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## The Initial Response and Behavioral Patterns Exhibited by an Officer to a Weapon being drawn in a Traffic Stop Simulation

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The Initial Response and Behavioral Patterns Exhibited by an Officer to a Weapon being  
drawn in a Traffic Stop Simulation

By

Samantha J. Tupy

A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Arts

In

Clinical Psychology

Minnesota State University, Mankato

Mankato, Minnesota

May 2014

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This thesis has been examined and approved by the following members of the student's  
committee.

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The Initial Response and Behavioral Patterns Exhibited by an Officer to a Weapon being  
drawn in a Traffic Stop Simulation

Samantha J. Tupy

Master of Arts in Clinical Psychology

Minnesota State University, Mankato

Mankato, Minnesota, 2014

Abstract

Traffic stops are one of the most frequent forms of interaction between law enforcement officers and civilians. The traffic stop has been referred to as a “routine traffic stop” when it is not a known felonious traffic stop; however, routine would imply that there is a predictable, unchanging, and safe standard that could be systematically applied to every stop. Traffic stops may present many unforeseen dangers, highlighting the importance of thorough training. Ninety-four officer volunteers completed a traffic stop training simulation included in this archival study. The purpose of the study was to evaluate the initial response, as well as the behavioral patterns exhibited by an officer when a gun is drawn on him or her in a traffic stop situation. Results indicate that officers tend to respond to an unanticipated weapon stimulus with hesitation. The behavioral patterns exhibited, even if the response was immediate, tend to thwart the officer’s ability to obtain a successful outcome. Further behavioral pattern details are explored in addition to the successful outcome repertoire.

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The Initial Response and Behavioral Patterns Exhibited by an Officer to a Weapon being  
drawn in a Traffic Stop Simulation

Traffic stops are one of the most frequent forms of interaction between law enforcement officers and civilians (Lewinski, Dysterheft, Seefeldt, & Pettitt, 2013; Pinizzotto, Davis, & Miller, 2008). The traffic stop has been referred to as a “routine traffic stop” when it is not a known felonious traffic stop; however, routine would imply that there is a predictable, unchanging, and safe standard that could be systematically applied to every stop (J.J. Geiger, personal communication, 03/2013; J. Neumann, personal communication, 09/27/2013; Remsberg & Anderson, 1995). In many situations, the traffic stop appears to be a relatively minor traffic violation (e.g., speeding) and progressively unfolds into a potentially life-threatening situation without warning (Edwards, 1995; J.J. Geiger, personal communication, 03/2013; Lewinski et al., 2013; Pinizzotto et al., 2008). Traffic stops present the danger of road hazards (e.g., traffic), environmental hazards and potential for the civilian to exhibit behaviors that were not within the officer’s traffic stop schema (Bristow, 1963; Pinizzotto et al., 2008; Reeder, 1981). In addition, lack of effective training on decision-making under pressure could increase the likelihood of officer injuries and death (Broome, 2011; Thompson, & McCreary, 2006; Lewinski, 2011; Taverniers, Smeets, Ruysseveldt, Syroit, & Von Grumbkow, 2011; White, 2006).

According to the Federal Bureau of Investigation’s (FBI) Law Enforcement Officers Killed and Assaulted (LEOKA) published by the Uniform Crime Reports section of the annual publication, from the year 2000 to 2012 there were a total of 711 felonious officer deaths. Of the 711 there were 486 (68%) officers killed who were on vehicle

assignment and 638 (90%) were killed with firearms. There were a total of 127 deaths and 72,413 assaults that occurred during traffic stop situations. Of the 127 deaths, there were 49 (39%) officer deaths during felony stops and 78 (61%) officer deaths during traffic violation stops. The majority of these deaths occurred when the officer and the perpetrator were within a range of zero to five feet apart from one another. Many of the officer deaths occurred while the officer was approaching the vehicle, interviewing the perpetrator, or while sitting in the squad car. In addition, most of the officers were wearing body armor at the time of their deaths. A large number of officers did not make an attempt to use their weapon, while several officers did use their weapon or attempted to use their weapon (U.S. Department of Justice, Federal Bureau of Investigation, 2000-2012).

These statistics highlight the importance of thorough training, following protocols, and staying alert during every traffic stop that is performed (Bristow, 1963; Broome, 2011; Pinizzotto et al., 2008; Lewinski, 2011; Taverniers et al., 2011; Thompson & McCreary, 2006). If an officer approaches the traffic stop expecting only one potential outcome, they may not be physiologically and psychologically prepared to respond appropriately. This lack of preparation for an unexpected outcome will be referred to as a “complacent approach”. Experienced officers, in particular, are at an increased risk for complacency as they may approach expecting a certain outcome based on past experiences (Lewinski, 2011; Pinizzotto et al., 2008; Toker-Gail, Selman, Kobolt, & Hill, 2010).

The close proximity of traffic stop situations may require advanced behavioral response training, particularly when there is a lethal weapon present (Artwohl, 2003;



Cappell, 2008; Kaminski & Martin, 2000; Thompson et al., 2006). Appropriate behavioral responses will vary from situation to situation; however, it is imperative that officers follow through with the decision that is made (J.J. Geiger, personal communication, 03/2013; J. Neumann, personal communication, 09/27/2013). It is important to note that the most common entry wound of the slayed officers were the front of the head or upper torso based on the LEOKA (U.S. Department of Justice, Federal Bureau of Investigation, 2000-2012). Therefore, additional training in the close proximity situations should include learning to duck, defensive tactics to obtain control of the perpetrator's gun in a close proximity situation, and what situations warrant seeking cover first (Bristow, 1963; J. Neumann, personal communication, 09/27/2013, T. Beck, personal communication, 09/28/2013).

