Motivation and body language as a key factor in the training of substance detection dogs
Motivator and body reading as a primary factor in the training of substance detection dogs

Jônatas Torres da Silva – Amazonas State University

ABSTRACT: The central objective of this research is to investigate the correlation between motivation and body language in the training of substance detection dogs, aiming to determine the importance of a proper understanding of these variables in the dog's performance and well-being, and consequently, lead to better operational results. The study is presented in the form of bibliographic, applied, exploratory, and qualitative research, providing an examination of the effects that motivators and body language have on the performance of substance detection dogs. Furthermore, specific theories were used that demonstrate that stress in detection dogs is a result of a combination of physical, emotional, and psychological factors. Overly demanding training, lack of motivation, adverse conditions, and inadequate teaching methods can cause stress, harming both the dogs' well-being and the effectiveness of the training. These signals include lip licking, eye aversion, yawning, stretching, and other body movements that indicate discomfort, insecurity, or frustration. If the trainer fails to recognize these signs, the dog may become stressed or unmotivated, negatively impacting its training performance.

Keywords: motivation; body language; training; dogs; detectors; substances.

ABSTRACT: The main objective of this research is to investigate the correlation between motivation and body language in the training of detection dogs, aiming to ascertain the importance of an adequate understanding of these attributes in the dog's performance, as well as in its well-being and, consequently, lead to better operational results. The study is presented in the form of bibliographic, applied, exploratory and qualitative re-search, providing an examination of the effects that motivations and body language have on the performance of detection dogs. In addition, specific theories were used to demonstrate that stress in detecting dogs is a result of the combination of physical, emotional and psychological factors. Excessive training, lack of motivation, adverse conditions and inadequate teaching methods can cause stress, harming both the dogs' well-being and the efficiency of the training. These signals include licking the lips, looking away, yawning, stretching the body, and other body movements that indicate discomfort, insecurity, or frustration. If the dog trainer fails to notice these signals, the dog may become stressed or unmotivated, negatively impacting its performance during training.

Keywords: motivation; body language; training; dogs; detectors; substances.

1. INTRODUCTION

The use of substance detection dogs is closely related to the origin and evolution of relationship between man and dog, which goes back thousands of years. According to Kátia Lopes (2012).

From the beginning of their domestication process, dogs were selected for their equal aptitude for hunting and scent, which still today are the basis for carrying out tasks such as detecting substances.

Thus, throughout history, the relationship between humans and dogs has been perfected, with dogs having crucial roles in various activities, whether through the use of their heightened senses in and work such as herding, guarding and hunting.

Today, these same scent characteristics have been adapted for precise functions (e.g., detecting drugs, explosives, and other materials). The use of dogs to detect illicit substances can be linked to the principles of behaviorism.

According to John B. Watson (1913), behaviorism is a school of psychological approach that focuses on examining observable behavior, in addition to analyzing the relationship between stimuli and responses. It is worth noting

also, that the phenomenon is especially related to operant conditioning, where behavior is shaped by reinforcements.

According to Márcio Micheletti (2016), although there are no precise records of when dogs began to be used to detect these substances, some evidence suggests that the use of dogs to search for valuable objects or substances began to be formalized in Europe in the late 19th century. As mentioned by Dantas (2022), it is known that dogs were already employed in tasks such as hunting and locating prey, and, over time, their sense of smell was recognized as a potential tool for locating objects of human interest, such as weapons or food.

Finally, during World War I, the use of dogs expanded to the military, where they were employed in surveillance and detection of landmines and other explosive devices. The use of dogs for substance detection has reaffirmed itself as one of the most effective approaches in various areas of public safety, including border operations and military activities.

According to Peixoto (2014), who talks about Skinner's learning theories, the process of training these animals for such functions requires a highly specialized methodology, which integrates conditioning techniques with a deep understanding of canine behavior.

Among the most important factors for the success of this training are the dog's motivation and the interpretation of its body language during the learning phase. Considering the importance of positive reinforcement in dog training, it is crucial to investigate the implications of the dog's learning and assimilation process.

