanent. One of the first and perhaps the most noted research effort involving the larger animals was achieved by Kellogg & Kellogg (1933). As a student of Dr. Kellogg's, I found him and his wife to have an uncanny interest in children and young animals and the changes and the differences that occurred during early development. Their history-making study involved raising their own newborn child with a newborn primate. Both infants were raised together as if they were twins. This study, like others that followed attempted to demonstrate that among the mammals, there are great differences in their speed of physical and mental development. Some are born relatively mature and quickly capable of motion and locomotion, while others are very immature, immobile and slow to develop. For example, the Rhesus monkey shows rapid and precocious development at birth, while the chimpanzee and the other "great apes" take much longer. Last and slowest is the human infant.

One of the earliest efforts to investigate and look for the existence of socialization in canines was undertaken by Scott-Fuller (1965). In their early studies, they were able to demonstrate that the basic technique for testing the existence of socialization was to show how readily adult animals would foster young animals, or accept one from another species. They observed that, with the higher level animals, it is easiest done by hand rearing. When the foster animal transfers its social relationships to the new species, researchers conclude that socialization has taken place. Most researchers agree that among all species, a lack of adequate socialization generally results in unacceptable behavior and often times produces undesirable aggression, excessiveness, fearfulness, sexual inadequacy and indifference toward partners.

Socialization studies confirm that one of the critical periods for humans (infant) to be stimulated are generally between three weeks and twelve months of age. For canines the period is shorter, between the fourth and sixteenth weeks of age. The lack of adequate social stimulation, such as handling, mothering and contact with others, adversely affects social and psychological development in both humans and animals. In humans, the absence of love and cuddling increases the risk of an aloof, distant, asocial or sociopathic individual. Over-mothering also has its detrimental effects by preventing sufficient exposure to other individuals and situations that have an important influence on growth and development. It occurs when a parent insulates the child from outside contacts or keeps the apron strings tight, thus limiting opportunities to explore and interact with the outside world. In the end, over-mothering generally produces a dependent, socially maladjusted and sometimes emotionally disturbed individual. Protected youngsters who grow up in an insulated environment often become sickly, despondent, lacking in flexibility and unable to make simple social adjustments. Generally, they are unable to function productively or to interact successfully when they become adults.

Owners who have busy life styles with long and tiring work and social schedules often cause pets to be neglected. Left to themselves with only an occasional trip out of the house or off of the property they seldom see other canines or strangers and generally suffer from poor stimulation and socialization. For many, the side effects of loneliness and boredom set-in. The resulting behavior manifests itself in the form of chewing, digging, and hard-to-control behavior (Battaglia).

It seems clear that small amounts of stress followed by early socialization can produce beneficial results. The danger seems to be in not knowing where the thresholds are for over and under stimulation. Many improperly socialized youngsters develop into older individuals unprepared for adult life, unable to cope with its challenges, and interactions. Attempts to re-socialize them as adults have only produced small gains. These failures confirm the notion that the window of time open for early neurological and social stimulation only comes once. After it passes, little or nothing can be done to overcome the negative effects of too much or too little stimulation.

The third and final stage in the process of growth and development is called enrichment. Unlike the first two stages it has no time limit, and by comparison, covers a very long period of time. Enrichment is a term which has come to mean the positive sum of experiences which have a cumulative effect upon the individual. Enrichment experiences typically involve exposure to a wide variety of interesting, novel, and exciting experiences with regular opportunities to freely investigate, manipulate, and interact with them. When measured in later life, the results show that those reared in an enriched environment tend to be more inquisitive and are more able to perform difficult tasks. The educational TV program called “Sesame Street” is perhaps the best known example of a children's enrichment program. The results show that when tested, children who regularly watched

this program performed better than playmates who did not. Follow-up studies show that those who regularly watch “Sesame Street” tend to seek a college education and when enrolled, performed better than playmates who were not regular watchers of the “Sesame Street” program.

