FACTORS INVOLVED IN SEARCH DOG TRAINING

A Thesis

by

MICHAEL BENJAMIN ALEXANDER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2009

Major Subject: Animal Science

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Approved by:

Chair of Committee,   Ted Friend
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ABSTRACT

Factors Involved in Search Dog Training.

(May 2009)

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Events of significant impact as recent as hurricane Ike yielded a consistent disturbing truth: we lack sufficient numbers of competent search dog [*Canis familiaris*] teams. This study was conceived to provide information in identifying factors involved in training competent search dogs. Obedience training methods, age training was initiated, previous handler canine training experience, and handler perception and emotional attachment to their search dog were examined through a sixty-six question survey. Achievement of a national certification was used as a measure of performance success. Association between factors and performance success was evaluated through Chi-Square testing. Surveys were announced through the National Search Dog Alliance (NSDA) and were available online; 177 were fully completed by respondents and used in the data analysis.

Seventy-two percent of nationally certified canine team respondents preferred positive reinforcement methods. Several statistically significant associations were detected: (a) female handlers preferred positive reinforcement training methods [$x^2 = 8.504$, d.f.=1, P = 0.004], (b) as dogs matured use of active training equipment increased

[x^2 = 54.043, d.f.= 2, P < 0.001]., and (c) four hours or more time spent training each week had a higher proportion of national certifications [x^2 = 16.379, d.f. = 1, P < 0.001]. The data also indicated a trend for handlers to have previous canine training experience equal to or greater than search dog training experience [x^2 = 118.36, d.f. = 9, P =0.05]. The results warrant further research on the effects of early training, the effects of training time investment, and the interaction between canine selection and handler understanding of canine learning theory.

DEDICATION

To my Granny, and my Late Aunt and Uncle, Pete and Polly Alquist; without their support I would not be where I am today.

To my fiancé Tiffanie Turner, for her love, support, and insight.

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To my search dogs: to Allie for guiding my way, to Fanta for teaching me how to communicate, and to Pete, my partner, for never giving up and without whom I would have never known the true meaning of the word search dog. To the late Missy and Kinsey who left everlasting impressions of integrity and heart upon my soul; thank you and god speed.

Last of all, to all the competent search dog teams. In the word of Robert Milner (2003), Lt Col, USAFR(Retired) and Search Team Manager – TN TF-1, "Search and Rescue dog trainers/handlers must hold themselves to a much higher standard of performance that any other area of animal training. Victim's lives hang in the balance. Search and Rescue dog training is a place where the trainer must put his ego in his pocket. The search dog trainer is not betting his life on his dog's performance. He is betting other people's lives on his dog's performance. The search dog trainer has a deep and profound moral obligation to select the best possible candidate for training, and to pursue the training program with the highest standards of excellence."

ACKNOWLEDGEMENTS

NOMENCLATURE

Alert   The natural behavior offered by the dog when in the presence of a target odor that signifies the dog has detected the target odor.

Drive   A vernacular used by detector dog trainers to describe different aspects of inheritable behavior, including social, prey, hunt, play, and fight/flight.

Final Response The trained indication the dog gives to indicate it has located and pinpointed as closely as possible the origin of the target odor.

HRD   Human Remains Detection.

Nerve Strength A vernacular used by detector dog trainers to describe a dog's level of adaptability to a wide variety of environmental stimuli.

Proofing   A vernacular used by dog trainers to describe the training method for conditioning the dog to ignore distractions or non-target odors.

SAR   Search and Rescue.

Source   The target odor or training aid the dog is trained to locate.

Target Odor   The specific odor the dog is trained to locate.

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INTRODUCTION

A canine [*Canis familiaris*] search team refers to a single unit, consisting of a search dog and handler. In general, canine teams are considered deployable after achieving basic certification credentials. These credentials usually consist of the dog having passed a Canine Good Citizen (CGC) test with the American Kennel Club, obedience proficiency, agility proficiency, and a certification field test in the appropriate scent detection discipline. Air scenting disciplines such as area search dogs, disaster dogs, or human remains detection dogs which work off lead must have an advanced level of control of their dogs which must be verified through obedience proficiency testing. An example of the level of difficulty required by most obedience proficiencies can be seen in Appendix A. The methods utilized to obtain this level of control will be examined in this thesis to determine the most effective training methods for SAR dogs.

Natural disasters such as hurricanes, earthquakes, and tornadoes are often of such magnitude that the use of search canines can greatly reduce the time required for rescue and/or recovery of victims. Search dogs are often needed in man-made disasters like bombings and air vehicle crashes as well. The recovery effort post hurricane Ike is the latest in a long line of incidents that showed the deficiency in the numbers of competent volunteer canine search teams. Despite organized and concentrated efforts on the part of Texas Task Force 1 (TX TF-1), The National Narcotics Detector Dog Association (NNDDA), United States Homeland Emergency Response Organization (USHERO),

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This thesis follows the style of the Journal of Animal Science.

Greater Houston Search Dogs, Cen-Tex Search & Rescue, and the Port Arthur Police K9

units, it took many weeks of continued effort to cover the forty-five plus debris fields

spread over southern Chambers County (J. Blanton, Cen-Tex Search & Rescue, Bryan,

Tx., personal communication). Previous events such as the terrorist acts against the

World Trade Center and the Pentagon Sept. 11, 2001 (9-11), the Columbia shuttle crash

of 2003, and hurricane Katrina demonstrated the ever widening gap between competent

teams and the "well intentioned but unprepared" (W. Buford, South East Louisiana Task

Force One Canine Manager, New Orleans, La, personal communication). Factors such

as obedience training method, age of obedience training introduction, training time

investment, handler skill level and experience, and handler perception must be examined

to determine the influence of these factors on performance success of a search dog.

In canine scent detection work today, regardless of the target odor, there appears

to be a great variance in the ability of a team to pass standardized certifications and

maintain the dog's working competence over a reasonable span of time. The National

Incident Management System (NIMS) was created in 2005 by Homeland Security and

The Federal Emergency Management Agency (FEMA) in an effort to avoid utilizing

unqualified dogs in disaster response. The National Incident Management System was

charged with creating guidelines outlining the types of resources utilized in search and

rescue (SAR) and mandatory minimal capabilities and qualifications for search teams.

Two guides were created. One guide (FEMA, 2005) categorizes search team resources

into appropriate categories and capabilities, while the other guide designates the

coursework, minimal credentials, and accepted credentialing agencies (NIMS, 2007) for

each resource category.   Federal and state first responders such as fire departments, federal task force teams, police departments, sheriff's offices, and emergency management agencies are now required through federal mandate to maintain NIMS compliance or lose federal funding. This mandate also requires that these agencies utilize only resources which are NIMS compliant.

While it is recommended that volunteer teams adhere to these same guidelines, there are no national mandates which require a volunteer team to be NIMS compliant. However, if the team is a recognized disaster response organization or receives grant monies from the state or federal government they are required to maintain NIMS compliance. Most volunteer teams receive no such funding and do not maintain NIMS compliance. Some states, such as Texas, are now in the process of making all volunteer teams to be utilized in disaster response NIMS compliant.   It is essential in the current environment that volunteer search dog teams demonstrate not only a desire and willingness to provide emergency aid, but the competency and credentials to be a resource rather than a liability. In the first wave of responses after a disaster, incompetence could cost not only time and money, but lives.

There is currently no mandatory national standard for search dog credentialing therefore, teams can even be fielded without any kind of credentials or certifications at all. The Scientific Working Group on Dog and Orthogonal Detector Guidelines (SWGDOG) is in the process of designing guidelines and best practices to be utilized for credentialing criteria evaluation (SWGDOG, 2005). There are organizations such as FEMA and a few state agencies such as California Rescue Dog Association (CARDA)

and the Maine Search and Rescue Dogs (MESARD) with standardized certifications for all members. There are also several well known national organizations that offer credentialing certifications for search canines that also meet the recommendations by NIMS such as the National Association for Search and Rescue (NASAR), The North American Police Work Dog Association (NAPWDA), The International Police Work Dog Association (IPWDA) and the National Narcotics Detector Dog Association (NNDDA). Local volunteer teams may utilize standards written by their own personnel which may or may not follow recommendations by NIMS. Local teams offering in-house certifications can vary greatly from organization to organization.

Tracking, trailing, and area search dogs are used to locate lost missing persons in a wide range of environments from urban to wilderness. Recovery dogs are used to locate deceased individuals in a variety of environments and scenarios. Search dogs are also utilized in the location of drowning victims. While the guidelines produced by NIMS offer a base for other disciplines besides disaster response canines, tracking and trailing dogs are not even addressed as they would be least likely to be utilized in a disaster response. Under the current NIMS recommendations, certification is recommended to be updated bi-annually. This is still less than law enforcement agencies that require yearly re-certifications but is better than many credentialing agencies such as NASAR, who do not require re-certifications at all.

Search and rescue/recovery is primarily a non-paid professional endeavor. The SAR community takes great pride in this volunteer tradition, but many well intentioned participants often lack adequate understanding of the appropriate drives, temperament,

and physical soundness that are required for a dog to become a competent search dog. Handler perception of their dog's capabilities and level of emotional attachment, while not an issue in regards to the human animal bond (Voith et al., 1992), has the potential to cause significant problems with realistic assessment of their SAR dog's competency (Carr, 2003).

Many successful methods have been identified for scent detection training (Bulanda, 1994; Hammond and Morris, 2000; Rebmann et. al. 2000; ARDA, 2002; Hammond, 2006). Given that these methods have been proven to be successful, it is unclear as to why there are still vast inconsistencies among search dog's performance. One answer may lie in the methodology chosen for foundation training, such as obedience (Hiby et. al., 2004). The type of obedience training used may have a strong influence on a dog's future success as a search dog. Many training philosophies adhere to various myths such as: a dog should not begin obedience training until after the age of 5 or 6 months (AKC, 2009) or until after the search behavior has been established. Due to environmental demands and tradition (Jennings, 1998; Stanley, 1998), most detector dogs originate from breeds that are forty pounds or larger. Breeds often used are German Shepherds, Labrador Retrievers, Belgian Malinios, Golden Retrievers, and Bloodhounds which sometimes range from seventy pounds to one hundred pounds or more at maturity. The use of the old standard advice of waiting until after a dog reaches 6 months often puts these young energetic dogs at fifty pounds or better when they begin obedience training. Size alone makes it physically more difficult to handle the dog during training. This increases the likelihood of resorting to active mechanical

equipment and compulsive methods to gain compliance to obedience commands. Compulsion is defined as "a force that compels" (Merriam-Webster, 2009). Sidman (1999) discusses a method of force whereby control over the behavior of another is gained through physical disciplinary actions used to force obedient behavior. Compulsive training methods may achieve suitable results for pet dogs however, some studies have indicated that animals trained with compulsion may not only fail to perform but suffer from stress induced welfare concerns (Clark and Boyer, 1993; Hiby et al., 2004).

Many recent studies support the theory that compulsive or punishment based training is less successful in achieving behavioral goals and increases the propensity for welfare related issues to occur (Clark and Boyer 1993; Ben-Michael et. al., 2000; Schilder and Van Der Borg, 2004;. Tilling, 2006). The American Veterinary Society of Animal Behavior (AVSAB) does not recommend punishment based training due to a variety of adverse effects which can occur (AVSAB, 2007). Some of the adverse effects cited were suppression of other behaviors and bad associations such as the handlers becoming punishment predictors to be avoided (Sidman, 1989; Schilder and Van Der Borg, 2004). Because search dog handlers often put in lengthy hours of training with their dogs, decaying the relationship with punitive based obedience methods might result in diminished success.

Myles (1991) asserted that competent training was the result of a trainer who was creative and flexible. She also argues that poor understanding of behavior on a trainer's behalf can create more problems than are actually solved. Understanding how dogs

learn is an essential element in successful training. Methods that utilize information known from learning theory research, such as clicker training (Pryor, 1994) may not only be more beneficial in obedience training methods, but decrease welfare issues due to stress and anxiety (Clark, 1993).

A variety of issues may affect the choice of obedience training methods, but in the end, the dog is dependent upon what the handler chooses. Therefore, effects of training methods and applications (Myles, 1991; Clark and Boyer, 1993) must be examined for both the public served by search dogs as well as, for the dogs themselves. The human animal bond is constantly being evaluated from ethical, social, and moral perspectives. Problem solving in dogs has recently been attributed to social ties between owner and dog (Topal et al., 1997). This makes examining the handler perception of their SAR dog's behavior and performance vital.