### **Immediate Response**

The initial response of an officer to the unanticipated behavior of a perpetrator is extremely important (J. Neumann, personal communication, 09/27/2013; J.J. Geiger, 03/2013; Kaminski & Martin, 2000; Pinizzotto et al., 2008). The response could improve or hinder the officer's chances of survival. Officers will respond to a high stress situation the way they were trained (Pinizzotto et al., 2008; J. Neumann, personal communication, 09/27/2013; Kaminski & Martin, 2000; Lewinski, 2011). If they were not trained for an acute high stress situation, their natural response may be an assembly of ineffective repertoires (Anderson, Litzenberger, & Plecas, 2002; Saunders, Driskell, Hall, & Salas, 1996; Thompson & McCreary, 2006). It may not be possible to train an officer in all situations in an 'if this, then that' manner, however, more can possibly be done in regards to officer training in these types of situations. One area of concern that can impact

behavioral responses is a lack of desensitization training (exposure methods that reduce the physiological response of the officer and increases their ability to respond well in a high stress situation) and effectively responding under stress (Artwohl, 2003; Broome, 2011; Morrison & Garner, 2011; Oudejans, 2008; Taverniers et al., 2011). Many officers will, upon seeing the gun, attempt to outdraw the perpetrator and fire their weapon (Lewinski, 2011). Officers will most likely respond too quickly, reducing their tactile control and ability to shoot accurately or will hesitate reducing their chances of firing first (Nieuwenhuys & Oudejans, 2010; White, 2006). In addition, the likelihood of an officer missing the target in a high stress situation is very likely, particularly if the officer has not been adequately trained to shoot under similar conditions (Charles & Copay, 2003; Nieuwenhuys & Oudejans, 2010; Nieuwenhuys, Savelsbergh, & Oudejans, 2011; Oudejans, 2008; White, 2006). When the target is shooting back or the officer needs to perform under a high stress situation, firearm performance is significantly less accurate (Nieuwenhuys et al., 2012).

Marion (1998) described an ideal training situation that encompasses the realistic shooting situations that may be encountered in the field at a training facility in Texas. Their training range includes targets that run, that are stationary, and that run towards the officer. Other departments have purchased electronic moving targets to give a more realistic feel during firearms training; while some departments have people or machines shoot back at the officer in training. These scenarios allow for a reality-based training situation, under stress, and targets marksmanship. Unfortunately, most departments and facilities cannot afford the costly training equipment that could give a more realistic training experience. Traditional firearms practice is often a more static experience. The

skills used to shoot at a stationary target in a controlled setting are not applicable in an emergency situation in the field (Marion, 1998). The infrequency of this type of situation should require in-depth training and periodic refreshers to ensure performance when the situation does arise (White, 2006; Oudejans, 2008).

### **Traffic Stop Protocol**

How an officer conducts the traffic stop, interacts with the perpetrator and handles a high-risk situation can make the difference between life and death (Edwards, 1995; Pinizzotto, 2008; Reeder, 1981; Remsberg & Anderson, 1995; Shafer & Mastrofski, 2005). There is not a universal protocol that an officer should follow for a traffic stop (J.J. Geiger, personal communication, 03/2013; J. Neumann, personal communication, 09/27/2013). In addition, each state may vary in their protocol. According to the Minnesota Board of Peace Officer Standards and Training website, the Minnesota legislature created the Minnesota Peace Officer Standards and Training Board (MPOTB) in 1967 to regulate law enforcement. In 1968 the MPOTB began certification of training agencies in an attempt to standardize training protocol. In 1977, the Minnesota Board of Peace Officer Standards and Training (POST) replaced the MPOTB. The POST gained the ability to license law enforcement officers, which also requires standards for training. Individual departments may choose to go above and beyond the minimum requirements set by the POST (Minnesota Board of Peace Officer Standards and Training, 2014). For the purpose of this study, the Minnesota State Patrol, as well as various law enforcement agencies, was the focus for training procedures in Minnesota.

A Vehicle Contacts Instructor of the Minnesota State Patrol shared information regarding the Minnesota State Patrol traffic stop protocol. The General Order traffic

protocol covers guidelines for considering the potential for escape, the potential risk for bystanders, and potential hazards due to other traffic and environmental conditions. There are clear guidelines for how to conduct the traffic stop from pulling the individual over to placing the perpetrator into the squad car. However, there is not a standard protocol for traffic stops in the behaviors that should be exhibited by the officer. Instead the focus is on allowing the officers to have several options to choose from and knowing the advantages and disadvantages of each. The options depend on the number of occupants, aggressiveness, compliance, environment, time of day, availability of backup and equipment, as well as other external factors that could have an impact (J.J. Geiger, personal communication, 03/2013). This is done because “there are many different ways in which the officer can achieve the three main goals of (1) the officer remaining safe, (2) doing something to meet resistance, and (3) to make quick, effective decisions in all situations” (J.J. Geiger, personal communication, 03/2013).

An officer of a southern Minnesota city offered information regarding traffic stop protocol procedures followed by police officers. The traffic stop vehicle approach used by the officer is their preference, similar to that of the MN troopers. Emphasis is placed on the advantages of the passenger side approach; however, it depends on the environment and context of the situation. Using the passenger side approach is unexpected by the occupant and may increase the likelihood that the officer will see potential weapons and other threats. A potential downfall of the passenger side approach is the officer may need to reach into the vehicle, which is never recommended. The officer should attempt to prevent the need to reach inside the vehicle, as that places them in a vulnerable position and gives the occupant more control of the situation, even if only

momentarily. In addition, with the passenger side approach, the officer is to do the “walk around” approach. This approach requires the officer to walk around the back of their vehicle and then approach the offender’s vehicle on the passenger side. Most often, officers prefer to use the driver’s side approach. The weakness of this approach is that drivers expect this approach and it will expose the officer to oncoming traffic. However, at nighttime it has been found to be more advantageous for the officer to approach the offender on the driver’s side because the flashlight will cause a blinding effect on the occupant, which puts them at a disadvantage (J. Neumann, personal communication, 09/27/2013).