Therefore, this article aims to understand how motivational factors and body reading influence the training and performance of substance detection dogs, and how important is an adequate understanding of these variables to optimize the effectiveness of the training process for these dogs?

To address this question, we propose a guiding hypothesis that addresses adequate motivation, combined with effective interpretation of canine body language, which are essential factors for optimizing the training and performance of substance detection dogs, promoting not only better operational results, but also the emotional and physical well-being of the animals.

In this context, the overall objective is to investigate the correlation between motivation and body language in the training of substance detection dogs, aiming to determine the importance of an adequate understanding of these variables on the dog's performance and well-being, and consequently, lead to better operational results. To this end, the following specific objectives were adopted: 1. To report the influence of motivation (intrinsic and extrinsic) on the learning and performance of dogs during substance detection training; 2. To investigate how canine body language reading can influence the training effectiveness and performance of substance detection dogs; 3. To assess the effects of failure to interpret the dog's body language during training and its impact on the animal's performance and well-bei

Regarding the hypothesis, it is based on the assumption that both the dog's motivation and the trainer's ability to correctly interpret the animal's body signals play a crucial role in the effectiveness of training dogs to detect substances.

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According to Márcio Micheletti (2016), Skinner's theory focuses on using a motivator during detection training, which is crucial to keeping the dog engaged and focused on the task. The motivator, which can be a toy or a treat, serves as an immediate reward for the dog upon finding the target odor. This creates a positive association between odor detection and the reward, increasing the dog's motivation to perform the task with precision and enthusiasm.

Additionally, using motivators helps reinforce the desired behavior, making training

more effective and efficient. In short, a suitable motivator is essential to ensure the success and consistency of the dog's performance during detection training.

On the other hand, according to Mariana Frazzi (2016), canine body reading — which involves observing signs such as posture, facial expressions, movements and even subtle changes in behavior — is essential to understanding the dog's emotional state during training, as it allows the assessment of the animal's physical and emotional state.

Understanding your dog's body language helps you identify signs of stress, fatigue, or discomfort, which can compromise the efficiency and accuracy of your detection work. Furthermore, observing your dog's posture, movements, and facial expressions can provide valuable information about their motivation and willingness to perform the task. A relaxed and focused dog tends to perform better, while an anxious or distracted dog may have difficulty detecting scents. Therefore, reading your dog's body language is essential to ensuring your dog's well-being and the effectiveness of your detection work.

A lack of accurate body language reading can lead to training failures, such as demotivation, excessive stress, or disinterest, negatively impacting performance. In this regard, this research is justified by the need to inform trainers responsible for training substance-detection dogs about the importance of using motivators correctly and, especially, the correct way to read dogs' bodies, as these aspects influence the dog's development and, consequently, will influence their work routine after training.

From this perspective, we believe in the importance of this scientific research for society, as mastering these techniques allows for the creation of highly trained dogs, ensuring efficiency and precision in their work, in addition to promoting harmonious interaction between humans and dogs, directly and indirectly impacting the safety and well-being of society. I also note that the presence of these dogs in police work contributes to the reduction of drug trafficking, preventing the circulation of illicit substances in schools, airports, highways, and public areas.

Furthermore, they help prevent terrorist attacks, such as detecting explosives before they can cause damage. This ability to preemptively intercept threats not only increases security but also creates a more protected environment for the population.

This study also promoted the professional development of the authors, who, in addition to having completed various canine training courses, also participate in the initial training of these detection dogs, as well as in substance detection missions. This work also improved the techniques used in our kennel's training routine. In this sense, the other participants in this study also benefited, as knowledge was shared during the study.

2. THEORETICAL FRAMEWORK

This section cites authors who discuss observable behavior, analyzes the relationship between stimuli and responses, and analyzes positive reinforcement. Studies and theories on canine body language and stress signals were also reviewed.

Therefore, for better understanding, we will address the issues related to the use of the motivator and canine body reading as a basis for training substance detection dogs.