There are numerous children’s studies that show the benefits of enrichment techniques and programs. Most focus on improving self-esteem and self-talk. Follow-up studies show that the enriched “Sesame Street” students, when later tested were brighter and scored above average, and most often were found to be the products of environments that contributed to their superior test scores. On the other hand, those whose test scores were generally below average, (labeled as dull) and the products of underprivileged or non-enriched environments, often had little or only small amounts of stimulation during early childhood and only minimal amounts of enrichment during their developmental and formative years. Many were characterized as children who grew up with little interaction with others, poor parenting, few toys, no books and a steady diet of TV soap operas.

A similar analogy can be found among canines. All the time they are growing they are learning because their nervous systems are developing and storing information that may be of inestimable use at a later date. Studies by Scott and Fuller confirm that non-enriched pups, when given free choice, preferred to stay in their kennels. Other litter mates who were given only small amounts of outside stimulation between five and eight weeks of age were found to be very inquisitive and very active. When kennel doors were left open, the enriched pups would come bounding out while littermates who were not exposed to enrichment would remain behind. The non-stimulated pups would typically be fearful of unfamiliar objects and generally preferred to withdraw rather than investigate. Even well-bred pups of superior pedigrees would not explore or leave their kennels, and many were found difficult to train as adults. These pups, in many respects, were similar to the deprived children. They acted as if they had become institutionalized, preferring the routine and safe environment of their kennel to the stimulating world outside their immediate place of residence.

Regular trips to the park, shopping centers and obedience and agility classes serve as good examples of enrichment activities. Chasing and retrieving a ball on the surface seems to be enriching because it provides exercise and includes rewards. While repeated attempts to retrieve a ball provide much physical activity, it should not be confused with enrichment exercises. Such playful activities should be used for exercise and play or as a reward after returning from a trip or training session. Road work and chasing balls are not substitutes for trips to the shopping mall, outings or obedience classes most of which provide many opportunities for interaction and investigation.

Finally, it seems clear that stress early in life can produce beneficial results. The danger seems to be in not knowing where the thresholds are for over and under stimulation. The absence or the lack of adequate amounts of stimulation generally will produce negative and

undesirable results. Based on the above, it is fair to say that the performance of most individuals can be improved, including the techniques described above. Each contributes in a cumulative way and supports the next stage of development.

Conclusion

Breeders can now take advantage of the information available to improve and enhance performance. Generally, genetics account for about 35% of the performance, but the remaining 65% (management, training, nutrition) can make the difference. In the management category, it has been shown that breeders should be guided by the rule that it is generally considered prudent to guard against under and over stimulation. Short of ignoring pups during their first two months of life, a conservative approach would be to expose them to children, people, toys and other animals on a regular basis. Handling and touching all parts of their anatomy is also a necessary part of their learning which can be started as early as the third day of life. Pups that are handled early and on a regular basis generally do not become hand-shy as adults.

Because of the risks involved in under-stimulation, a conservative approach to using the benefits of the three stages has been suggested based primarily on the works of Arskeusky, Kellogg, Yearkes and the "Bio Sensor" program (later known as the "Super Dog Program").

Both experience and research have dominated the beneficial effects that can be achieved via early neurological stimulation, socialization and enrichment experiences. Each has been used to improve performance and to explain the differences that occur between individuals, their trainability, health and potential. The cumulative effects of the three stages have been well documented. They best serve the interests of owners who seek high levels of performance when properly used. Each has a cumulative effect and contributes to the development and the potential for individual performance.

References

1. Battaglia, C.L., "Loneliness and Boredom" Doberman Quarterly, 1982.
2. Kellogg, W.N. & Kellogg, The Ape and the Child, New York: McGraw Hill.
3. Scott & Fuller, (1965) Dog Behavior -The Genetic Basics, University Chicago Press.
4. Scott, J.P., Ross, S., A.E. and King D.K. (1959) The Effects of Early Enforced Weaning Behavior of Puppies, J. Genetics Psychologist, p 5: 261-81.