**Training on the traffic stop.** Minnesota troopers have reality-based training on traffic stops that are completed every year. For cadets in training, at the end of the academy two days are set aside for traffic stop scenarios that incorporate all aspects of the training. The training includes surprise situations of deadly-force encounters as well as situations that the officers will encounter on a daily basis in the field (J.J. Geiger, personal communication, 03/2013)

The Minnesota city police training protocol also use scenario-based training situations that cover a range of possibilities within the traffic stop scenario at in-services. The focus is on making training as realistic as possible and includes a discussion section afterwards. Options are given and there is an emphasis on finding cover if needed, while using the appropriate amount of force for the situation (J. Neumann, personal communication, 09/27/2013). The traffic stop training includes guidelines such as, do not touch the perpetrator’s vehicle, try to keep distance between you and the occupant, and use doorpost to your advantage for cover (J. Neumann, personal communication,

09/27/2013). Staying behind the doorframe will also require the occupant to look back, which places them at a disadvantage for attempting to surprise the officer. Another important practice is not standing directly in front of the occupant's door. There are two main reasons for this: One, the door could be whipped open by the occupant either injuring the officer or pushing them into traffic, and two, bullets easily travel through the door (J.J. Geiger, personal communication; 09/27/2013; J. Neumann, personal communication, 09/27/2013). These are not considered to be formal standards for traffic stops, although, they are considered best practice by many officers (J.J. Geiger, personal communication; 09/27/2013; J. Neumann, personal communication, 09/27/2013). While there are no current regulations to follow in regards to the appropriate stance an officer should use while communicating with the occupant of the vehicle, it would seem to be most desirable for the officer to stand in a manner that would allow for them to push off of their front foot if they need to escape. However, most often the officers tend to stand with relatively equal weight distribution (J. Neumann, personal communication, 09/27/2013).

**Literature on traffic stop protocol.** It is recommended that officers follow seven main guidelines: (a) do not rest your weight against the vehicle, (b) be mindful in the now and be aware of any suspicious movements, (c) always scan the interior vehicle, including the floor and backseat domain, (d) it is recommended that the officer stand at an angle to allow for the best view of the interior and exterior of the vehicle, (e) it is recommend that right handed individuals use their left hand to accept items from the occupant, (f) never under any circumstance, go in front of the offender's vehicle, and (g) always try to remain behind the door post, or body frame of the driver's window (Reeder,

1981). As Lieutenant Geiger stated, “The response has to be quick and dynamic with the end result being that the trooper goes home that night” (J.J. Geiger, personal communication, 03/2013).

### **Reality-Based Training of Officers**

The ability to perform under high-stress situations is an essential piece of the officer’s line of duty (Broome, 2011; Helsen & Starkes, 1999; Lewinski, 2011; Saunders, Driskell, Hall, & Salas, 1996; Taverniers et al., 2011; Thompson & McCreary, 2006). It is essential that officers maintain composure, think clearly, and respond effectively to a range of situations (Kaminski & Martin, 2000; Lewinski, 2011; Saunders et al., 1996; Thompson & McCreary, 2006). An officer can learn to harness the natural response to a threatening situation and use the heightened arousal to their advantage (Artwohl, 2003; Saunders et al., 1996; Thompson & McCreary, 2006). When the event arises, the officer can simply respond the way he/she was trained. For example, in a fire drill you don’t analyze the probability of the outcome, you simply respond the way you were trained to by evacuating the premises (Klein, Calderwood, & Clinton-Cirocco, 1986; Thompson & McCreary, 2006). This is where reality-based training can be very useful for preparing cadets for the field.

Reality Based Training (RBT) is used to train officers in a realistic setting that could improve the officer’s tactics in the field (Broome, 2011; Taverniers et al., 2011). The purpose of RBT is to decrease the natural stress response intensity that is elicited by high risk and ambiguous situations in addition to preparing the officer to be able to perform well under similar conditions in the field (Artwohl, 2003; Thompson & McCreary, 2006). RBT attempts to influence the autonomic nervous system (ANS) to

decrease the overall intensity of the response (Broome, 2011). As described by Anderson and colleagues (2002), the ANS responds to high stress and vulnerability by releasing hormones that are intended to speed up thought processes to allow for quick decision making in the moment. A perceived danger induces the release of epinephrine, norepinephrine, and dopamine into the system. The body also releases a number of glucocorticoids, with the most important being cortisol, which shuts down unnecessary systems in the body in a moment of high stress and danger. This allows for more blood to be distributed to the essential body organs (e.g., muscles and lungs) for the in-the-moment situation (Anderson et al., 2002). A downfall of the system is that this may cause inflexible thinking or create a panic induced mental block that generates a hesitation response (Broome, 2011; Oudejans, 2008; Taverniers et al., 2011). Some are more vulnerable to the ANS freeze response or may have too high of a level of arousal to make coherent, logical decisions (Broome, 2011; Saunders et al., 1996).

According to Broome (2011), the goal of the RBT is not to prevent the natural response to a potential threat of death or injury, but instead to educate and behaviorally train the officers to respond in a controlled fashion. RBT allows officers to experience the heightened arousal stress response that is natural for the promotion of survival and trains officers to recognize the response. RBT then assists officers to harness the heightened arousal to their advantage in a controlled manner that allows for efficient behaviors to be exhibited that would promote survival. This includes educational, cognitive, and behavioral training all incorporated into one collaborative training method (Broome, 2011).



Broome (2011) investigated the RBT methods specifically examining the subjective experiences of officers during a reality-based training procedure. Each participant shared that they had a panic response, or experienced an “emotional shock” when they first encountered the lethal training situation. This response included changes in how they perceived the situation, physical sensations, physical motor changes, as well as what they were focused on. These subjective responses support that the RBT does elicit a near natural response and allows for training that includes similar conditions to a lethal situation in the field. This training method would allow for officers to potentially make automatic decisions in a real-life lethal encounter based on previous training (Broome, 2011).