According to John B. Watson (1913), behaviorism is a psychological approach that focuses on examining observable behavior and analyzing the relationship between stimuli and responses. This theory emphasizes that

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behaviors, whether of humans or animals, can be understood through environmental factors, eliminating the need to consider internal mental processes, such as thoughts and emotions.

The behaviorist movement emerged in the early 20th century, with the main goal of transforming psychology into a more objective and empirical science, based on scientific observations and experiments. Furthermore, often recognized as the founder of behaviorism, Watson advocated that psychology should be limited to the analysis of observable behavior. For him, internal mental processes, such as feelings and thoughts, were subjective and difficult to measure.

Watson postulated that, through conditioning, it was possible to shape the behavior of any organism, including humans, by manipulating the stimuli presented to them. This psychological approach provides a robust basis for training dogs specialized in detecting substances, as it focuses on modifying behavior through stimuli and reinforcement. Another well-known method within behaviorism is operant conditioning, developed by B.F. Skinner.

According to Sampaio (2005), Skinner's conditioning is widely applied in this training: dogs receive positive reinforcement when they correctly perform search tasks, such as locating narcotics and explosives. These reinforcements, which can be toys or treats, strengthen the desired behavior, increasing the likelihood of its repetition.

Thus, the dog's behavior is gradually developed through repetition and reward, without the need for complex mental processes. This behaviorist approach is highly effective because it allows for consistent and predictable learning, essential for the accuracy and reliability of dogs in their detection functions.

Regarding the reinforcement mentioned above, the motivator is one of the most important factors in training substance detection dogs, as it is directly related to the animal's desire to perform the task effectively and persistently.

According to Richard Ryan and Edward Deci (2000), motivation can be divided into two broad categories. First, intrinsic (internal) motivation. These are natural instincts and needs, such as hunting behavior, and these can be leveraged during training. Dogs have a strong predisposition to "hunt" or search for things, which aligns with the pursuit of substances.

According to Meneses (1983), this behavior is governed by a combination of primitive instincts and learning. Furthermore, there is internal satisfaction, which dogs can also be motivated by the desire they feel when performing a task correctly, such as "hunting" for substances. This type of motivation is fundamental for dogs in long-term tasks, where interest in the activity needs to be sustained by psychological, not just physical, compensation. This is extrinsic (external) motivation.

External rewards that are generally used in dog training, where dogs are recom-designed with food, toys or other stimuli to perform specific tasks.

According to B.F. Skinner (1953), one of the leading figures in the field of operant conditioning, extrinsic motivation is crucial for reinforcing desired behaviors, creating a learning cycle based on positive reinforcement. In operant conditioning, trainers can associate the pursuit of substances with rewards, which increases the likelihood that the dog will continue to perform the task correctly. Consequently, extrinsic motivation is essential for dogs in training.

intensive, when it is necessary to maintain focus and energy to perform repetitive tasks.

According to Fazio (2012), motivation is a central factor in human behavior and can be understood as the process that initiates, directs, and sustains actions toward specific goals. Motivation is described as an internal state that energizes and organizes actions, and can be intrinsic (when

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the person performs the activity for pleasure or personal satisfaction) or extrinsic (when there is an external reward involved).

Fazio emphasizes that motivation is not just a matter of desire, but also involves the evaluation of incentives and the perception of control over goal achievement. Studies such as Fazio's (2012) suggest that adequate motivation is directly linked to the effectiveness of training and the maintenance of both human and dog attention. Motivated dogs tend to be more focused, persistent, and less prone to physical and mental exhaustion during training, which is crucial for substance-detection dogs, who often must conduct prolonged searches under stressful conditions.

Another important factor is canine body language, the ability to interpret a dog's signals and gestures, a form of nonverbal communication. This skill is crucial for trainers, as dogs cannot express their emotions or needs in words, but rather through body language.

According to Turid Rugaas (2013), a leading expert in canine behavior, calming signals are gestures dogs use to communicate their emotions and avoid conflict. These signals include lip licking, eye aversion, yawning, stretching, and other body movements that indicate discomfort, insecurity, or frustration. If the trainer fails to recognize these signals, the dog may become stressed or unmotivated, negatively impacting its training performance.