Identifying the contributing factors that make for a competent search dog will assist in increasing the overall numbers of competent teams available. While there are suggested best training practices (SWGDOG, 2005) for scent detection training available, factors that affect how training is approached and what types of methods are used in training foundation behaviors such as obedience may be the key. Some studies have found no correlation between obedience training and behavioral problems (Voith et al. 1992; Jagoe and Serpell, 1996) but they failed to look at the method used to train the obedience. This is pointed out by Hiby et al. (2004) who found results that indicated that compliant obedient behavior in pet dogs was correlated primarily with reward based methods.

I hypothesize that successful performance of a search dog is dependent upon the method of obedience training utilized to establish field level control. Furthermore, I predict an association between increased age of the dog and increased forceful obedience training methods. This study will also evaluate the effect of time spent training on performance success of the search dog. I predict that handlers who spend more time working with their dogs will be associated with a higher degree of success than those who spend less.

Many studies have examined the relationship between canine owner and dog (Voith et al., 1992; Clark and Boyer, 1993; Jagoe and Serpell, 1996; O'Farrell 1997; Hart et al., 2000; Bennett and Rohlf, 2006) however, no study to date has evaluated the relationship between handler perception of a search dog and performance success. I will evaluate the handler's perception of their SAR dog to determine whether increased attachment and anthropomorphic tendencies decrease competency in search performance.

LITERATURE REVIEW

Background: Biological Detector Systems; Why a Dog?

Despite electronic odor identification technology advancing at a rapid rate over the last ten years, the dog's nose is still one of the best odor sensor systems available today (Furton and Myers, 2001; Harper, 2001). Small portable electronic nose units are now available and more sensitive than humans, but there are still limitations in the number of compounds the unit can be sensitized to detect (Turner and Magan, 2004). A human's nose has approximately 5 million nasal olfactory receptors, whereas dogs have between 200 and 250 million nasal olfactory receptor cells (Kristofeck, 1991). William Syrotuck (1972) proposed in the early nineteen seventies that a dog's nose was 44 times more sensitive than that of a human. Current estimates are generally accepted at anywhere from 10 to 100 times greater than that of a human (SWGDOG, 2005). Canines have been proven to be sensitive to odors at greater than 500 parts per trillion (Johnston, 1999). Syrotuck (1972) cites Droscher (1971) as using a theoretical construct to demonstrate the dog's acuity in regards to scent sensitivity compared to a humans. In the scenario used, one gram of butyric acid, if dispersed evenly in the tenth story of an office building would be detectable to a dog throughout a city the size of Hamburg, Germany and at an altitude of 300 ft. A human would barely be able to perceive its existence even standing in one of the rooms it was dispersed into. The most accurate, durable and flexible system available is still considered to be the dog (Furton and Myers, 2001).

Competent search dogs are accurate and reliable in locating their target odor (NASAR, 1999; Rebmann et. al., 2000; Hammond, 2006; Shaffer, 2008;). They are able to work independent of their handlers. They are confident, energetic, and adaptable in most environments. They have high hunt drive yet are capable of working off lead but always under the handler's control through voice commands or hand signals (Hammond, 2006). Control of the dog in various environments, accomplished through obedience training is an essential quality (NASAR, 1999).

A Military Function: The History of Dog Obedience Training in the United States

The twentieth century saw formalized dog obedience training in the United States initiated by the military. Strict obedience training for the military dogs was modeled from boot camp training for personnel (Jennings, 1998). The 1950's saw the rise of a young trainer named William Koehler. Koehler is often thought of as one of the primary pioneers of dog obedience training in the United States. In the early 1960's, the U. S. Army K-9 Corps adopted a standardized training regimen established by Koehler (Koehler, 1983) for the obedience phase of the military dog training. Popularized by the military's use, Koehler's methods became the predominant method for dog obedience training. The Koehler Method of Dog Training, originally published in 1962, is one of the all time best selling obedience training books.

The Koehler method advocates the use of a choke chain or pinch collar and physical force mechanically applied to the dog during training, to achieve compliance to commands (Koehler, 1983). These collars allow trainers to physically control large

strong dogs. Once the dog is responding to commands, mechanical force is attenuated; however, the equipment enhances the ability of the trainer to enforce compliance.

The History of Detector Dogs

The origins of human use of dogs for scent work is lost in antiquity. Bloodhounds have been utilized for several centuries for hunting and for tracking humans, documented as far back as the 1600's (The American Bloodhound Club, 2008). Jennings (1998) relates the history of modern detector dogs had its beginnings following World War I. Jennings notes that the initial breed utilized by the United States military was the German Shepherd Dog. Lindsay (2000) relates that in 1942, the Dogs for Defense (DFD) program was launched with the assistance of the American Kennel Club to help locate dogs for the ongoing war effort. Approximately 10,000 dogs were trained to successful deployment in the war efforts (Lindsay, 2000) however, 8,000 were found to be insufficient in health or mental soundness and were returned to their owners.

By the sixties, the United States government had also tapped into the dog's olfactory capabilities by training for explosives detection. In the 1970's the use of scenting canines expanded even farther by incorporating drug detection. The United States Department of Defense is responsible for supplying many of the dogs to agencies like the Federal Aviation Administration (FAA) for explosives detection. In the 1970s, the FAA began using breeds identified by the public as friendly, like Labrador retrievers and golden retrievers due to their interaction in public facilities (Jennings 1998).

Tracking and trailing dogs were the standard tools for locating missing persons until the 1960's (ARDA, 2002). Tracking dogs utilize a scent article belonging to the

subject they are looking for to individualize that person and allow the dog to only follow that person's scent. Tracking dogs follow footstep by footstep the path that a person has walked, whereas trailing dogs do not necessarily follow the exact footfall of their subject, but follow where the concentration of the scent is located (NASAR, 1999; Hammond, 2006;). Trailing dogs therefore, may be substantially off the footpath of a subject depending upon terrain and weather conditions.

In contrast, area search dogs need no trail to follow to locate their subject (ARDA 2002) and work off lead and independent of the handler. Area search dogs are also often referred to as air scenting dogs as it is theorized they locate a person by detecting human scent from dead skin cells and chemical compounds carried by air currents (Syrotuck 1972; Stanley 1998; Hammond 2006). Area search dogs now include avalanche (Stanley, 1998), cadaver or human remains detection, (Hammond and Morris, 2000; Rebmann et. al., 2000), water drowning victim recovery (Hardy, 1992), and disaster victim rescue (Hammond 2006).

Bill and Jean Syrotuck helped pioneer the use of area search dogs for wilderness search and rescue in the early sixties. The Syrotucks veered from the popular Koehler dog training theories of the day, using only positive reinforcement methods with the search dog candidates and were very successful (ARDA 2002). Bill Syrotuck fostered the concept of selecting a dog with high prey and hunt drives who valued reward above all else. Use of this concept could produce a search dog who would willingly search for extended hours, often under adverse conditions to locate their subject and thereby, their reward.

Principles of Learning

Classical conditioning occurs when an automatic or reflexive response becomes associated with previously neutral stimulus by its pairing with an antecedent that elicits the reflexive response (Lindsay, 2000). The turn of the twentieth century in psychology also saw rapid advancements in the area of learning theory in the United States. Edward L. Thorndike theorized that animals learned through trial and error based on the consequence of their behavior. In 1911, he published Animal Intelligence. Thorndike's theory, the Law of Effect, states that stimuli which produce a response resulting in a pleasant state will be more likely to occur again and that stimuli that produce a response resulting in an unpleasant state are less like to occur again.

B. F. Skinner's work proposed that observable learning is the results of a stimulus-response-consequence contingency which can be manipulated in four manners. A stimulus can increase (reinforce) or decrease (punish) the probability of an animal repeating a behavior in the future (Skinner, 1951). These stimuli can be further manipulated by adding or removing them to increase or decrease the subsequent behavior. Learning theory and application is reviewed in detail in the Principles of Learning and Behavior by Michael Domjan. Table 1 summarizes these four states of operant conditioning.

Table 1. The four states of operant conditioning.

Stimulus	Positive	Negative
Reinforcement	Add Stimuli = Increases Behavior	Remove Stimuli = Increases Behavior
Punishment	Add Stimuli = Decreases Behavior	Remove Stimuli = Decreases Behavior

Positive Reinforcement occurs when a response produces an appetitive stimulus (Domjan, 2003). An example of this in search dog training; the dog is exposed to a target odor, the dog exhibits scenting behavior to the odor such as smelling or nosing the target then the behavior is marked with a conditioned reinforcer and dog receives a primary reinforcer. This should increase the dog exhibiting scenting behavior again.

Negative reinforcement prevents or removes an aversive stimulus resulting in an increase in the behavior (Domjan, 2003). An example of this in search dog training; an aversive stimulus can be applied to the dog until it performs a desired behavior, which ends the aversive stimuli. An example of this is when a dog fails to offer a passive final alert, such as a sit or down at target odor. The dog is then presented with target odor and jerked or shocked until a sit or down is offered. The dog increases the passive alert behavior to avoid or stop the application of the stimulus. However, one concern is whether the dog also now has an association via classical conditioning of target odor tied to the unpleasant event of being jerked or shocked. If so, this association may result in a decrease in the dog's reliability to hunt and locate this target.

Positive punishment is the application of an aversive stimulus in conjunction with the target behavior which will decrease the likelihood of the behavior occurring again in the future (Domjan, 2003). Relevant example to scent training: the dog engages in inappropriate pursuit of an undesired odor, such as that of another animal. The dog is given a verbal or physical correction which results in the dog being less likely to engage in the inappropriate behavior again.

Timing is essential. If the dog associates the punishment with any non-target behavior being performed at the time of the punishment, he is also less likely to perform that behavior. Therefore, if the dog was actually scenting a target odor and the handler misinterpreted the behavior or the target odor dissemination, it may decrease the dog's likelihood to engage in the actual search behavior.

Negative punishment, also referred to as omission training by Domjan (2003), is the removal an appetitive stimulus or the opportunity to acquire an appetitive stimulus resulting in a decreased likelihood of the behavior occurring again. Many dog trainers are now incorrectly replacing the term negative punishment with extinction. Extinction results from non-reinforcement of a behavior that has a history of receiving reinforcement (Domjan, 2003) therefore it is not an accurate replacement for negative punishment. Relevant to scent dog training: removing the dog's opportunity to obtain the reward due to undesirable behavior such as failing to offer an alert or focusing on other scents beside the target odor. The handler simply removes the dog from the training situation into a kennel and does not allow the dog the opportunity to obtain any type of reward. Often, the dog is placed within view of the training area and allowed to

watch subsequent teammates using that dog's toy reward to reward their dogs at the target odor. Eventually the handler takes the dog out of the kennel and attempts the training scenario again. If the dog goes to the correct target and offers a final response, the previously withheld reward is given. The probability is decreased for the future occurrence of the incorrect behavior of ignoring the target scent by removing the chance to obtain the reward.

Associative learning is used in scent dog training to establish associations between conditioned reinforcer and the discriminative stimulus, the specific target odor. All air scent based detection disciplines work off lead, therefore disciplines, such as area search and human remains detection, must have good foundations in obedience control. Dogs that work off lead must have a distinct and unmistakable manner to communicate to their handlers that they have located their target odor. This is known as a final response behavior (SWGDOG, 2005). Final response behaviors vary depending upon the job the dog is performing. Table 2 illustrates the different categories and types of final response behaviors.

Table 2. The types of final response behaviors

Category	Type
Passive	Sit or Down
Aggressive	Bark, Dig, Paw, Scratch, Refind, Jump, or Bringzel

The final response behavior, such as a down, is trained separately and then paired with the target odor (Rebmann, 2002; SWGDOG, 2005). The reliability of the final response behavior may be contingent upon how the behavior was initially trained. Search dogs must learn to differentiate odors, ignore distractions, orient their total attention to the location of their subject or target scent, and communicate that to their handler (Hammond, 2006). Another possible explanation for final response reliability problems may be the result of commands which have been unintentionally paired with stimulus perceived by the dog as painful, fear inducing, or aversive (Pryor, 2002).

A negative reinforcement training method that is currently gaining popularity in the SAR dog community is the use of an electronic shock collar (e-collar). E-collars are utilized in a variety of methods by both skilled and unskilled trainers. In skilled hands, an e-collar can be a useful tool as a positive punishment, sometimes even life saving, if the behavior the collar is intended to stop is one that endangers the dog, such as inducing avoidance behaviors of snakes or car chasing. E-collars can also be useful in re-enforcing compliance to commands through negative reinforcement in older dogs that have already learned basic obedience but have begun to fail to comply with commands.