To attain valid training, the officer should feel the pressures of the situation during the training session to allow for the appropriate application of the skills in the field (Saunders et al., 1996; Thompson et al., 2006). A delicate balance must be achieved in training to provide a realistic experience under stress. If too high of a stress response is achieved in training it could evoke hyper-vigilance in future situations that could impede the officer’s ability to respond appropriately (Broome, 2011; J. Neumann, personal communication, 09/27/2013). Training should be thorough enough to allow for automatic decision-making resulting in less stress and confusion in the moment (J. Neumann, personal communication, 09/27/2013; Klein et al., 1986; Lewinski, 2011). Ensuring that officers are engaged in active learning is essential to allow for increased understanding and performance (Taverniers et al., 2011). Taverniers and colleagues (2011) found that reality-based, high-stress training allows for more active learning for the officer (Taverniers et al., 2011).

Artwohl (2003) used the Stress Inoculation Training (SIT) model in a recent study. SIT follows a similar theory of RBT in that if officers train in a high-arousal, stressful and ambiguous situation then officers will be able to generalize their performance to infrequent but potentially lethal situations encountered in the field. This is referred to as State Dependent Learning (SDL). The principle of SDL asserts that if one learns something in one state, they will be able to perform it best in a similar state. There is a significant focus on the ability to recognize the ANS responses and to harness that arousal to maintain control (Artwohl, 2003). Saunders (1996) explained the SIT training method occurs in three stages. The first stage is the educational phase, with the focus on educating officers on what stress is and the potential side effects it may have. The second phase would encompass training of the skills, as well as practicing. The last phase is the use of the newly learned information in reality-based situations that are very similar to the potential field environments they will encounter. This use of behavioral training, in addition to, the in-course materials is helpful in producing a well-rounded and competent officer. Previous research has indicated that SIT is successful in reducing overall anxiety and stress in high-arousal situations (Artwohl, 2013; Saunders, 1996). In addition, the training is successful in a variety of subjects from low anxiety to high anxiety individuals (Saunders, 1996).

Previous training practices have focused on the performance basics. These included facets such as gun use, driving, and defensive tactics (Cappell, 2008). More recently there has been additional awareness and training on communication, problem solving, and decision-making (Helsen & Starkes, 1999; J. Neumann, personal communication, 09/27/2013). Recent training focuses on the ability to recognize and

control the natural physiological processes that may occur in certain situations. These training practices, if amalgamated, may be the best option for producing highly trained officers.

### **Decision Making**

According to Klein and colleagues (1986) officers often have to make decisions in less than 1-2 seconds in a high-risk situation. The classic model of decision-making potentially requires a great deal of time because one must understand the situation, think of the potential response options, identify the pros and cons of each option, and then select an option to act on (Kobus, Proctor, Holste, 2001). The Recognition Primed Decision (RPD) model allows for decisions to be made much more quickly. An RPD model allows officers to recognize a situation rather than to analyze the situation. This may allow for quick, effective decision-making in a high-risk situation. Officers have previously stated that if you have to think about what you should do, it is probably too late (J. Neumann, personal communication, 09/27/2013). If you were to recognize the situation based on previous training and then act automatically, it could save your life. This would require situation awareness, which is quickly gathering an adequate amount of information from the situation to make an RPD (Klein et al., 1986). Officers would need training to recognize a potentially high-risk and fatal situation. The risk that one takes with situation awareness is a potential overreliance on past experiences rather than training. This dependence on past experiences could bias the decision-maker into choosing an unsuccessful option, and may also minimize the relevant information of the current situation (Klein et al., 1986). This reiterates the necessity of thorough officer training to prepare them for the unexpected in the field.

The decision-making of an officer during a high-stress, threatening situation does provide a glimpse into the overall training (Helsen & Starkes, 1999; Klein et al., 1986; Saunders et al., 1996). Training emphasizing how to maintain and regain control in a situation where control has been lost is an ideal (Helsen & Starkes, 1999; J.J. Geiger, personal communication, 03/2013; J. Neumann, personal communication, 09/27/2013). This would include not only the initial training for cadets, but also occurring a few times a year during in-services for the officers, refreshing and updating the training as more information becomes available (Helsen & Starkes, 1999; Kaminski et al., 2000).

### **Military Training**

Law enforcement officer training may benefit from additional training mechanisms that are used in military training. Contrary to military training, when a police officer encounters a high-stress and potentially lethal situation the response is often to plant their feet and draw their weapon, which may be an ineffective repertoire (J. Neumann, personal communication, 09/27/2013). According to Thompson and McCreary (2006), the military focus on “mental readiness” to prepare the officers for the field. Mental readiness is the integration of psychological coping and understanding physiological responses. There is an emphasis on physical, emotional, and cognitive systems in the training. Military training uses Stress Exposure Training (SET), which expands upon the previously mentioned SIT to improve the performance of officers in diverse environments. This not only allows officers to respond quickly and efficiently in the field, but also improves and strengthens the mental health resilience of officers. In addition, officers have an increased stress tolerance baseline. This “overlearning” strategy

used by the military may allow for appropriate responses within the field and removes what they refer to as “the noise of competing responses” (Thompson & McCreary, 2006).

Military trained personnel are highly trained to respond to high-stress and lethal situations effectively. According to a Minnesota Deputy Sheriff who was in active duty in the United States Marine Corps and is now a Use of Force Instructor and a team leader on the Special Weapons and Tactics team (SWAT), the idea behind the training is to *move*. The officers are not to plant their feet and draw their weapon, but to respond to the threat while moving. They are taught to draw, shoot, and avoid the path of the bullets, all while moving. There is a need for this philosophy of movement to be incorporated into how law enforcement officers are trained. In addition, training in close proximity, combat-like situations would benefit the officers as well. However, most training facilities and agencies recognize this but avoid it because of the increased likelihood of physical injury during the training (T. Beck, personal communication, 09/28/2013).

### **Automatic Response Training**

According to Lewinski (2011), training should be done in such a way that allows for the officers to have an automatic response. Automaticity comes from effective and thorough training on how to respond in lethal scenarios (Broome, 2011). The lack of definitive standards for officer responses in immediate danger is due to the fact that not all situations are alike. In addition, what may be effective in one situation may be lethal in another. Officers in a situation of life or death need to recognize the situation and rely on their training to have a quick, appropriate response (Lewinski, 2011).