According to Rugaas (2006), trainers must learn to recognize these signs and, accordingly, adjust their training techniques, providing a more comfortable and positive environment for the dog. In the same vein, a dog's behavior also reflects its emotions and psychological state.

Konrad Lorenz (1993) argues that dogs express their emotions through postures, facial expressions, and behaviors. When a dog is uncomfortable or anxious, it may display signs of stress, such as ears back, a tense body, a tail between the legs, and even avoidance of certain stimuli.

Accurately reading these signals allows the trainer to understand when the dog is overwhelmed or when it needs more motivation or a break from training, improving not only the results, but also the animal's well-being.

According to Lorenz (1971), dogs can display subtle or overt signs of stress, such as excessive barking, rigid body posture, excessive panting, or even avoiding eye contact. These signs are crucial for interpreting how a dog is reacting to an environment or situation and can help trainers avoid intensely stressful situations for the animal.

Furthermore, Lorenz highlighted the great importance of nonverbal communication between dogs and humans, emphasizing how stress signals can be interpreted and managed to promote a healthier environment for the animal.

A study by Silva Guimarães (2017) showed that a lack of understanding of a dog's body language can result in training and performance failures, as well as causing frustration and stress in the animal. In the context of substance detection, a dog that is emotionally unbalanced due to signs of stress will not be effective in its searches, as its focus will be compromised.

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Correctly interpreting signs of stress, anxiety, or distraction allows the trainer to adjust the pace of training, reinforce positive behaviors, and keep the dog motivated and focused.

Ultimately, the combination of motivation and body language is crucial to successful training of substance-detection dogs. Research by P.L. Harris (1982) indicates that effective training depends not only on the application of reinforcement methods but also on the ability to recognize and respond to emotional and behavioral cues.

3. MATERIAL AND METHOD

The study is an applied, exploratory, and qualitative study that examines the effects of motivators and body language on the performance of substance detection dogs. Theories were used that demonstrate that stress in detection dogs is a result of a combination of physical, emotional, and psychological factors. Overly demanding training, lack of motivation, adverse conditions, and inadequate teaching methods can cause stress, harming both the dogs' well-being and the effectiveness of the training.

The use of positive reinforcement, adapting tasks to the dog's level and creating a balanced work environment are fundamental practices to avoid stress and ensure optimal performance of detection dogs. substances.

This research explored the different approaches and theories surrounding the topics covered, as well as the connection between other studies and the study's purpose. The focus will be on understanding what has already been proven, which different approaches are most effective, and which questions have not yet been resolved or deserve further exploration.

One of the theories discussed was Operant Conditioning, developed by BF Skinner (1985). It is widely recognized as one of the most relevant approaches in the field of learning theory, which is motivated by the consequences of a given behavior.

According to La Rosa (2003), Skinner defines reinforcement as any stimulus or event that increases the likelihood of a behavior occurring. He distinguishes between positive and negative reinforcement: positive reinforcement involves the presentation of a stimulus as a consequence of the behavior, while negative reinforcement involves the removal of a stimulus as a result of a given action.

Skinner also categorizes reinforcers into primary, related to basic needs such as food and water; secondary, which gain meaning by being paired with primary reinforcers; and generalized, which encompass stimuli associated with multiple reinforcers.

Furthermore, the Stress Response Theory, proposed by Hans Selye (1930), which describes stress as a physiological response of the body to excessive demands, in which he described three phases (alarm, resistance and exhaustion) which we will use in our study.

In the context of detection dogs, stress can arise when training is overly demanding or when the dog is forced to perform tasks beyond its capabilities, which can harm its performance and well-being. Although Selye did not focus specifically on canine behavior, his theory of stress can be applied to animals in general, including dogs. Signs of stress in dogs, such as panting, defensive or aggressive postures, among others, can be explained by the body's response to the activation of the sympathetic nervous system, which prepares the body for "fight or flight," a concept introduced by Selye.