E-collars work by delivering electronic shock to the neck of the dog via blunted metal prongs made to contact the dog's skin. E-collars come in a wide variety of stimulation ranges and operational adjustability. Some of the more sophisticated collars have a dial system, allowing the trainer a great deal of control over the level of shock administered. This allows trainers to utilize this type of e-collar to illicit a response for any given individual dog at minimal levels.

Training methods asserting an e-collar as positive reinforcement is both misleading and incorrect in terms of the scientific knowledge. Studies have shown that electric shock can induce avoidance behavior in animals (Schilder and Van Der Borg, 2004). While each dog is individual and has its own threshold for pain animals perceive shock as unpleasant and aversive. Alleging shock as positive reinforcement is erroneous and may therefore lead to failure in training systems based on this assumption.

The two-process theory of avoidance has provided evidence (Domjan, 2003) that if the shock is paired with a stimulus, the stimulus itself can induce avoidance. Furthermore, since the stimulus is now aversive, it can also elicit fear. Dogs and electric shock were specifically used to study the phenomena of the learned-helplessness effect by Overmier and Seligman (1967). They found that dogs exposed to inescapable shock suffered from a deficit in subsequent learning. Learning theory asserts that an animal is capable of recognizing the association between a behavior and a reinforcer. The learned-helplessness hypothesis (Maier and Seligman, 1976; Domjan, 2003) asserts that an animal learns that their behavior has no effect on whether they will or will not receive a shock and that reinforcers are random and not controlled by their behavior. This leads the animal to an expectation that their behavior is independent of shocks or rewards. This further complicates the animal's ability to learn any new associations between stimuli and consequences (Domjan, 2003). Therefore, poor timing and misuse of e-collars may lead to aversive associations, difficulty in learning, and reduced problem solving (Pryor, 2002). Since search scenarios often require the dog to problem solve to

pinpoint the origin of the target odor, using e-collars inappropriately may compromise this.

B. F. Skinner as well as Marian and Bob Bailey demonstrated that coercive methods were not the only way to achieve success in behavioral training (Bailey and Bailey, 1996). They showed that positive reinforcement and variable reward schedules could be very successful in training a variety of animals to perform competently. Bailey even worked on projects with the United States military training a variety of species, most notably dolphins, to perform difficult and dangerous tasks through positive reinforcement techniques (Bailey and Bailey, 1996). Despite Skinners earlier success, it was not until the late 1980s that these methods were brought to the dog training world by marine mammal trainer, Karen Pryor. Pryor began giving seminars in 1987 on the use of a "bridge" signal with pet dogs. Use of this method is now referred to as "clicker training" (Pryor, 2002). This method focuses on the use of positive reinforcement and free shaping to acquire desired behaviors. Desired behaviors are marked with a bridging stimulus such as a click and a reward is delivered immediately following the bridge. Free shaping promotes problem solving; which should be a quality of a search dog.

Intellectual Merit of Project

To date, there have been few formal studies comparing canine obedience training methodologies with competency in performing their task as well as eliciting the fewest unwanted behavioral repercussions. One objective of this research is to determine if search dog performance success is a function of the method of obedience training

utilized and if the age obedience training is initiated affects the type of obedience training method chosen.

Many studies to date have focused on pet dog owners and their perception of their dog's behavior in terms of obedience, behavior problems, and how they view their relationship with their dog in terms of emotional attachment (Voith et al., 1992; Clark 1993; Jagoe and Serpell, 1996; O'Farrell 1997; Topal et. al, 1997; Ben-Michael et. al., 2000; Hiby et. al., 2004; Bennett and Rohlf, 2007). Dwyer et. al, (2006) even created the Monash Dog Owner Relationship Scale (MDORS) to evaluate dog – pet owner relationships, with one of the areas focusing on the perceived emotional closeness between owner and dog, however it did not take any training aspects into account. Dywer asserts that previous terms such as handler attachment are incorrect and that a more accurate descriptive is emotional bonding, although, Voith et. al. (1992) and O'Farrell (1997) utilize the degree of anthropomorphic perception in describing the relationship between handler and dog.

There are few studies in contrast, which examine the emotional attachment of dog handlers with working dogs such as military and police and their perception of their dog's behavior (Kristofeck, 1991; Hart et al. 2000; Schidler and Van Der Borg, 2004; Lefebvre et. al., 2006). The effects of obedience training and handler emotional attachment with working dogs is of special interest to this project, as there is a wide variance of attitudes among volunteer SAR handlers as to whether their search dog is first their companion or their working partner (Rebmann et. al, 2000).

In one of two studies that focused on working dogs and their handlers, Lefebvre et al. (2006) surveyed Belgium military dog handlers. Results indicated that the officers who took their dog home during off hours and practiced bite sports with the dog, perceived a better compliance to obedience commands with the dog during work shifts. These results further indicated that as the handler perceived an increase in relationship quality as indicated by their desire to continue as a canine officer and their trust in their canine partners ability, so did the handlers perception of a higher degree of the dog's compliance to obedience commands. This leads to a circular inquiry; does time spent training increase the quality of the relationship, or does the quality of the relationship increase the time spent training. Similarly, Clark and Boyer (1993) identified a tautology of dog training which has yet to be successfully challenged or answered. Some dogs that naturally offer preferential obedient behavior obtain a high degree of reward from their owner, much like proud parents. Other owners only reward after obedience compliance is achieved. Therefore, it is unknown as to whether dogs which receive a higher rate of rewards from the owner results in an increase in obedience success, or whether obedience success increases the level of reward offered from the owner.

Hart et. al. (2000) found that the relationship between the police officer and the canine partner when at home was more closely correlated to that of an owner and pet relationship. Further, Hart found that officers that perceived their canine partner as a family pet valued their canine partner's presence and ability during duty hours more. This is contrary to the popular theory perpetuated among some SAR experts from

traditional military or law enforcement backgrounds who feel that a pet cannot be a working dog, nor can a working dog be a pet. These individuals are concerned that handler emotional attachment and anthropomorphism of their SAR dogs may result in compromised performance and the handler's assessment of performance.

There have been even fewer peer review published studies on search dogs. Two studies on search dogs focused on the ability of cadaver dogs to locate human remains. One study examined the ability of cadaver dogs to locate scattered remains (Komar, 1999), while the other study focused on canine ability to locate buried remains (Lasseter, et. al., 2003). One common problem seen in both studies was unintentional and disruptive handler influence on the dog and failure of the handler to recognize the dog's behavior and alerts.

Lit and Crawford, (2006) compared cross-trained dogs, which are dogs trained to locate both live and deceased individuals with live-only dogs, which are trained to only locate live subjects. The two groups totaled 23 dogs, all of which came from the same region of the southwest United States. Each dog completed a series of trials comprised of four choice scenarios: 1. live odor present only; 2. cadaver odor present only; 3. no odor present; and 4. both live and cadaver present. Only cross-trained dogs that utilized a separate command for each odor were used. The cross trained dogs in this study were less accurate than the live-only dogs in all except the live only test. However, the cross trained dogs were more accurate in the live-only test than the live-only dogs, even though this was the live-only dogs area of specialization. While this study has strong implications for search dog deployment issues in a disaster setting, the

study failed to evaluate several factors which may have been confounding. It failed to include a control group of cadaver only trained dogs, to test the cross trained dogs' performance against. It also did not account for the type of scent detection training the dogs in the two groups had received, either in regards to search paradigms or obedience training. Search paradigms such as distinguishing between live and cadaver when a cadaver command is offered could result in failure, if the dog had not specifically had previous experience in this type of training scenario. Lit and Crawford (2006) did not determine if there was any previous experience in choice distinction of the cross-trained dogs. Lasseter (2003) noted that dogs that were not trained on specific scenarios, such as buried skeletal remains, did not perform well on blind tests which evaluated the canine's ability to find buried skeletal remains, hence prior experience appears to be very important to successful performance. Sigma Pseudo Corpse Scent, a single chemical synthetic cadaver substitute, was also utilized in Lit and Crawford's (2006) study instead of real human decomposition training aids. It is unknown whether the dogs tested were trained with pseudo scent or with real human decomposition training aids. Training paradigms effects, scent thresholds, and scent composition are all factors which beg further investigation.

The most recently published paper on search dogs explores the ability of cadaver dogs to detect residual scent. Residual scent is a theory that decomposing human scent lingers on objects after the body and forensic evidence is removed. Carpet squares were exposed for 2 and 10 minutes to a human cadaver but without any direct contact. The dogs were tested at up to 35 days post exposure and again at 56 days post exposure.

Oesterhelweg et. al. (2008) found that the dog's sensitivity for detecting the correct targets was 98% for the ten minute samples and 86% for the two minute samples, and that there was no significant difference in the time periods post exposure for detection. That study gives much needed scientific validation to the criminal justice system to utilize canine teams in crime scene investigations.

We have exploited the dog's incredible olfactory abilities to benefit us for thousands of years. Scent detection dogs are valuable tools in homeland security, disaster response, and the rescue or recovery of missing persons. This study will examine the following objectives.

Objectives

- Determine the relationship between handler previous canine training experience and search dog performance on scent detection standardized national certifications.

- Determine the relationship between the age at which the dog is started in obedience training and the type of method used to train obedience behaviors.

- Determine the relationship between type of obedience training methods used to train behaviors utilized for field control and search dog performance on scent detection standardized national certifications.

- Determine the relationship between the total numbers of training hours spent each week and the handler's attainment of a nationally certified detector dog.

- Determine the relationship between handler perceptions of their search dog with the achievement of a nationally certified detector dog.

MATERIALS AND METHODS

A survey questionnaire was developed to analyze factors affecting search dog performance. National, Regional, and State Certifications were selected as a measure of performance success due to the enormous amount of variation that could exist within local team standards and the inability to review these standards for each respondent.

Subjects

Self reported search dog handlers from across the United States were solicited through email list server notifications and the National Search Dog Alliance (NSDA) webpage and online newsletter. A required limitation of the study was to ensure confidentiality; therefore any names attached to the survey were deleted. State location was kept to examine regional differences. Search dog handlers did not have to be a member of NSDA to participate in the survey. Participating handlers were directed to an online survey at surveymonkey.com. Two hundred-twelve responses were recorded from Sept 1, 2007 until April 30, 2008, however, 35 surveys were discarded due to incomplete information or inappropriate responses. Handlers of varying experience level had the opportunity to participate, as well as those without certified dogs.

Survey Instrument Design

One-hundred and sixty six questions were developed through literature research and discussions with over twenty expert SAR trainers from across the United States. Sixty-six questions were then selected to evaluate five categories of factors; obedience training methods, training time and paradigms, handler skill and experience, and handler

perceptions of their SAR dog. A pilot survey was conducted with 10 local handlers.

Clarifications and minor changes were made based on input from the pilot survey.

The finalized survey as available to the SAR handlers is listed in Appendix B.

Questions 1 through 20 determined demographics. Demographics included the state of

residence, age and sex of the respondent and the respondent's dogs, dog breeds, scent

disciplines, and certification status and issuing agency. Nine recognized national

certifying bodies were listed in question 11, with a tenth option to write in an agency if

included in the choices. Questions 1 through 8 were open ended to allow for individual

specific answers. Questions 15 and 16 determined the respondents years of generalized

canine training experience and SAR dog training experience. Questions 21 through 31

evaluated obedience and agility training methods. Methods were evaluated through age

of training onset, equipment choice and training scenario questions. Methods were

categorized as either positive reinforcement or compulsive. Positive reinforcement

methods for the purpose of this study were defined as methods utilizing capturing,

shaping, and luring to train a behavior (Table 3). Compulsive methods for the purpose

of this study were defined as methods utilizing mechanical force to physically induce a

behavior during training.

Table 3. Classification and definition of training methods utilized to teach basic obedience and agility.

Method Classification	Training Techniques
Positive Reinforcement	
	Capturing
	Luring
	Shaping
Compulsion	
	Physical Manipulation
	Mechanical Force

Capturing is a technique in which a trainer rewards an animal for a spontaneous behavior when it is offered. Luring is a method where a food treat is used to lure the dog into position. Shaping a behavior begins with a trainer having a predetermined final goal behavior. To achieve this goal the trainer begins with reinforcement of small approximations of the behavior. Once an approximation is established as a reliable behavior, a new approximation that is closer to the goal behavior is then required for reward. Through this method of incremental steps, previous approximations are extinguished and the goal behavior is achieved. Compulsive methods utilize some type of mechanical force to achieve the desired behavior.