A Minnesota police officer shared automaticity training that is used with their department. Their automaticity training includes choices that are addressed for high stress

situations; for example, when a gun is drawn on the officer by a perpetrator. Ideal training attempts to obtain a “happy medium” stress level through Skills<sup>1</sup>, which often does facilitate a degree of RBT. In training there are weapons drawn, blanks are often used, and loud noises are involved to ensure the training is facilitating a realistic experience. This training allows trainees to feel the pressures and know what it may be like to have a gun drawn on them that elicits high physiological arousal. However, it is impossible to simulate the reality of that situation in training. The officers often say things like they “felt it” and that they can imagine the intensity it would take on in a real situation. Realistic and active training cannot be emphasized enough. You will do as you are trained, no matter how good or smart you are. “It’s all about training. They replicate what they do in training, especially in high stress situations” (J. Neumann, personal communication, 09/27/2013).

### **Purpose of Current Study**

This study was conducted to evaluate the initial response, as well as the behavioral patterns exhibited, by an officer when a gun is drawn on him or her in a traffic stop situation. The study may yield useful information about the types of behaviors that officers commonly engage in and may identify behavioral patterns that promote survival in potentially lethal traffic stop situations. In addition, the results may lead to staff development training and improved quality of training for officers, as well as identify voids in current training practices.

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<sup>1</sup> Skills is the hands-on “clinical” education portion of the law enforcement cadet training program

## Method

### Participants

There were 94 officer volunteers from two west coast law enforcement agencies included in the study. Officers ranged in age from 27 to 56 years old, with the mean age being 39 and the mode being 34. There were 81 (86%) males and 13 (14%) females. The officers were participating in a training simulation that was being facilitated and videotaped by the Force Science Institute, as well as their agency. The sample consisted of various officer rankings; see Figure 1 below for the descriptive statistics of officer titles. Officers' experience in law enforcement and traffic stops ranged from one year to 34 years, with a mean of 12 years and a mode of 13 years. The officers completed zero to 80 stops per week, with a mean of 16 stops and a mode of 10 stops (Lewinski et al., 2013).

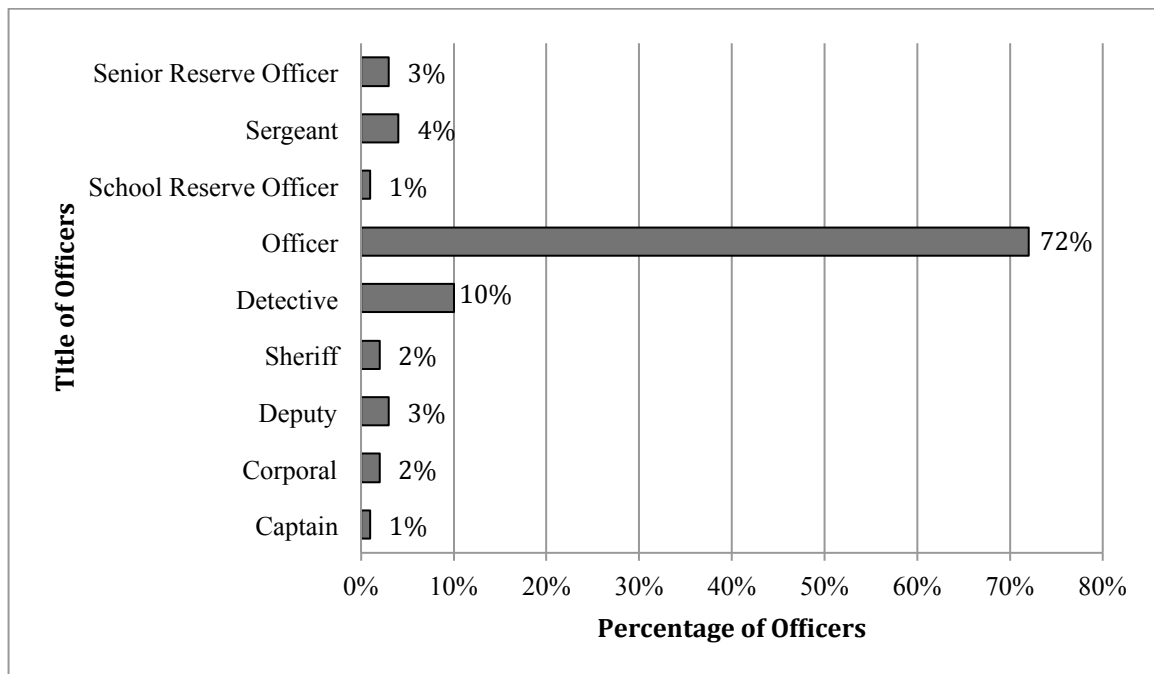


Figure 1. The professional titles of the participants included in the study.

### **Officer Training Simulation Videos**

The Force Science Institute recorded and provided 94 training simulation video recordings. The recordings were of training simulation traffic stop situations that were set up to allow researchers to assess various behavioral, physiological, and verbal aspects of the officers during the simulation. Each simulation had a series of three scenarios: Expected Outcome, Verbal Aggression, and Weapon Stimulus. The Expected Outcome scenario involved the traffic stop to unfold with a compliant civilian. The Verbal Aggression scenario involved the perpetrator becoming increasingly agitated with the officer and being verbally resistant to the officer's requests. The Weapon Stimulus scenario initially began similar to the Expected Outcome and Verbal Aggression scenarios, however, it involved the perpetrator drawing a weapon and firing a gun multiple times in the direction of the officer with intent of hitting the officer (Lewinski et al., 2013). The overall length of each training simulation (including all three scenarios) was variable. The length of the Expected Outcome and the Verbal Aggression scenarios were about 45 seconds each. The length of the Weapon Stimulus scenario varied by the unique interaction that took place between the acting perpetrator and the officer.