The Stress and Coping Theory, developed by Lazarus and Folkman, offers an important perspective to understand how sniffer dogs deal with stressful situations.

Biggs (2017) describes that, according to this theory, stress occurs when an individual (or animal) perceives that the demands of the environment exceed their resources to face them, therefore, factors such as unpredictable environments, complex tasks without adequate periods of rest or extensive training excessively rigorous can generate emotional overload and, consequently, worsen performance.

Animal welfare is defined as the state in which an individual can adjust to its environment, encompassing physical and emotional aspects that can be scientifically measured. As cited by Pereira

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(2020), modern guidelines are based on the "Five Freedoms," formalized by the Farm Animal Welfare Council (FAWC), which ensure that animals are free from hunger and thirst; discomfort; pain, injury, and disease; fear and stress; and that they can express natural behaviors. This concept has been expanded to include quality of life, which can be classified into three levels: a good life, a life worth living, and a life not worth living. The hierarchy of welfare priorities considers maintaining life to be paramount, followed by maintaining health, and finally, comfort.

According to Bazilio (2022), homeostasis, or the body's internal balance, is fundamental to animal well-being and is often affected by stress, which results from environmental stimuli that overload biological systems and can be assessed by hormonal measurements, such as cortisol levels. Finally, according to Laurino (2009), the Theory of Physiological Condition will also support our research. The dog's physical condition is one of the factors in the stress response; dogs in poor physical condition or fatigue may become more stressed during detection. Furthermore, anticipatory anxiety can increase stress in dogs that associate training with past experiences of failure or frustration.

Proper management of your dog's physical health and creating a positive training environment are essential to reducing stress and improving performance.

Studies on the importance of reading a dog's body language are essential for establishing a relationship of trust between the dog and its trainer, as nonverbal communication directly impacts training success. Therefore, based on an in-depth bibliographical foundation, we focused on understanding the principles underlying dog motivation and body language, which are fundamental to training these animals.

Furthermore, this study uses a qualitative analysis that investigates the types of motivators used and how they influence the dog's performance, in addition to exploring canine psychology, the interaction between trainer and dog, and the learning models applied to these animals.

It is concluded that these steps allowed the construction of a rich and detailed analysis, based on theoretical evidence, on the impact of motivators and body reading in the training of substance detection dogs.

4. RESULTS AND DISCUSSIONS

Regarding the various authors cited during the research, it is important to know them in detail.
about the use of motivators, as well as the correct reading of the dog during its training as a substance detector. Regarding the motivator, Skinner (1953) reports this fact citing it as reinforcement.

This reinforcement generates motivation, which is approached from a behaviorist perspective, focusing on how reinforcements and environmental consequences influence human behavior. Skinner argues that motivation is not an internal state or mental force, but rather the result of interactions between behavior and environmental responses. He emphasizes that individuals are motivated to repeat or avoid certain behaviors based on the consequences these behaviors generate, such as rewards or punishments.

Motivation, therefore, is closely linked to the process of operant conditioning, where positive reinforcements increase the likelihood of a behavior being repeated, while negative reinforcements or punishments can decrease it. In Fazio's article (2012), motivation is understood as a key factor in the formation and change of attitudes, which can be directly related to dog training.

Like humans, dogs are motivated by positive and negative reinforcements, which influence their behavior.

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Fazio suggests that motivation can be both automatic and controlled, which, in the case of dogs, can be triggered by immediate rewards or the expectation of a desired action. The trainer, by using positive reinforcement, such as rewards for a desired behavior, encourages repetition of that behavior, aligning the dog's motivation with its response to training, similar to what Fazio describes as the dynamic between attitudes and behaviors.

TABLE 1. Perception of the main motivators for behavioral reinforcement in the training of substance detection dogs.

MOTIVADORES PARA FORMAÇÃO DE CÃES DETECTORES	
EXTERNO	**INTERNO**
- Recompensa alimentar; - Brinquedos; - Jogo de caça ou recompensa através de brincadeiras; - Socialização e elogios.	- Instinto de caça; - Curiosidade e exploração; - Socialização e vínculo com o condutor; - Energia e excitação.