Early Stimulation Exercises

Figure 1 Tactical stimulation

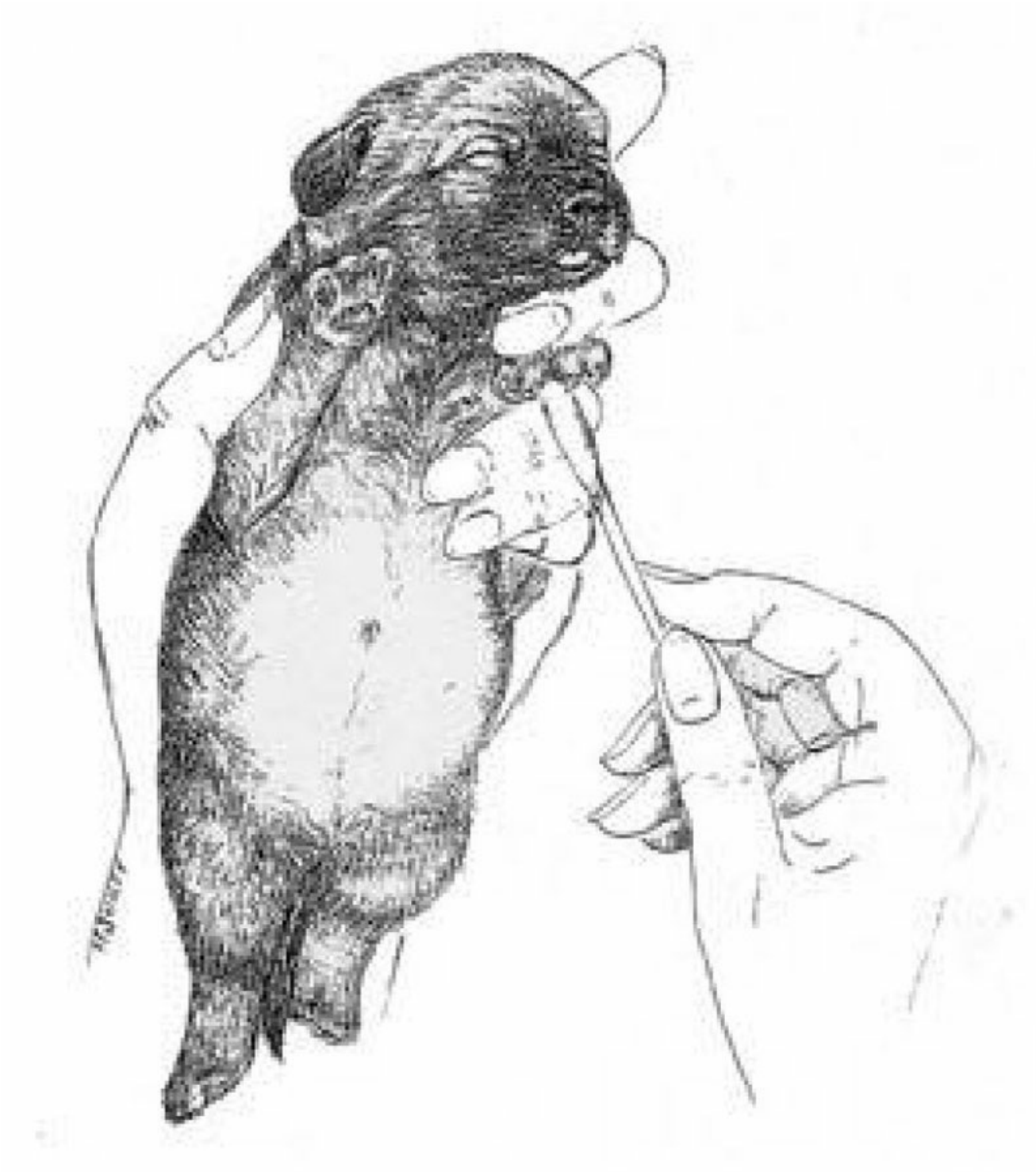

Figure 2 Head held erect

Figure 3 Head pointed down

Figure 4 Figure Supine position

Figure 5 Thermal stimulation

About the Author

Carmen L Battaglia holds a Ph.D. and Masters Degree from Florida State University. As an AKC judge, researcher and writer, he has been a leader in promotion of breeding better dogs and has written many articles and several books.Dr. Battaglia is also a popular TV and radio talk show speaker. His seminars on breeding dogs, selecting sires and choosing puppies have been well received by the breed clubs all over the country.

Log in or register to post comments