Different types of equipment can enhance a trainer's ability to physically induce a behavior therefore questions 26 through 28 asked handlers to indicate the types of equipment they would utilize for different age groups of dogs. Equipment choices given were categorized for statistical analysis as passive or active in terms of the mechanical

action involved in their utilization (Table 4). Equipment patents were referred to for the mechanical action of buckle collars, harnesses, front pull harnesses, head halters, slip and limited slip collars, and pinch collars. Passive equipment was categorized as such due to their inability to maintain a force ratio putting the handler at a mechanical advantage. Active equipment was categorized as such due to their ability to maintain a force ratio which gives the handler a physical advantage over the dog regardless of the dog's weight. Buckle collars induce the opposition reflex, which results in no mechanical advantage for the trainer. Harnesses also induce opposition reflex, however, in this case it works in the favor of the dog due to the construction of the harness with straps going over the shoulders and nothing directly around the neck, allowing the dog to lean into the harness and gain a physical advantage. Front pull harnesses, however, changes any force to a rotational effect, turning the dog towards the trainer and eliminates opposition reflex. Limited slip collars function through a limited tightening and releasing mechanism. Head halters function through a mechanical lever action, whereby the handler pulls upward and gravity forces the hindquarters to the ground with some assistance. Choke chains function through a tightening and releasing mechanism, which can, if improperly used, literally choke the dog. Pinch collars function through the application of pressure to the neck through multiple prongs which penetrate the fur and contact the skin. Electronic collars were included in the active category despite no mechanical action due to their ability to exert force through electrical shock.

Table 4. Equipment classification in terms of mechanical force induced upon the dog during training.

Collar Type	Functional Assessment
Passive	
None	Non-mechanical
Buckle	Non-mechanical, opposition reflex
Harness	Non-mechanical, opposition reflex, pulling force
Front Pull Harness	Limited mechanical, rotational force, no opposition reflex
Active	
Limited Slip	Mechanical, limited slip/choke force
Head Halter	Mechanical, lever force
Slip	Mechanical, choke force
Pinch	Mechanical, limited choke and pressure point force
Electronic shock	Mechanical, electric stimulation

Question 32 through 55 determined training regiments and paradigms. Factors examined were the amount of time respondents spent training each week and discipline specific factors such as introduction of target odor, how the final response was trained, the type of final response, and training maintenance paradigms. Questions 56 through 66 focused on handler attitude, philosophy, and perception in regards to their SAR dog and SAR training in general.

Question 56 and 57 determined the reason for the dog's acquisition, where the dog was obtained, and where the dog slept to determine handler attachment. Sleeping location has been used in several previous studies to determine attachment levels (Hart

et. al., 2000). Question 58 listed five descriptive terms which the handler was instructed to choose all that they felt applied to how they perceived their SAR dog. No definitions were provided to the handlers. These terms were ranked from least to most anthropomorphic based on common definitions and vernacular's common to the search dog industry (Table 5). These raw scores were then added together for each answer and divided by the number of answers to give an average score for ranking the handlers perception of their SAR dog.

Table 5. Question 58 terminologies defined (Merriam-Webster, 2009) and scored for analysis of anthropomorphic perception of the handler towards their search dog.

Term	Description	Score
Tool	Instrument or apparatus	1
Pet	Domestic animal kept for pleasure not utility	2
Partner	Associate especially in action or business	3
Companion	A comrade, intimate friend, or associate	4
Family Member	Common ancestry, convictions, or affiliations	5

Statistical Analysis

Two Hundred-Twelve survey responses were recorded, of which 35 were excluded due to incomplete or otherwise invalid answers. A sample size of 177 surveys was viable for calculating statistical tests for each set of comparisons. All associations in this study were analyzed using non-parametric statistical tools. Survey data was analyzed using the Chi-square test with *SPSS,* 16.0 and by hand (Jagoe and Serpell,

1996). G-tests were performed for confirmation and P values for the G-test were pre-set at $P = 0.05$. Except for demographic information in questions 1 through 8, questions were close ended and were either categorical, rank, or scale in nature. Scale questions were on a five point scale. Question 58 allowed for multiple choices therefore scores were summed and then divided by the number of choices to produce an average score on a scale between 1 and 5 for statistical analysis (Dwyer et al., 2006; Bennett and Rohlf, 2007).

RESULTS

Demographics

Respondents from across the United States participated in the survey (Table 6). Texas canine handlers had the greatest proportion of participation with 38 respondents; however, at least one response was obtained from each of 48 states.   Thirty-eight states were represented with 2 or more responses.

Table 6. Number of handler respondents from each state.

State	Response Number
TX	38
CA, MO	9
NY	8
FL	7
IL, IN, PA	6
NM, VA, WA	5
AL, MD, OH	4
HI, IA, MA, MI, MT, UT, WY	3
AZ, CO, KS, ME, MN, MS, NC, NJ, OK, OR, RI, SC, TN, WI	2
AR, DE, GA, KY, LA, NE, NH, SD, VT, WV	1

Respondents indicated the breeds of dogs they owned that were mission ready for deployment. The most common breed among mission ready dogs was the German Shepherd Dog with over 48 dogs. Labrador retrievers, mix breeds, Border collies, Golden retrievers, Belgian malinois, and Bloodhounds were the next most popular breeds utilized (Table 7) followed by other herding, sporting, hound, and working breeds. Questions 7 and 8 were open ended questions and answered in an inconsistent manner therefore were excluded from the data. The data was also evaluated for an association between breed and training method selection, and no relationship was found.

Table 7. Number of mission ready canines by breed.

Breed	Number
German Shepherd Dog	48
Labrador Retriever	23
Mixed Breed	14
Border Collie	12
Golden Retriever	11
Belgian Malinois and Bloodhounds	10
Doberman Pinschers	4
Australian Shepherds and Collies	3
Rottweiler and Catahoula	2
Belgian Sheepdog, Chesapeake Bay Retriever, Flat Coated Retriever Rhodesian Ridgeback, English Shepherd, German Short Haired Pointer, Springer Spaniel, Weimeraner, Viszla, Pit Bull, and Newfoundland	1 each

Questions 9 and 10 found the highest proportion of respondents were certified at both the national and local level in area search dogs, followed by human remains detection, and water recovery (Table 8). The most poorly represented category of search dogs in the survey were avalanche dogs, with only 11 locally certified dogs and 1 nationally certified dog. Although area search dogs comprised the largest number of certified dogs either locally or nationally, human remains detection dogs comprised the discipline with the greatest proportion that were nationally certified at 62% (Table 5).

Table 8. Distribution of local and national certifications by discipline.

Certification	Local	National	Percent of Discipline with National Certification
Trailing	50	21	42%
Area Search	113	60	53%
Avalanche	11	1	9%
Human Remains	79	49	62%
Water Recovery	56	21	36%
Disaster Live	37	18	50%
Disaster Human Remains	20	8	40%

The distribution of National Certifications from question 11 are shown in Table 9. Nine responses in the "other" category were validated as being state or regional certifying bodies. Validation was obtained by internet searches for the organization

marked in "other". If not located, officials from other organizations in the respondents region were referenced for the organizations existence and legitimacy. Five responses in the "other" category for national certification could not be validated and where therefore excluded. Twenty-one handlers had certifications with multiple national organizations. One hundred seventy of 177 respondents had dogs that were at minimum, certified locally, and 95 respondents had dogs certified nationally. Seven respondents indicated they had dogs they were deploying on missions without any type of certification.

Table 9. Number of national certifications of respondents per organization.

Organization		Responses
The National Association for Search and Rescue	(NASAR)	47
The National Narcotic Detector Dog Association	(NNDDA)	17
International Police Work Dog Association	(IPWDA)	12
The North American Police Work Dog Association	(NAPWDA)	12
Federal Emergency Management Association	(FEMA)	11
North American Search Dog Network	(NASDN)	9
The Alliance of Search K-9's	(TASK)	7
The American Rescue Dog Association	(ARDA)	5
Law Enforcement Training Specialists	(LETS)	2
Other recognized State or Regional Organizations		9

Question 13 and 14 determined the sex and age of the respondents. Age did not
show a significant relationship with any other factors.   However, handler gender (Table
10) was associated with of the type of obedience training and agility training method
chosen (x^2 = 8.504, d.f.=1, P=.004). G-test confirmed the association (G = 8.46, 1 d.f., P
= 0.05). Seventy-six percent of female respondents indicated they use positive
reinforcement methods, whereas males used positive reinforcement only 54% of the
time.

Table 10. Gender and training method comparison.

Obedience and Agility Training Method	Gender	
	Male	Female
Positive Reinforcement	54%	76%
Compulsive	46%	24%

Previous Canine Experience versus SAR Experience

Question 15 addressed the number of years respondents had experience in any
type of canine training while question 16 addressed the number of years of experience
respondents had in canine SAR training (Table 11). Data was analyzed using the Chi-
square test for association and the G-test for independence. An association was found
between previous canine experience and SAR canine experience [x^2 = 118.36, d. f. = 9, P
=0.05]. G test confirmed the association (G = 136.72, 9 d. f., P = 0.05). The trend
showed handlers had previous canine training experience equal to or surpassing their
years of experience as SAR canine handlers. However, no relationship was found

between previous canine training experience or SAR training experience, and national

certification achievement. The only exception was found in the category of one to five

years of SAR experience, where 9 respondents indicated that they had more SAR

experience than previous canine training experience.

Table 11. Previous canine training experience versus SAR canine training experience.

	Previous Canine Training Experience				
	Less than 1 yr	1 to 5 yrs	5 to 10 yrs	10 to 20 yrs	More than 20 yrs
No National Cert.					
Less than 1 yr SAR	1	0	0	0	0
1 to 5 yrs SAR	0	10	8	5	4
5 to 10 yrs SAR	0	0	16	5	9
10 to 20 yrs SAR	0	0	0	14	16
20 yrs plus SAR	0	0	0	0	5
National Cert.					
Less than 1 yr SAR	1	3	1	0	0
1 to 5 yrs SAR	9	0	6	7	3
5 to 10 yrs SAR	0	0	0	3	4
10 to 20 yrs SAR	0	0	0	1	5
20 yrs plus SAR	0	0	0	0	8

Age and Obedience Training Method

Questions 22 through 25 examined the preferred age to introduce scent training, obedience training, and agility training (Table 12). The relationship with national certification could not be examined because the survey did not instruct respondents to choose only a certified or non-certified dog as the basis of their responses.

Table 12. Age of training when dogs were first introduced to obedience, agility, and scent detection (live and human remains detection) training.

Age	Obedience	Agility	Live Scent	HRD Scent
Before 6 wks	7	3	3	5
6 to 8 wks	53	14	34	8
8 to 10 wks	39	15	25	10
10 to 12 wks	30	20	19	10
3 to 6 months	23	40	35	21
6 mos. to 1 yr.	13	44	22	28
1 yr. to 2 yrs.	11	28	17	32
Above 2 years	1	3	9	23
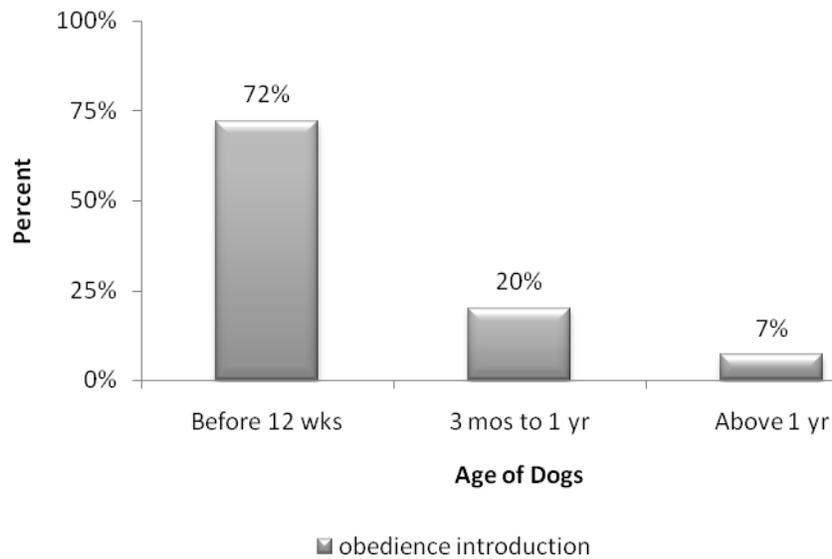
Figure 1. Percentage of handler responses indicating the age they prefer to introduce obedience training.