Fonte: Elaborado pelo autor da pesquisa/Dados da pesquisa

When we look at these examples of motivators, we realize that the main external motivators for training substance-detection dogs are related to stimuli that encourage the desired behavior during training. These motivators are used to reinforce the dog's responses, aiding the learning process. As mentioned in the table above, we have food rewards, which can be high-value treats (such as meat, biscuits, or even kibble). Food motivation is one of the most effective, as dogs have a strong association between correct behavior and obtaining a reward.

Another motivator is toys (balls, ropes, chews, etc.). Using toys as rewards can be effective, especially for dogs with a greater play drive. This creates a positive association between work and play.

Additionally, there's hunting or rewarding through play. For dogs with a strong hunting instinct, the reward can be the "capture" of an object (such as a toy), which simulates the satisfaction of the natural hunting instinct. Finally, socialization and praise are key. Vocal praise, petting, and social interactions with the trainer can also be important motivators, creating an association between correct behavior and positive interaction with the human. The internal motivators for training substance-detecting dogs are related to the animal's natural instincts and behavioral predisposition, which directly influence its ability to learn and perform tasks.

According to Meneses (1983), this behavior is governed by a combination of primitive instincts and learning. These internal motivators are essential for making training more effective, as they activate the dog's interest and enthusiasm. According to the table above, following the internal motivators, we first have the hunting instinct. This instinct motivates them to search for and locate objects, such as the substance being sought. Active search activity is natural to them and can be directed during training to detect substances. Second, curiosity and exploration. Dogs are naturally curious and have a desire to explore their environment.

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This exploratory behavior can be used to motivate them to investigate areas and objects in search of substances. Curiosity is an important internal motivator to keep the dog interested and engaged during training. The third motivator is socialization and bonding with the trainer. Dogs have a strong need to establish social bonds, and many feel motivated to please their owners or trainers.

This desire for social interaction can be used as internal motivation, as the dog seeks approval and recognition from its leader. The emotional bond and the pleasure of pleasing can be strong drivers in training.

Finally, energy and excitement. Many dogs have high energy levels, which can be channeled into specific activities such as substance detection. Enthusiasm and excitement can be used to motivate the dog to actively seek the substance with vigor, especially when combined with positive reinforcement (such as toys or rewards).

Given the above, and according to Richard Ryan and Edward Deci (2000), in their Self-Determination Theory, two main motivations stand out: intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to behavior performed for pleasure or internal satisfaction, while extrinsic motivation is driven by external rewards, such as recognition or tangible rewards.

In training substance-detection dogs, these two motivations play complementary roles. Both are essential to keeping the dog engaged and effective during training, as they combine the dog's natural pleasure with the need for external rewards to reinforce desired behaviors.

Furthermore, regarding the influence of canine body language during the training of substance detection dogs, it is essential for evaluating the progress and effectiveness of training. According to Konrad Lorenz (1993), dogs communicate primarily through postures, facial expressions, and subtle body movements, such as ear or tail position. Experienced trainers observe these signals to identify when the dog is motivated, confused, distracted, or has found a target odor.

Understanding this communication allows you to adjust training techniques in real time, reinforcing desired behaviors and ensuring that the dog develops confidence and accuracy in its detection skills. Turid Rugaas (2013) highlights, in his work, the importance of understanding canine communication signals, especially the so-called "calming signals", which dogs use to express emotions and avoid conflicts.

These signals include movements such as looking away, licking the nose, yawning, or lowering posture, indicating emotional states such as stress, discomfort, or an attempt to defuse a situation. When training substance detection dogs, this body reading is essential, as it allows trainers to identify and adjust the environment or training method, ensuring the dog remains comfortable and focused on the task. Recognizing signs of stress or insecurity helps create more positive and effective learning, promoting confidence and better performance in detection work.

CHART 2. Perception of the main body signals and their respective indications.