The video recordings took place in a large warehouse; within the warehouse were two vehicles. One vehicle was a police cruiser and the second vehicle was a 2004 Ford Taurus. There was an acting perpetrator with Simunition ammunition (a brand of non-lethal blanks) and training handgun inside the Ford Taurus. In addition, the acting perpetrator had a "homemade 'conveyance pass' and a declaration of his sovereign nation status" (Lewinski et al., 2013). The acting perpetrator was scripted with various opening



arguments to use when the officer approached the vehicle such as, “Do you even know what you are doing?” (Lewinski et al., 2013).

Officers were not primed as to the number of scenarios that each training simulation would include. Officers were informed that they were participating in a traffic stop simulation and that the scenarios may or may not be eventful. The officers were provided a “Simunition, nonlethal training ammunition, and a magazine” (Lewinski et al., 2013). Each officer wore a “SOLO 915 Men’s wrist heart rate monitor, ear plugs, safety glasses, identification information, and an orange armband to indicate they had attended the safety-check portion of the study” (Lewinski et al., 2013).

### **Training of research assistants**

There were three research assistants that coded the videos. The independent observers were trained by first memorizing the operational definition of the target behaviors and were familiarized with the data-recording sheet and any questions regarding the timing system were addressed. After the memorization process was complete, independent observers were then tested on their ability to recognize the target behaviors. Three videos taken from liveleak.com and youtube.com were used as a training mechanism. Two of the videos included a two-minute clip that included the target behavior within the time frame and one two-minute clip that had a similar situation but the target behavior did not occur. This was done to show the independent observers examples of what the target behavior topography does and does not look like. Once the independent observers felt confident that they fully understood what the target behavior would look like, a comprehension check was applied. The comprehension check involved the independent observers watching a three-minute scene from COPS. There were two video clips that had the

target behavior occur within the frame. The independent observers were to treat this trial as a real session and to record the data on the data sheet as accurately as possible.

After the training and again after the comprehension check were completed, inter-observer reliability was assessed. The study used the block-by-block reliability formula, which is calculated by dividing the smaller number (sum of agreements) by the larger number (agreements and disagreements) in each block, and then summing the results, dividing the sum by the total number of blocks and multiplying by 100. Before the independent observers were allowed to view the archival training simulation videos and begin the session of recording the target behavior, the percent agreement had to be at or above 90%. Inter-observer agreement was assessed for 85 percent of the videos that were randomly selected. A randomizing calculator was utilized, from the website [mathgoodies.com](http://mathgoodies.com), to determine random selection of the archival videos. The three independent observers achieved an inter-observer agreement of 91% for the study; the range was 64% to 100% and the mode was 100%.

### **Procedure**

**Data Collection.** Research assistants independently observed the training simulation videos of the officer and FSI assistant encounters from the FSI. The behaviors emitted by the officers were recorded on the observation forms provided to each observer per training procedures.

**Data Analysis.** Qualitative analysis was conducted for the frequency of behavior types emitted by officers, as well as heart rate information across the three scenarios. The analysis of successful and unsuccessful behavioral patterns of the officers was identified. The operational definition of a successful outcome was (a) the perpetrator aims directly at

the officer and the officer does not appear to be shot by the perpetrator's bullet; (b) the perpetrator does not aim directly at the officer and the officer does not appear to be shot by the perpetrator's bullet. The operational definition of an unsuccessful outcome was the officer appears to be shot by the perpetrator's bullet.

**Hypothesis 1:** Officers, who hesitate upon seeing the weapon, will decrease their likelihood of a successful outcome. Hesitation was defined as a lapse in time two seconds or longer after the gun stimulus was presented.

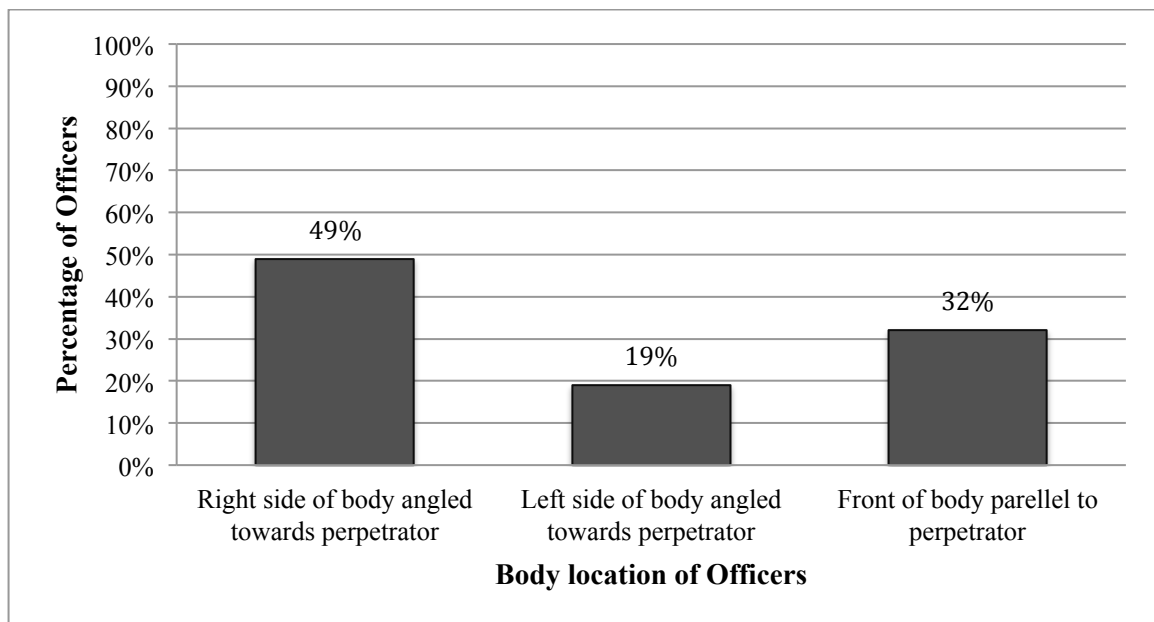
**Hypothesis 2:** Officers who attempt to gain control of the perpetrator's weapon, however necessary, will increase their likelihood of a successful outcome.