Obedience training introduction (Figure 1) shows a that a high proportion of search dogs are introduced to early learning, with 72% of respondents choosing to introduce obedience training before 12 weeks of age. Of that group, almost half, 47% prefer to begin teaching obedience to their puppies before 8 weeks of age. Over 80% of the responses indicated respondents introduced agility training at less than 1 year of age. In contrast to early obedience training (Figure 2), only 50% of the responses indicated an introduction age between 3 and 6 months to agility and even fewer less than 3 months of age.
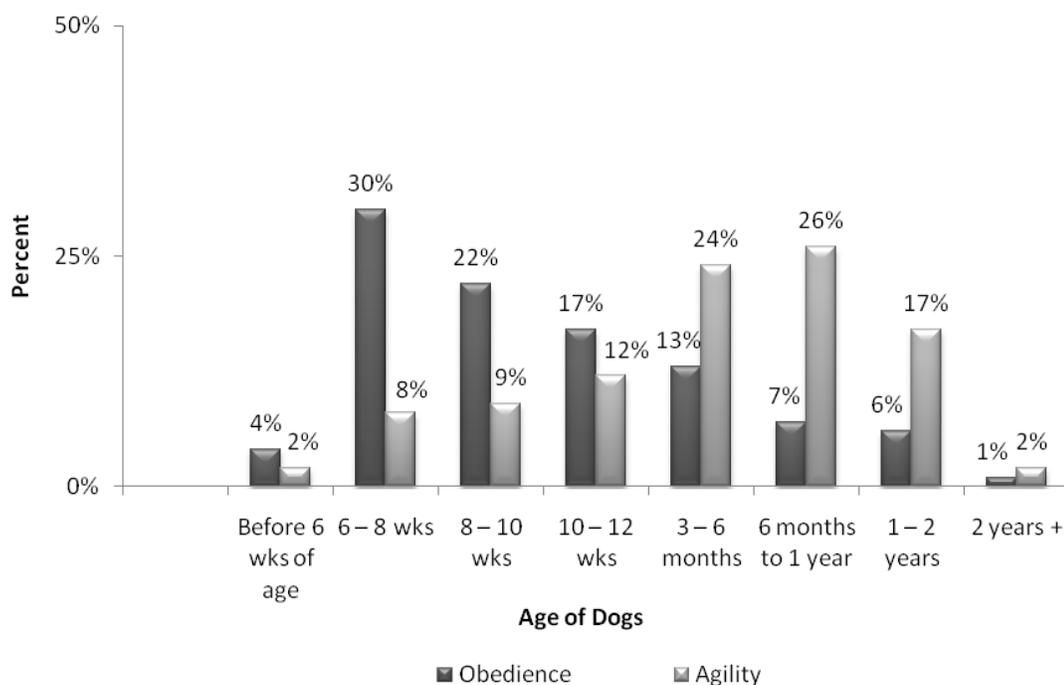
Figure 2. Percentage of handler responses indicating the age they preferred to introduce agility training versus obedience training.

Data obtained from questions 26, 27, and 28 were analyzed in terms of the type

of equipment a handler used with a given age group of canines. Respondents could

select more than one piece of equipment within each age group. The responses for these

questions can be accessed in Appendix B. No collar, buckle collar, harnesses, and front

pull harnesses were selected as passive due to their lack of mechanical application,

whereas, head halters, choke chains, pinch collars, and e-collars were selected as active

due to the mechanical component of their administration. Martingale collars were

eliminated from the final data analysis due to their ambiguous nature in terms of

mechanical application. The Chi-Square test showed an association [$x^2 = 54.043$, d.f. =

2, P < 0.001] between increasing age of the dog and the increasing handler willingness to use active equipment (Figure 3). G test confirmed the association (G = 56.722, 2 d. f., P < 0.001). The data was also analyzed with front pull harnesses and martingale included in the active category. Both analyses showed the same trend in increasing age and increasing use of active equipment at a P < 0.001.
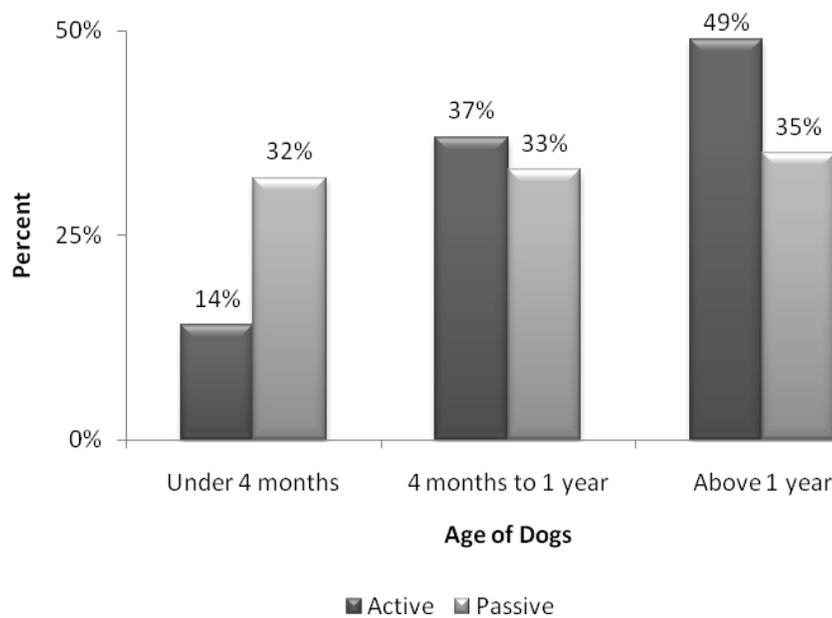
Figure 3. Percentage of handler responses indicating an increasing preference for active versus passive equipment for obedience training as the dog matures.

Obedience Training Effects

The results from question 29 when paired with nationally certified respondents indicated a 72% preference of positive reinforcement training methods for obedience. Sixty-eight of the 95 nationally certified handlers selected the positive reinforcement

methods of shaping or luring to teach an obedience behavior, whereas, 27 selected one

of the compulsive methods (Figure 4). The same proportions were also found for

method selection in teaching a new agility behavior. The data obtained did not allow for

comparison between dogs failing to achieve national certification and those which did

because there was no question which specifically addressed whether the respondent had

attempted and failed a national certification. Therefore there was no way of categorizing

those without national certification in terms of success.
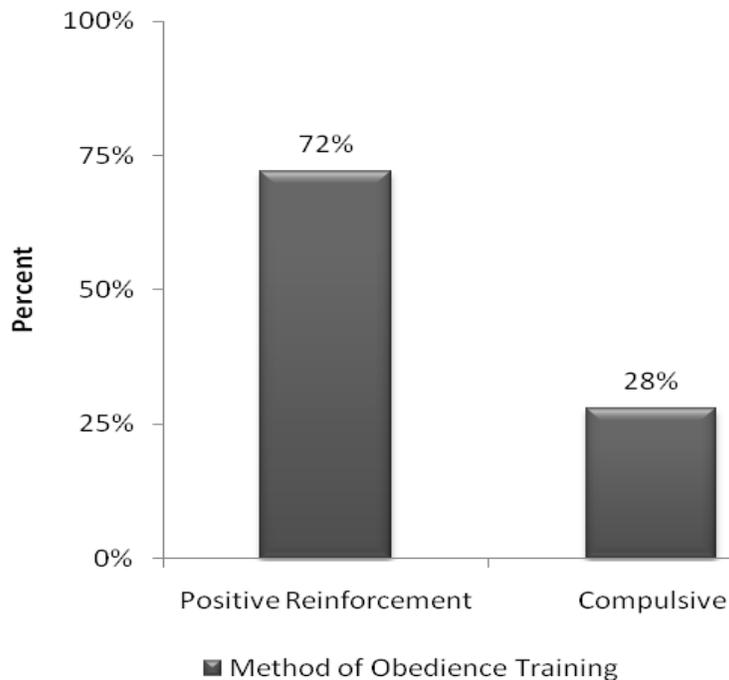
Figure 4. Percentage of nationally certified handlers prefering positive
reinforcement methods for obedience training versus those prefering complusive
methods.

Weekly Training Time

The amount of time spent in training each week was compared with whether the handler had achieved a national certification. Based on court precedent of a minimum of four hours per week as an acceptable standard for scent detection dogs (Fleck, 2008) the data was organized into two categories, one exceeding four hours and one less than four hours (Table 13). The Chi-Square test found an association between more than four hours time spent training with achieving national certification [$x^2 = 16.379$, d.f.=1, P <. 0001]. The G test confirmed the association (G = 16.633, 1 d. f., P < 0.001).

Table 13. Training time compared to performance success as measured by national certification.

Hours per week	National Certification	No National Certification
Less than 4	19	42
More than 4	74	41

Handler Perception

The emotional attachment the handler felt for their SAR dog was examined with questions 56 and 57. The reason for acquisition of the dog, where the dog was obtained, and where the dog slept were selected as attachment indicators (Hart et Al., 2000). Chi-Square analysis for independence was applied and found no relationship between

achievement of a national certification and handler emotional attachment. G test for independence was applied and found no relationship.

The handler's perception of their SAR dog (O'Farrell, 1997; Voith,1992) was examined with question 58. Descriptive terms were used as indicators of the handler's level of anthropomorphic perception (O'Farrell, 1997; Voith,1992) of their SAR dog. Respondents could select multiple terms describing how they considered their SAR dog. These terms were not previously defined by the researchers for the respondents, it was left to their interpretation. Ranked combined numerical scores were assigned by the researcher for data analysis (Table 5). No significant association was found between the handler's level of anthropomorphic perception of their SAR dog and national certification achievement. Nationally certified (83%) and non-certified handlers, (90%) responded at a similar level of anthropomorphic perception of their SAR dog.

DISCUSSION

This study analyzed self-reported search dog handlers for several factors affecting performance success. There is little peer reviewed research data available on search dog teams. The National Search Dog Alliance facilitated this research through announcement of this survey on their list servers and website. Conventional data about survey participation indicated response numbers would be poor with a large number of questions, however, many comments submitted by the volunteers who participated in this survey indicated their willingness to have taken an even more in depth survey. This survey produced several significant associations related to achievement of national certification.

An association was found between handler gender and obedience and agility training method selection. The data demonstrated men's preferential use of compulsive training methods at 46%, whereas women opted for positive reinforcement methods (76%). Due to the large bias in demographics towards females, 57 men to 123 women, there could be bias in determining whether national certification was more likely to be obtained by men or women. This may also be an indication that there are more female handlers involved in SAR than men.

The data obtained indicated that previous canine training experience was associated with canine SAR training experience. The data in Figure 3 shows a greater proportion of SAR experience than previous canine training experience at less than 5 years. However, at five years or greater, SAR canine experience is equal to or exceeded by the number of years of previous canine training experience. A drop in total

responses in the 1 to 5 year category may be indicative of handler drop out due to training issues, testing failures, or lost interest. Further research in this area is suggested especially in regards to handler's understanding of the principles of learning theory and its application with search dogs. Surveying handlers prior to initial tests and then following up on the portion of handlers who failed their first national test five years later would also help clarify if and where a drop-out rate occurs or whether those handlers continued to participate at local levels without any credentials. This will also assist in evaluation of factors which are contributing to failure on certifications.

Responses indicated that seven handlers were deploying their dogs on missions without local, regional, or national certifications. Though this figure is low, the fact that there are any individuals at all fielding their dog without some type of unbiased credential should be examined. This supports the need for unified agreement of handlers across the United States to support some kind of minimal standard certification requirement be it at the state, regional, or national level.

This study indicates that SAR dog handlers prefer early introduction to obedience training, with over 73% of respondents preferring to begin their puppies in obedience before three months of age, and of that a little less than half prefer to begin obedience training even earlier than 8 wks of age. This study raises important questions about the role that early learning plays in the career of the SAR dog. These findings contradict the standard practice of waiting until a dog reaches 5 to 6 months of age to begin obedience training advised to many dog owners (AKC, 2009). Although many trainers offer puppy kindergarten classes and many veterinarians now recommend early training, many still

recommend 6 months of age. While we were unable to determine if there were any differences in success rates between canines that began training at an early age versus those who began as young adults due to the design of the survey, it is clear from the large numbers of handlers indicating they prefer starting dogs at a very early age that the affects of early learning on SAR dog performance deserves more research.

A reversal in the trends of early obedience introduction and early agility introduction is seen in the data. It is important to point out that delay in agility introduction may be due in part to physical development and standard veterinarian advice to delay jumping and other stresses on developing muscles, tendons, ligaments, and bones until the dog is more mature. Delay of agility introduction to prevent injury to developing puppies fails to take into account that a growing trend among many experienced SAR handlers (T. M. Turner, Cen-Tex Search and Rescue, Bryan, Tx., personal communication) is to scale their agility equipment to the size of the puppy, therefore encouraging confidence in the puppy on different types of surfaces with variable stability, while not endangering the puppy's health.