ASPECTOS E FATORES	
SINAIS CORPORAIS	INDICAÇÕES
- Bocejo; - Lamber o focinho; - Desviar o olhar; - Virar o corpo ou cabeça; e - Arfar excessivamente.	- ESTRESSE E DESCONFORTO
- Movimentos lentos; - Evasão ou afastamento; - Postura corporal relaxada demais; e - Bocejar e desviar o olhar.	- DESINTERESSE
- Movimentos ágeis e enérgicos; - Abanar a cauda de forma intensa; - Foco no tutor ou objeto; - Pequenos sons; e - Corpo levemente inclinado para frente.	- MOTIVAÇÃO E INTERESSE

Fonte: Elaborado pelo autor da pesquisa/Dados da pesquisa

According to the table above, Turid Rugaas (2013) highlights several signs that dogs display when they are stressed or anxious, known as "calming signals" or "appeasing signals."

Among the most common are yawning, which demonstrates discomfort or tension, and licking the nose, often associated with nervousness. Looking away or turning the head and body are ways to avoid confrontation or ease the pressure in an interaction.

Furthermore, excessive panting, out of context, reflects insecurity, discomfort, and stress. Observing and interpreting these behaviors is crucial to ensuring the well-being of dogs, especially in contexts such as detection dog training, where a positive environment is essential for learning.

Konrad Lorenz (1993) reports that dogs disinterested in an activity may present a series of behavioral signs that indicate a lack of engagement, such as slow or lethargic movements, distraction, yawning (which may also reflect boredom or stress) and even attempts to escape or move away from the place or person.

Additionally, it's common to observe excessively relaxed body postures, such as lying down during activity. Lorenz further emphasizes that these signs should be analyzed within the context of the emotional relationship between the dog and its handler, as disinterest may reflect fatigue, lack of stimulation, or emotional disconnection.

Lorenz also describes how motivated dogs interested in an activity demonstrate a series of clear and observable behaviors that reflect their excitement and engagement. These signals include agile and energetic body movements, such as jumping or quick steps, often accompanied by intense and rhythmic tail wagging.

The dog's gaze tends to be fixed on the owner or the object of interest, with full attention and evident concentration, while the ears remain erect or directed towards the stimulus.

Additionally, engaged dogs often vocalize, such as barking or making small sounds, especially when they are eager to start or continue the activity. These signals are accompanied by active body postures, such as an alert position with the body slightly tilted forward, indicating readiness and enthusiasm for interaction.

Lorenz points out that these behaviors reflect dogs' emotional bond and natural willingness to cooperate with humans or explore challenging and stimulating activities.

Furthermore, regarding the consequences of misinterpreting canine communication, Konrad Lorenz (1971) argues in his work that this error can have detrimental effects on both the animal and the humans involved. He notes that dogs, being highly communicative and expressive, possess specific behavioral signals that, if misinterpreted, can result in stress, confusion, or frustration. In training or work situations, as in the case of substance detection dogs, this misreading can lead to serious consequences.

For example, if the dog's handler fails to correctly interpret the animal's signs of fatigue, discomfort, or disinterest, it can force the dog to continue working beyond its limits, harming its physical and psychological well-being. In the context of training substance detection dogs, this misreading can compromise the effectiveness of training and operation. Dogs trained to detect drugs or explosives, for example, are highly sensitive to changes in the environment and, when signaling detection, may exhibit subtle behaviors, such as a specific posture or a change in breathing rate.

If the trainer or operator fails to recognize these signals correctly, operational errors may occur, such as ignoring a true detection or overloading the dog with excessive tasks. This affects not only the animal's health and well-being, but also the effectiveness of the operation itself.

This fact, in turn, can have consequences for society, and may result in risks to public safety, such as the failure to identify drugs or explosives, and may also lead to an increase

in the incidence of stress or disease in dogs, which, in the long term, harms the effectiveness of work units and the resources invested in training these animals.

Lorenz, therefore, emphasizes that an accurate understanding of canine language and attention to animal welfare are fundamental, not only for the effectiveness of substance-detection dogs, but also for respecting and caring for the animal as a sensitive and valuable being for society.