**Hypothesis 3:** Officers who exhibit a higher than average (60-100 beats per minute) heart rate (Tanaka, Monahan, & Seals, 2001), will likely exhibit behavioral patterns, such as hesitation, that reduce the likelihood of a successful outcome.

## Results

### Behavioral Patterns Identified

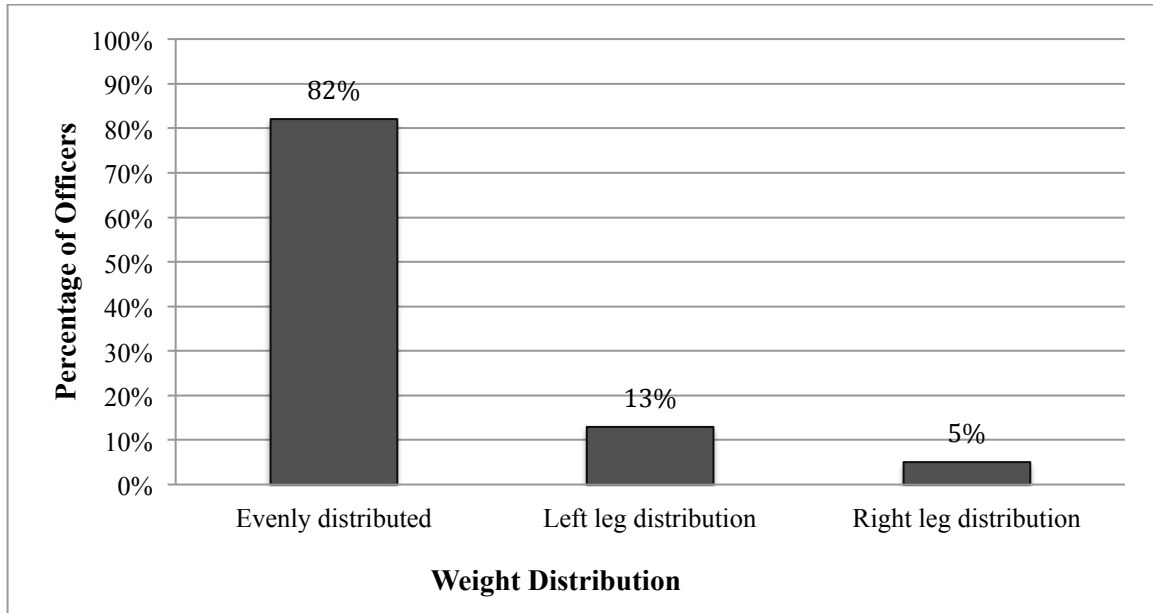
The officers' body location during the Weapon Stimulus scenario is provided in Figure 2. The majority of the officers had the right side of their body angled towards the perpetrator. Several of the officers had their body parallel to the perpetrator, with only a few officers having the left side of their body angled towards the perpetrator. The angling of the body may determine how the officer is able to escape the situation when the gun stimulus is presented. The FSI orchestrated the footings of the officers for another study; therefore, the results cannot be independently interpreted here. However, the data is included for informational purposes to interpret other aspects of the data.



*Figure 2.* Officer body location during the Gun Stimulus scenario. The body location was orchestrated by the FSI for a separate study; therefore the body location cannot be analyzed independently.

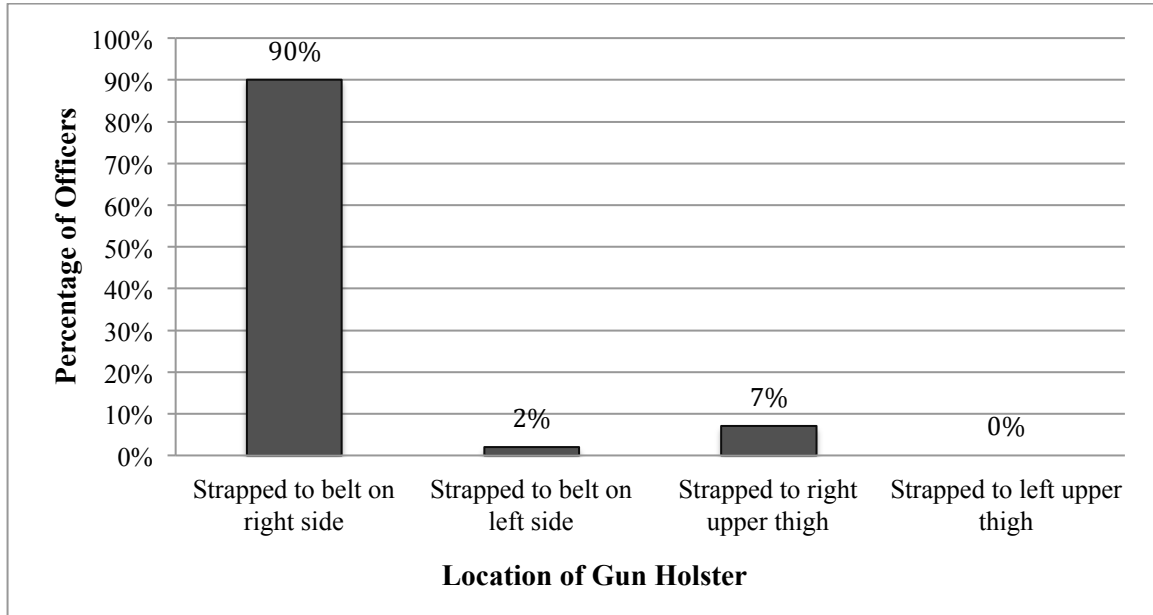
The officers' weight distribution during the Weapon Stimulus scenario is presented in Figure 3. A majority of the officers maintained an equal weight distribution on both legs during the scenario, supporting previous recommendations (J. Neumann,

personal communication, 09/27/2013). This may have an impact on the officers' ability to escape the situation when the gun stimulus is presented. Kinesthetically, evenly distributed weight may be conducive to an escape. Officers would first need to shift their weight to another foot and then push off if their body positioning indicated having the majority of the weight on one leg or the other.