Puppies are generally weaned somewhere between 6 and 8 wks of age. Some SAR dog handlers are initiating introduction to obedience training even earlier than the common weaning age. This is often accomplished by raising the litter themselves or purchasing puppies from breeders who utilize enriched environments and begin obedience, agility, and human remains scent introduction at ages ranging from birth to six weeks. In contrast to the tradition of starting a dog at six months or older, documents now released from the military on the Biosensor program, (Battaglia, 2001) offer

scientific evidence to support the benefits of early enrichment and training (Scott and

Fuller, 1965). Five benefits that were noted were an increased tolerance to stress,

enhanced cardio vascular performance and stronger heart beats, healthier adrenal glands,

and more resistance to disease. Each of these factors could enhance the chance of

producing puppies better suited for the stressful environment to which search dogs are

often exposed too. Further support for the potential of early enrichment was found by

Wells and Hepper (2006) who found evidence that supports that puppies are able to

detect specific scents while still in the womb.

The method of selection for early introduction to obedience, agility, and scent

training may be important in future performance success. Pick of the Pack; Selecting

Your Canine SAR Partner, is a book currently in press by the National Search Dog

Alliance (NSDA) that concludes with a chapter entitled "Puppy Enrichment" (Crippen,

2008). This chapter was authored by nationally credentialed search dog handler T.

Turner and co-breeder of the litter. It documents the recent raising of a litter of six

Border collie puppies. This litter, born in May 2007 was raised with early enrichment

techniques as utilized in the Superdog program (Battaglia, 2001) as well as early

introduction of different types of surfaces, obstacles, and noises. All six puppies began

their introduction to positive reinforcement obedience training beginning at 4 weeks of

age. The puppies were then trained in their various scenting disciplines with positive

reinforcement methods utilizing toys as the primary reward objects. All six of these

puppies as of this writing are SAR dogs. All achieved their CGC at fourteen months of

age. All passed agility proficiencies at one year of age and obedience proficiencies at

sixteen months of age.   The four pups trained in human remains detection achieved their first outside and national certification from NNDDA at sixteen months of age, and the other two are in training for live subject detection.   Experienced breeders and trainers of working scent detection canines (R. Utley, National Narcotics Detector Dog Association, Beaumont, Tx., personal communication) point out that this level of performance success is statistically unlikely in a litter. Further research on the effects of early training in search dogs could substantially enhance the ability of handlers to increase performance and competency in future generations of search dogs.

There is a great deal of anecdotal evidence supporting the use of positive reinforcement methods for obedience training of search dogs versus traditional compulsive methods. One argument used to support positive reinforcement methods relates to the dog's willingness to stay committed to a target odor, even if that behavior conflicts with the handlers commands. Many search dog trainers feel that dogs that have had compulsive obedience training are not capable of this level of commitment and therefore can easily be pulled off of a target odor. In fact, many bloodhound trailing handlers will not teach any, or very minimal, obedience in fear of this conflict affecting the dogs performance. No studies have evaluated the relationship between obedience control and the level of independence required in SAR dogs to stay committed to their target odor. Only one study has compared obedience methodology and performance success, and this was in pet dogs' ability to satisfactorily comply with owner commands (Hiby et. al., 2004). Hiby et. al. (2004) found that obedience success was associated with positive reinforcement training rather than compulsive methods. Obedience

success as defined from a SAR dog handler perspective may vary from this population, as well as from handler to handler.

Obedience training methods were evaluated in terms of positive reinforcement or compulsion. Positive reinforcement methods included capturing, shaping, and luring the dog to obtain the behaviors. Compulsive methods include mechanical force used to obtain behaviors. We acknowledge that varying degrees of discomfort exist within compulsion training dependent upon the equipment, the dog's pain threshold, and the execution of the compulsion by the trainer. In 95 respondents that had obtained a national certification, 72% preferred to utilize positive reinforcement methods for teaching obedience, whereas, only 28% preferred to use compulsive methods. This preference also applied to teaching agility.

Training paradigms responses indicated a small proportion of SAR dog handlers who claimed one hundred percent accuracy of their dogs. Two questions attempting to evaluate training paradigms recorded seven parallel responses which indicated they perceived their dogs as providing the correct response one hundred percent of the time in one question and with the other question that there dog never offered an incorrect response to a search problem. All seven responses came from canine handlers that indicated their dogs were certified through FEMA and five had dogs certified only through FEMA and no other agency. The court recognizes that no dog is capable of 100% accuracy and has set a precedent that sixty-two percent accuracy is reasonable and acceptable for detection dogs. It is also important to point out that even in the most delicate and accurate scientific machines, have a known error rate (Kiely, 2006).

Therefore, it is highly unlikely that the responding FEMA handlers' canines exceed court-recognized standards so drastically. It is important to point out that it is a standard practice for search dogs trained to detect live victims always has the dog succeed in training, regardless of the situation or any problems encountered. This could account for a biased responses or inaccurate performance assessment.

Time invested in weekly training showed a statistically significant association to handler's with nationally certified dogs. The minimal hours of weekly training set in court precedent is four hours per week of training for law enforcement agency detector dogs (Fleck, 2009). In actuality, most of these dogs greatly exceed this minimal number of hours due to the maintenance of the scent detection specialty, obedience and agility maintenance, not to mention actual duty hours that the canine works (Hart, et. al., 2000). Law enforcement canine officers must also maintain a training log which can be held accountable in a court of law for minimal hours spent in weekly maintenance training, a minimal accuracy of sixty-two percent, and annual re-certification credentials (Fleck, 2009). While there are no mandatory laws concerning credentials for civilian owned search dogs, handlers that are called to court to testify in cases they have participated in are held to the same level of proficiency. This supports the correlation found between more hours spent training and national certification achievement, as it more closely resembles the level of accountability as deemed appropriate by a court of law.

Unlike law enforcement handlers, civilian handlers do not get paid for training their dogs. Civilians may therefore be motivated by a different set of factors regarding training time investment in their search dog. A variety of motivations may be involved

and overlapping in regards to search dog handlers. These motivations could be similar in nature to other volunteer emergency services such as volunteer fire fighters. The sense of altruism and compassion and a sense of purpose may be motivating factors. Most handlers must pay for all training and credentialing on their own. It is estimated that maintaining a SAR dog requires about $2000 per year (NASAR, 2008) on top of standard dog owner expenses.

The desire of the handler to assist their fellow man or community may be notable motivation but the enjoyment the handler gains through the interaction with their dog may be equally motivating (O'Farrel, 1997). The amount of time a canine handler may engage in training their SAR dog may be related to their level of attachment and the pleasure they obtain from the interaction with their dog. Studies have shown that dogs lower our blood pressure, increase our activity level, and return us to a time of play thereby increasing our relaxation levels (Allen, 2003). While no correlation was found between handler attachment and performance success, the lack of a correlation is equally significant. Handlers are often criticized for keeping their SAR dogs as anything beyond working dogs in kennel type environments. The data obtained indicates that keeping a SAR dog in the house and allowing it to sleep by one's bed does not have any effect on performance success.

The results of this study also indicated there was no significant difference between nationally certified handlers and those without national certification in regards to the handler's anthropomorphic perception of their search dog. Average scores were obtained by selecting a combination of the descriptive terms: tool, pet, partner,

companion, and/or family member. Forty percent of handler scores indicated they considered their search dogs as partners. Only 13% perceived their SAR dog as pets and tools or only tools. However, 47% of handlers indicated they considered their search dogs as companions or family members. Based on the scale used in this study, 90% of SAR dog handlers perceive their search dogs at an intermediate anthropomorphic level or higher.

Tool was the least selected descriptive term to indicate how handler's perceived their search dog. Tool is defined by Merriam-Webster (2009) as "something (as an instrument or apparatus) used in performing an operation or necessary in the practice of a vocation or profession".   The term tool is often utilized by the military and law enforcement entities in describing detector dogs.   This does not mean that police canine officer or military canine handlers do not become attached to their dogs; in fact, studies have shown that many do indeed become very attached to their canine partners (Hart et.al, 2000; Lefebvre, et. al., 2006).

The term pet was the second lowest selected by respondents. Merriam-Webster (2009) refers to a pet as "a domesticated animal kept for pleasure rather than utility". Varner (2002) asserts there are three categories of domesticated animals kept that fall within the realm of pet; mere pet, companion animal, and domesticated partner. Varner (2002) ascribes four basic criteria to the vernacular referred to as a mere pet. These are the affection criterion, the domicile criterion, the discontinuity criterion, and the dependency criterion. The affection criterion asserts that the owner feels affection towards the animal; however the animal may or may not feel or be capable of feeling the

same affection towards the owner. Varner's (2002) definition of pet disallows the dog that has been discarded by an uncaring owner into the backyard to be considered a pet while a tarantula that may have no affection for its owner to be considered as one. This definition places most SAR dogs clearly beyond the realm of pet and may be an explanation of its low selection as a descriptive measure of the owners perception of their SAR dog.

Varner (2002) describes a companion animal as an animal that meets the pet criterion for discontinuity, dependence, and domicile but exceeds the affection criterion in terms of voluntarily choosing to stay with the owner even if it had the option to leave. This indicates that the animal has affection towards the owner as well as the owner towards the animal. Merriam-Webster (2009) defines companion as "one employed to live with and serve another". Varner (2002) goes on to describe a domesticated partner which is allocated to the animal that meets all the criteria for the companion and additionally works with the owner in a mode which facilitates the animal's mental or physical capabilities in a manner beneficial to the animal.

The term "family member" would indicate a high degree of attachment and anthropomorphism. Family is defined as "common ancestry or affiliation" by Merriam-Webster (2009). An internet search of the term family member results in legal documents which define family as a sibling, parent, or spouse. Many of the respondents who checked family member also checked companion, partner, and tool, indicating a complicated matrix of perception of their search dog.

The association found between previous canine training experience and SAR experience urges more research into other factors not evaluated through the survey. Handlers with more previous canine experience and SAR experience possess more overall experience which may bias their success through the dogs they select as SAR candidates. Most experienced military, law enforcement, and SAR dog handlers agree that selecting the appropriate candidate is crucial in producing a competent search dog (Brownell et. al, 2002; Carr, 2003; Milner, 2003; SWGDOG, 2005; Hammond, 2006). There are so many aspects of canine selection that it would require a study dedicated solely to this investigation. There is currently ongoing genome studies (Robin et. al., 2009) aimed at locating specific scenting genes associated with specific target odors in hopes of improving detector dog selection. If this gene mapping comes to fruition in the future it may very well assist in the assessment of detector dogs. However, genetics alone fail to take into account the entire spectrum of environmental influences from the uterine environment during development, early environmental enrichment, and training.

Many experts and handlers feel canine selection is often overlooked by the SAR volunteer canine handler. Many inexperienced beginning canine handlers start with their current "pet" that may or may not possess the qualities which are crucial to a search dog such as nerve strength, focus, and drive. These inexperienced handlers may also not possess the balance in how they perceive their dog and may be more inclined to a high degree of anthropomorphism of their pet. In this circumstance a high degree of anthropomorphism could lead to their inability to impartially evaluate their dog's capabilities or progress in training. Starting a dog into training which is weak or lacks

these the critical qualities of a search dog often results in failure of the team all together or worse; producing a substandard canine. This lends support to the mentoring of new canine handlers by experienced, successful trainers (Shaffer, 2008).

Selection criteria such as canine temperament, confidence, nerve strength, and socialization are focused on by the National Search Dog Alliance (Crippen, 2008) in their book "Pick of the Pack; Selecting your canine SAR partner", are defined and emphasized in regards to selecting an appropriate candidate for SAR dog training. These criteria (Svartberg, 2002) may also be a key in regards to obedience training methods and how the individual dog handles specific types of equipment and methodology. Law enforcement agencies and military units tend to prefer dogs that are commonly referred to as hard or high drive dogs. These dogs are often considered unsuitable by civilian handlers who also keep their SAR dogs as family companions. Hammond (2006) notes that disaster dogs must be highly driven dogs and therefore, not necessarily suited for some as a family pet. Consequently, there are many successful SAR dogs that are rescues from shelters; turned in by their previous families for these very traits which made them undesirable family pets. Successful SAR dog handlers may have a higher threshold of tolerance of these high drive dogs due to what they know is required of a dog for field success.

This difference in temperament may account for some of the problems seen with civilian SAR dogs. Dogs selected by law enforcement tend to have a high level of pain tolerance, confidence, prey drive, and hunt drive. Dogs lacking this intensity of drive

may be reluctant to work in distractible environments such as areas devastated by a hurricane or tornado, acres of rough wilderness terrain, or avalanche conditions.