FINAL CONSIDERATIONS

Substance detection dog training is a highly specialized process that combines technical training and a deep understanding of canine behavior. These dogs are trained to identify specific odors, such as narcotics, explosives, or even biological substances, using their highly refined sense of smell.

Training involves steps that include socialization, developing a bond between dog and handler, and the gradual introduction of target substances, always with positive reinforcement, such as toys or rewards. This practice is widely used in areas such as public safety, border control, and even healthcare, with dogs capable of identifying diseases.

The effectiveness of this work depends both on the dog's genetics and natural aptitude, as well as on the methodology applied during training. Knowing that the trainer plays a fundamental role in the training of detection dogs, being responsible for guiding, motivating, and developing the dog's natural abilities, ethically and effectively.

The trainer establishes a relationship of trust and respect with the animal, which is essential for the dog to feel motivated to perform tasks. During training, the trainer teaches the dog to associate the odors of the target substances with rewards, using techniques based on positive reinforcement to ensure consistent and enjoyable learning.

Furthermore, the trainer must be able to interpret the dog's behavior to identify subtle cues that indicate the detection of a substance. Their expertise is crucial to ensuring that training is carried out efficiently, respecting the animal's physical and psychological limits.

To this end, it was based on theorists such as John B. Watson (1913) who discusses the psychological approach that focuses on the examination of observable behavior; BF Skinner (1985) who addresses Operant Conditioning; Richard Ryan and Edward Deci (2000) in their theory of Self-Determination that highlights the two main motivations: intrinsic and extrinsic; in addition to Konrad Lorenz (1993) and Turid Rugaas (2013) who address important points about canine body reading, among others.

The results showed that motivating is a central element in the training of substance-detecting dogs, as it drives the dog to perform its tasks with enthusiasm and dedication. Typically, the motivator is something the dog enjoys, such as a toy, a ball, or even treats. It's used as a reward during training, associating the location of the substance's odor with the pleasure of receiving its favorite reward.

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This positive association creates a stimulating experience for the dog, keeping it engaged and focused on the task. Choosing and using the right motivator is essential to reinforce learning and ensure the dog's efficient performance in real-life situations, as well as contributing to its emotional well-being. tional during training.

The results regarding canine body language showed that it is crucial for the effectiveness of training substance-detection dogs. During training, the trainer needs to interpret body signals.

The dog's behavior, such as posture, tail movement, gaze, and breathing, indicates how engaged or disengaged the dog is in training. These subtle signals reveal the dog's emotional state and level of concentration, allowing for real-time training adjustments to maximize learning.

Furthermore, the ability to understand a dog's body language strengthens communication between the animal and the trainer, creating a more effective and collaborative partnership, as well as improving the dog's quality of life and well-being. Accurately reading these signals is essential to ensuring the dog is working efficiently and comfortably, both during training and in real-world mission situations.

Furthermore, the study showed that the correlation between canine body language reading and the appropriate use of motivators is essential for successful training of substance-detecting dogs. Reading the dog's body language allows the trainer to identify signs of focus, fatigue, anxiety, or excitement, adjusting training to keep the dog engaged and comfortable. At the same time, the motivator acts as positive reinforcement, encouraging the animal to associate substance detection with a pleasurable experience.

When the trainer understands and applies these two aspects in an integrated manner, they create a more efficient and respectful learning environment, promoting the dog's well-being and ensuring more effective training. This understanding is essential for the trainer, as it allows them to build solid and clear communication with the dog, essential for reliable performance in real-life situations. Finally, to train substance-detection dogs efficiently and ethically, it is essential that the trainer constantly develops their skills.

Staying up-to-date on modern training techniques, understanding canine psychology, and prioritizing animal welfare are fundamental pillars. Continuous training allows not only for technical improvement but also for building a trusting relationship with the dogs, ensuring effective and respectful training. By balancing the pursuit of results with caring for the animals' well-being, the trainer ensures superior performance and a healthy environment for the dogs.

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