Scent detection dog training is based on an association of a target odor with a reward. Some handlers use secondary reinforcers to facilitate this association. A conditioned (secondary) reinforcer acquires the capacity to reinforce through its relation to a primary reinforcer. The effectiveness of a conditioned reinforcer is the result of the strength of the pairing of the conditioned reinforcer with a primary reinforcer (Domjan, 2003). In dog training, primary reinforcers most often used are food, toys, and social interaction. Toys are viewed by some as an extension of social interaction while others view toys as objects of prey or hunt drive (Brownell, et al., 2002) and therefore primary reinforcer substitutes. Clickers and verbal markers such as "good dog" are conditioned (secondary) reinforcers (Pryor, 2002).

Many dog trainers use a combination of techniques and methods, which are sometimes not compatible. One relevant example in scent training where incompatible methods are blended together is in the maintenance of a discriminative stimulus. Stimuli which require choice to occur before an operant response, and which trigger a specific consequence are known as discriminative stimuli (Domjan, 2003). Search dog work requires discrimination between target odors and non-target odors, some of which, when dealing with organic decomposition, can be very similar. Target odors therefore become discriminative stimuli which predict appetitive consequences.

To be effective, secondary reinforcers must be maintained by consistent pairing with primary reinforcers. Pryor (2002) points out valid reasons for avoiding aversives

with a discriminative stimulus that has a history of appetitive consequences. A "learned" discriminative stimulus that turns on an appetitive stimulus should be held consistent. She asserts that using an aversive at this point causes confusion and weakens the previous association. This may be one of the underlying causes of problems with search dogs and their obedience and scent detection training. Experienced SAR dogs which fail to offer their trained final response at a target odor are often given corrections until the final response is offered after which they are rewarded. If Pryor (2002) is correct, this would disintegrate the association of the discriminative stimuli with the appetitive consequence of the target odor and make it at best ambiguous to the dog.

When a target odor is introduced, positive reinforcement in association with scent is strongly emphasized. Training progression requires that the canine not only locate the odor but give a readable final response to indicate the location of the target odor to the handler. Some handlers choose to accept and shape natural indication behavior early on in training such as a dig or bark. Others, for various reasons, require a passive indication such as a sit or down. This requires obedience training of these commands. How the end behavior of a sit or down is approached in training may well affect the strength of the final response when paired with the target odor. Some training protocols (Rebmann et al., 2000) call for the handler to cue or reinforce the command in association with the scent. If improperly performed, this could cause problems for the dog.

Example 1: Dog approaches target odor, puts nose down, smells odor, is then cued to desired final response. If the dog is not prompt in the performance of obedience

behaviors, the dog may be physically placed into a sit or down using a choke collar or

pinch collar or shocked with an e-collar until it complies. It is then rewarded. Despite

the reward delivered after accomplishing the desired final response, the association to

the target odor is now coupled with an aversive act.

Example 2: Dog is taught obedience commands outside of scent work to a high

level of proficiency, but through compulsive methods. Dog is asked to sit, accompanied

by a jerk or pop of the leash and a push on the rump, or dog is popped or jerked to the

ground, sometimes leash stomped to the ground for a down. This type of obedience

training achieves a high compliance to avoid the physical punishment (Koehler, 1983)

however with many dogs, the commands themselves illicit behavioral reactions that are

associated with stress and displacement behaviors. Now pair this chained behavior and

its consequences with a target odor, the dog may come to associate the odor with the

command and hence, aversion or possibility of correction. A bad association with the

commands has now also been paired with the target odor. How this affects the dogs

performance may very well depend upon the personality of the individual dog. Dogs

typically selected by the military or law enforcement who are exceedingly confident,

may very well be successful despite even harsh compulsion. Family pets that lack this

level of confidence may not.

In creating a survey there are always caveats. A survey study is is reliant on the

respondent's candid and honest answers. The findings in this study assume honesty and

integrity in the answers of the respondents. Questions 33 and 34 were excluded from

analysis based on comments by handlers both associated with the survey. These

questions addressed training paradigms concerning blind versus double blind training scenarios. Many handlers indicated that they understood blind problems to be where the dog does not know the location of the target, and double blind to be where neither the handler nor dog knows the location. This is of course, a gross misunderstanding of the terminology; therefore any data obtained would be unreliable.

Including a distinction for which SAR dog partner the respondent was answering the questions for would have been useful. Another limitation of this study was the inability to obtain data from individuals who had failed national certifications and potentially quit SAR afterwards, thus limiting the scope of interpretation that can be made. The reliability of detector dogs is being challenged more frequently in the court system. Limited peer reviewed research and the lack of identified best practices for training methods and canine certifications support the need for further research by the academic and scientific communities.

CONCLUSION

Significant associations were found between previous canine training experience and SAR canine training experience, gender and obedience method, age of obedience training onset with equipment and method selection, and training time investment and national certification. The survey data collected supported my hypothesis that increasing canine age was found to be associated to active equipment use. Further evaluation of the effect of obedience training methods and how early training can be utilized to increase the reliability of search dogs is needed. Greater than 4 hours invested in training time was associated with national certification achievement. Further research to investigate the relationship between handler experience and search dog selection and performance is recommended. No relationship was found between handler perception and performance success as indicated by a national certification.

While there are often multiple methods for obtaining behaviors, results from this study urge further research into how the various methods affect the ultimate performance of the search dogs. In the end, the only thing that truly matters is competent performance which should be the ultimate goal of all SAR dog handlers. Further research can help handlers in obtaining this goal.

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APPENDIX A

NORTH AMERICAN POLICE WORK DOG ASSOCIATION
OBEDIENCE CONTROL TEST

This test is to determine if the police work dog is capable of performing off lead obedience exercises. The test is designed to test the dog's ability and proficiency and the handler's total control over his/her dog.

This test must be passed before proceeding on to any other Utility phases which may include aggression and where the dog will be utilized off lead. **Revised 06-22-97**

The police work dog team will be tested in the following three (3) phases:
1.) Heeling phase
2.) Walking phase
3.) Distance phase

Each phase may be tested in any order and will be judged on a pass/fail basis. All phases will be done under direction of the Master Trainer. ***No cruel or abusive corrections will be displayed at any time. If such is observed the Master Trainer will note same and forward to NAPWDA Headquarters for file information***.

HEELING PHASE:
The heeling phase of this test will consist of the following exercises:
1.) Normal pace
2.) Fast pace or double time
3.) Slow pace or half step
4.) A minimum of two (2) right turns; two (2) left turns: two (2) about turns.

Each leg of the above must be a minimum of thirty (30) feet long. The different phases may be conducted on any leg. On one leg of the course, the team must heel through a group of stationary people, group minimum of three (3).

WALKING PHASE:
The handler and dog will begin from the "Finish" position and walk forward together. At a point designated by the Master Trainer, the handler will place their dog in a stay position, (sit or down), and continue walking. This is to be done without breaking stride. At a point designated by the Master Trainer, the handler, while continuing to walk away from his/her dog, will command his/her dog to heel. The Master Trainer will instruct the team to "About Turn" and then to walk forward. At a point designated by the Master Trainer, the handler will stay his/her dog, (sit or down), and without breaking stride, will continue walking. At a point designated by the Master Trainer, the handler will turn and retrieve his/her dog and return to place of origin.

DISTANCE PHASE:
At a point designated by the Master Trainer, the handler will leave his/her dog in a "Stay". At a distance of no less than ten (10) feet, nor more than thirty (30) feet the handler will be directed to turn and face his/her dog. At the direction of the Master Trainer the handler will complete the following commands (Choice and order of command or signals will be at the direction of the Master Trainer.):

"Sit and Down" (by VOICE)
"Sit and Down" (by HAND)
Revised 06-14-03

The dog will then remain in a down or sit position (the position will be the handlers discretion) for three (3) minutes. During this three (3) minute period the handler may reinforce the command by voice or hand signal while no less than ten (10) feet nor more than thirty (30) feet away. **Added 06-14-03**

The Master Trainer will then instruct the handler to recall his/her dog by hand or by voice. At a point prior to reaching the handler, the Master Trainer **WILL** order the handler to stop his/her dog by voice or by signal. (Note: Stopping the dog may be either by a down or sit command). Upon completion of the "Stop", the Master Trainer will direct the handler to recall his/her dog to the "Finish" (heel) position by voice or signal command.

All tests given the K9 team will be on a pass/fail basis. The Master Trainer will determine if the team will be certified upon the completion of the test. **The handler and dog will be considered as a team and it is the team who will be certified. If the dog changes handlers, a new team exists and the team will need to be certified.**

This certification will be valid for one (1) year from the date of issue as defined in Certification Validity paragraph. ***There will be no fee charged for NAPWDA certification testing. A fee may be imposed to cover expenses of travel, lodging and meals only, if necessary.***

Reviewed and revised 06-29-07

APPENDIX B

Search Dog Survey

1. I have read and understand the purpose of this study and agree to participate to the best of my ability. I will attempt to answer as many questions as I can and will skip questions that are not applicable.

2. This is information is not required but will be helpful especially in tracking any regional differences, such as is often seen in training due to the variable climates and topography search teams train and field in.
____State

3. How many dogs do you currently field personally as deployable mission ready?

4. How many dogs do you have that are currently in training? (not mission ready)

5. My current deployable canine's breed or mix is?

6. My current dog in training's breed or mix is? (if any, not mission ready)

7. Number of canine scent discipline certifying tests you have taken in your search career?

8. Number of canine scent discipline certifying tests you have passed in your search career?

9. Please check all disciplines in which you have trained a dog that has passed local certifications and achieved mission ready status.
- 50 Trailing
- 113 Wilderness Area Search (air scenting)
- 11 Avalanche
- 79 Human Remains Detection/Cadaver – land
- 56 Water recovery
- 37 Disaster response (live subject)
- 20 Disaster response (human remains)

10. Please check all disciplines in which you have trained a dog that has passed national certifications and achieved mission ready status.
- 21 Trailing
- 60 Wilderness Area Search (air scenting)
- 1 Avalanche Human Remains Detection/Cadaver – land
- 49 Water recovery
- 18 Disaster response (live subject)

        <u>8</u>   Disaster response (human remains)

11. What national agencies have you certified your search dog under? (please check all that apply)

        <u>47</u>   NASAR
        <u>17</u>   NNDDA
        <u>11</u>   FEMA TASK FORCE
        <u>9</u>   NASDN
        <u>12</u>   IPWDA
        <u>12</u>   NAPWDA
        <u>7</u>   TASK
        <u>0</u>   USPCA
        <u>5</u>   ARDA
        <u>9</u>   Other – Please list (2 LETS)

12. Discipline/s in which I currently deploy my dog

        <u>46</u>   Trailing
        <u>100</u>   Wilderness Area Search (air scenting)
        <u>6</u>   Avalanche
        <u>80</u>   Human Remains Detection/Cadaver – land
        <u>47</u>   Water recovery
        <u>31</u>   Disaster response (live subject)
        <u>21</u>   Disaster response (human remains)

13. My age:

        <u>4</u>   18 - 25
        <u>33</u>   26 - 35
        <u>48</u>   36 - 45
        <u>48</u>   46 - 55
        <u>37</u>   55 +

14. My sex

        <u>57</u>   male
        <u>121</u>   female

15. Please indicate how long you have worked with dogs in any training capacity, formal or informal.

        <u>11</u>   Less than one
        <u>13</u>   +1 - 5
        <u>38</u>   +5 - 10
        <u>35</u>   +10 - 20
        <u>54</u>   More than 20

16. Years of experience as a search dog handler
- 6   Less than 1
- 52   1 - 5
- 44   + 5 - 10
- 36   +10 - 20
- 13   More than 20

17. Number of canines I have certified with a local agency
- 41   0
- 71   1
- 33   2
- 12   3
- 10   4
- 10   More than 4

18. Number of canines I have certified with a National Agency
- 73   0
- 52   1
- 32   2
- 6   3
- 2   4
- 3   More than 4

19. Number of search canines I have trained?
- 9   0
- 59   1
- 45   2
- 25   3
- 11   4
- 34   More than 4

20. My current canine partner's sex
- 32   intact male
- 59   neutered male
- 11   intact female
- 79   spayed female

21. Age I began my current canine partner's training at the age of:
- 80   6 to 12 wks
- 46   3 mos. to 6 mos.
- 25   6 mos. to 1 year
- 23   1 – 2 years
- 7   2 years

22. What age did you begin any training your canine to find live subjects (games, hide – n- seek, catch me, puppy runaways on or off leash.)?

- 3   Before 6 wks of age
- 34   6 – 8 wks
- 25   8 – 10 wks
- 19   10 – 12 wks
- 35   3 – 6 months
- 22   6 months to 1 year
- 17   1 – 2 years
- 9   2 years +
- 14   NA

23. What age did you begin introducing ("imprinting") your canine to human remains?

- 5   Before 6 wks of age
- 8   6 – 8 wks
- 10   8 – 10 wks
- 10   10 – 12 wks
- 21   3 – 6 months
- 28   6 months to 1 year
- 32   1 – 2 years
- 23   2 years +
- 40   NA

24. What age did you begin teaching any obedience (such as sit, down, or come) to your dog?

- 7   Before 6 wks of age
- 53   6 – 8 wks
- 39   8 – 10 wks
- 30   10 – 12 wks
- 23   3 – 6 months
- 13   6 months to 1 year
- 11   1 – 2 years
- 1   2 years +
- 3   NA

26. Please check all the types of equipment you would utilize for training a canine under 4 months of age.

- 143   Buckle collar
- 79   Harness
- 11   Easy walk harness
- 25   Martingale collar
- 13   Head halter
- 25   Choke chain or choker collar

<u>20</u>   Pinch collar
<u>13</u>   Electric collar
<u>25</u>   Other (please specify)

27. Please check all types of equipment you would use to train a puppy over 4 months of age but under 1 year.

     <u>143</u>   Buckle collar
     <u>86</u>   Harness
     <u>13</u>   Easy walk harness
     <u>35</u>   Martingale collar
     <u>21</u>   Head halter
     <u>61</u>   Choke chain or choker collar
     <u>65</u>   Pinch collar
     <u>36</u>   Electric collar
     <u>22</u>   Other (please specify)

28. Please check all the types of equipment you might utilize to train a dog one year of age or older.

     <u>145</u>   Buckle collar
     <u>90</u>   Harness
     <u>19</u>   Easy walk harness
     <u>38</u>   Martingale collar
     <u>24</u>   Head halter
     <u>67</u>   Choke chain or choker collar
     <u>92</u>   Pinch collar
     <u>62</u>   Electric collar
     <u>25</u>   Other (please specify)

29. Please identify which statement best describes the method you would utilize for teaching a new obedience behavior, such as a sit.

     24   Wait for a behavior to occur, mark behavior with a clicker or voice cue, and offer a food or toy reward.
     100   Lure into a sitting position with food or toy, mark behavior with a clicker or voice cue, and offer reward.
     34   Offer voice cue to sit and gently place puppy into sit by tucking hind quarters under and then rewarding sit behavior.
     18   Offer voice cue to sit while gently pulling up on collar and pushing down on hind quarters and rewarding sit behavior.
     6   Offer voice cue to sit and stimulate with electric collar simultaneously then reward the dog for the behavior.

30. Please identify the statement which best describes the method you utilize for teaching a new agility behavior.

     <u>100</u>   Lure dog to, across, or through object with food

<u>39</u>   Lure dog to, across, or through object with toy
<u>33</u>   Use leash to guide dog to, across, or through object
<u>2</u>   Use leash tugs/jerks to help guide dog to, across, or through object
<u>4</u>   Use electric collar stimulations to guide dog to, across, or through

31. Please pick the most appropriate answer for the level of agility your canine is trained to perform.

<u>7</u>   Dog cannot perform basic agility exercise
<u>32</u>   Dog can perform basic agility exercises with handler guidance on leash.
<u>71</u>   Dog works off leash, basic agility for field function, some distance control
<u>52</u>   Dog works off leash, intermediate to advanced agility, distance and directional control.
<u>16</u>   Dog works at agility performance level equal to an agility competitor or does compete in agility.

32. I spend the following amount of time weekly to train my dog on scent training, obedience, and/or agility

<u>7</u>   0 – 2 hour per week
<u>53</u>   2 – 4 hours per week
<u>79</u>   4 - 8 hours per week
<u>37</u>   8 + hours per week

33. I routinely train blind problems:

<u>8</u>   Never
<u>52</u>   Up to 25% of the time
<u>49</u>   25 – 50% of the time
<u>34</u>   50 – 75% of the time
<u>34</u>   Greater than 75% of the time

34. I routinely train double - blind problems: (This is defined as neither you nor anyone walking with you knows where the target (training aid or person) is located)

<u>47</u>   Never
<u>61</u>   Up to 25% of the time
<u>30</u>   25 – 50% of the time
<u>22</u>   50 – 75% of the time
<u>17</u>   Greater than 75% of the time

35. My dog completes blind problems successfully without aid:

<u>16</u>   100% of the time
<u>71</u>   at least 95% of the time
<u>60</u>   80 – 94% of the time
<u>13</u>   66 – 79% of the time
<u>17</u>   up to 65% of the time

36. My dog's reward system is: (Please check all that apply.)
  - <u>108</u> Food
  - <u>125</u> Toys
  - <u>129</u> Verbal Praise
  - <u>117</u> Physical praise/petting
  - <u>21</u> Other (please specify)

37. Please select the best statement regarding how you trained your canine's final response. (alert or trained indication).
  - <u>68</u> My dog offered a behavior at the subject or training aid which I rewarded and shaped to consistency.
  - <u>101</u> My dog was trained on an alert behavior separately. I then paired the subject or training aid with a cue of the alert behavior.
  - <u>1</u> My dog was presented with a subject or training aid and when interest was shown, was then physically placed in a sit or down with the aid of a collar and leash.
  - <u>7</u> My dog was presented with a subject or training aid and through the use of electric stimulations, cued to offer a final response behavior.

38. If my dog fails to alert on a target odor (live human or cadaver) in training, of these choices I would be most likely to: (Please choose only one)
  - <u>5</u> Nothing.
  - <u>77</u> Call my dog to me and re-issue their search command.
  - <u>59</u> Cue the dog to alert at the target.
  - <u>3</u> Go get the dog and put it in a time out either in a stay or crate.
  - <u>3</u> Re-issue the command loudly.
  - <u>11</u> Electronically stimulate the dog at the target until the alert is offered.
  - <u>39</u> Other (please specify)

39. My dog offers its trained final response incorrectly:
  - <u>5</u> Always
  - <u>12</u> Most often
  - <u>25</u> Sometimes
  - <u>116</u> Rarely
  - <u>19</u> Never

40. My live find dog was started on scent work:
  - <u>49</u> On lead
  - <u>95</u> Off lead

41. My live find dog's final response when a subject has been located is:(also referred to as an alert, trained indication)
  - <u>15</u> Sit or down identification at subject
  - <u>40</u> Bark at subject

63 Refind
2 Bringzel
39 Other (please specify)

42. We utilize the following for subjects in training: (please check all that apply)
 109 Family members
 137 Team members
 128 Friends
 128 Unknown persons
 8 Other (please specify)

43. I began my initial training of my cross trained dog on:
 84 Live find first
 7 Cadaver first
 14 Concurrently

44. My cross trained dog is trained to respond to:
 25 The same command for live and HRD
 78 A separate command for live and HRD

45. My cross trained dog's final response: (trained indication or trained alert)
 44 Is the same for live and HRD
 60 Is different for live and HRD

46. I set up training scenarios specifically to test my dog's accuracy to command: (i.e.: cadaver placed in search area with live victim and live command issued or cadaver placed in search area with live victim and cadaver command issued)
 38 Never
 39 Up to 25% of the time
 14 25 – 50 % of the time
 6 50 – 75 % of the time
 3 75% or more of the time

47. My cross trained dog's final response for locating a live subject is:
 17 Sit or down
 22 Bark
 55 Refind
 0 Bringzel
 24 Other (please specify)

48. My cross trained dog's final response for HRD is:
 18 Sit
 32 Down
 14 Paw/scratch/dig

<u>17</u>   Bark
<u>20</u>   Refind
<u>16</u>   Other (please specify)

49. My human remains detection dog's final response on land is:
    <u>26</u>   Sit
    <u>35</u>   Down
    <u>14</u>   Paw/scratch/dig
    <u>21</u>   Bark
    <u>15</u>   Refind
    <u>18</u>   Other (please specify)

50. My water recovery canine's final response on shoreline searches is:
    <u>16</u>   Sit
    <u>12</u>   Down
    <u>9</u>   Paw/scratch/dig
    <u>22</u>   Bark
    <u>10</u>   Refind
    <u>29</u>   Other (please specify)

51. My water recovery canine's final response from a boat is:
    <u>8</u>   Sit
    <u>6</u>   Down
    <u>16</u>   Paw/scratch/dig
    <u>28</u>   Bark
    <u>0</u>   Refind
    <u>38</u>   Other (please specify)

52. I use the following training aids: (Please check all that apply)
    <u>107</u>   Human Bone
    <u>109</u>   Human Blood
    <u>100</u>   Human Teeth
    <u>76</u>   Human Hair
    <u>104</u>   Human Tissue
    <u>89</u>   Human decomposition fluids or "body bag fluids"
    <u>85</u>   Human adipocere or "grave dirt"
    <u>69</u>   Human Cremains or charred bone
    <u>30</u>   Pseudo scent
    <u>0</u>   Pig
    <u>14</u>   Other (please specify)

53. My dog's very first training session exposure to human remains utilized the
following aid/s:

- 25   Human Bone
- 53   Human Blood
- 20   Human Teeth
- 13   Human Hair
- 66   Human Tissue
- 25   Human decomposition fluids or "body bag fluids"
- 14   Human adipocere or "grave dirt"
- 3   Human Cremains or charred bone
- 7   Pseudo scent
- 0   Pig

54. My dog's initial HRD training can best be described by the following method:

- 45   Training aid was placed out in the open and dog rewarded for showing interest in aid.
- 18   A scent imprinted training aid such as a tennis ball or towel was introduced to the dog for play.
- 19   Training aid was placed in small container and presented to canine by handler and rewarded for interest.
- 33   Training aid was placed in concrete blocks or scent boxes and dog was rewarded for interest.
- 11   The dog was guided to the training aid through the use of electric stimulation.
- 12   Other (please specify)

55. I proof my dogs off of animal remains during training

- 5   Never
- 45   Up to 25% of the time
- 36   25 – 50% of the time
- 13   50 – 75% of the time
- 17   75% or more of the time

56. I obtained my current partner: (Please check all that apply)

- 31   As a pet for myself and/or family
- 3   For hobby to compete in sports such as agility, hunting, obedience, etc.
- 104   Specifically as a candidate for search and rescue
- 64   From a breeder
- 19   From a rescue or shelter

57. My dog sleeps:

- 9   In a kennel run
- 3   In a fenced backyard

<u>28</u>   Inside my house in a crate
<u>32</u>   Inside my house loose with no access to my bed
<u>107</u>   With access to, beside, or on my bed

58. I consider my search dog a: (Please check all that apply):
    <u>121</u>   Family member
    <u>69</u>   Pet
    <u>117</u>   Companion
    <u>167</u>   Partner
    <u>78</u>   Tool

59. I gain experience with each certification, pass or fail.
    <u>147</u>   Always
    <u>17</u>   Most often
    <u>3</u>   Sometimes
    <u>0</u>   Rarely
    <u>1</u>   Never

60. I feel training sessions should always end successfully.
    <u>121</u>   Always
    <u>53</u>   Most often
    <u>4</u>   Sometimes
    <u>0</u>   Rarely
    <u>0</u>   Never

61. In blind training problems or on missions, I trust my dog and reward my dog whenever they offer their trained final response whether I can confirm they are correct or not.
    <u>55</u>   Always
    <u>48</u>   Most often
    <u>14</u>   Sometimes
    <u>17</u>   Rarely
    <u>30</u>   Never

62. I view unsuccessful attempts at blind problems or certifications as a learning experience.
    <u>140</u>   Always
    <u>30</u>   Most often
    <u>5</u>   Sometimes
    <u>0</u>   Rarely
    <u>0</u>   Never

63. I feel training is the appropriate time to challenge my dog's capabilities.

     88   Always
     60   Most often
     24   Sometimes
     2   Rarely
     2   Never

64. I feel that reinforcing basic components of training is necessary throughout the course of the dog's search career.

     158   Always
     14   Most often
     5   Sometimes
     1   Rarely
     0   Never

65. I feel once certification is achieved it is still necessary to go back and reinforce basic or foundation training.

     152   Always
     18   Most often
     7   Sometimes
     0   Rarely
     0   Never

66. I research and attempt to replicate real life scenarios in my training.

     66   Always
     77   Most often
     35   Sometimes
     0   Rarely
     0   Never

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