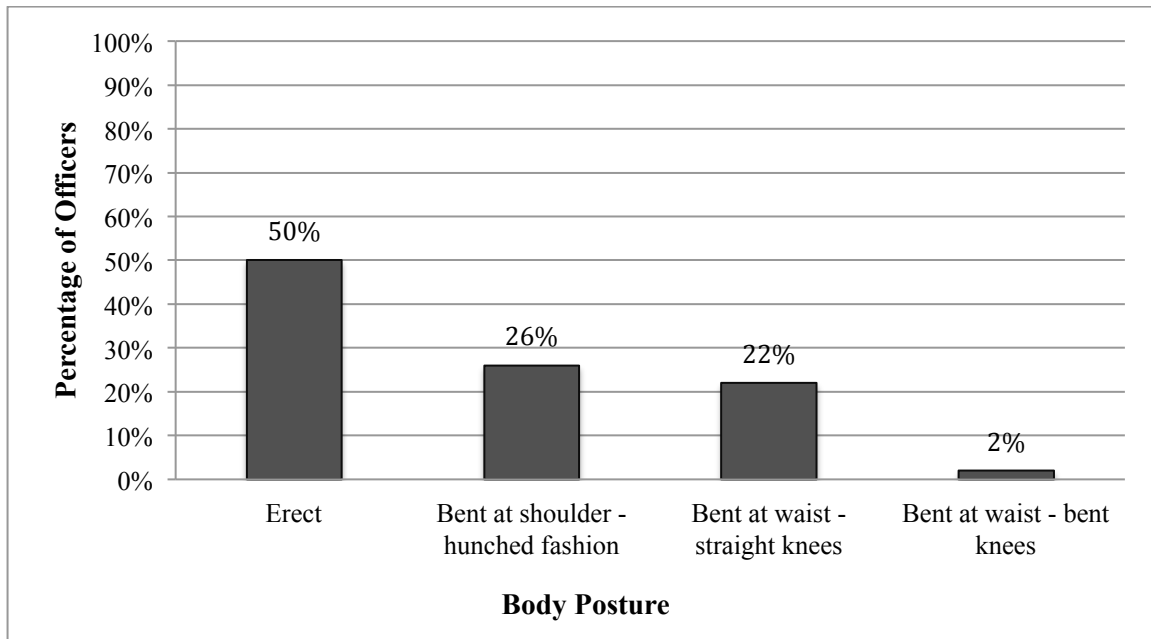
*Figure 3.* Weight distribution of the 94 officers during the Weapon Stimulus scenario.

The location of the gun holster for a majority of the officers was located on the officer's right side of the waist. This does appear to be the norm with having a majority of the officers being right handed. See Figure 4 below for the visual distribution of the gun holster position.



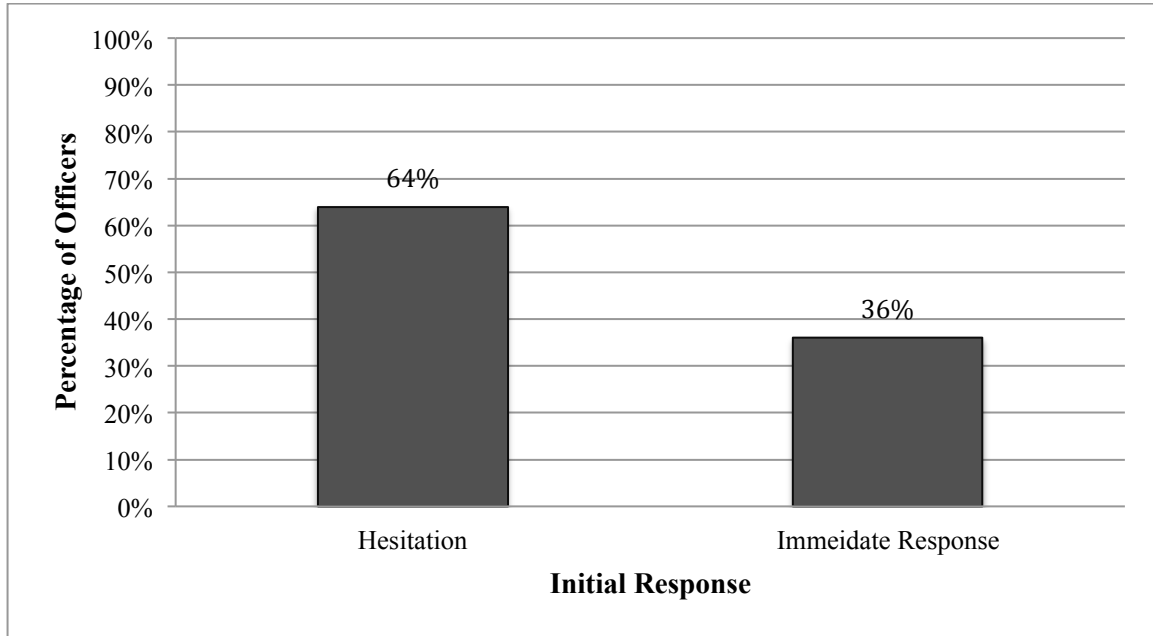
*Figure 4.* Location of the gun holster on the officers' bodies during the Weapon Stimulus scenario.

An officer's posture may have an important impact on their ability to escape a situation. Figure 5 below represents the officers' posture in the Weapon Stimulus scenario. Half of the officers maintained an erect posture throughout the Weapon Stimulus scenario interaction with the perpetrator. There were several officers that were bent at the shoulders in a hunched fashion and many that were bent at the waist with straight knees. There were a few officers that were bent at the waist with bent knees. Officers endorsing a relaxed stance may not be able to respond appropriately to an unexpected stimulus.



*Figure 5.* Officer body posture during the interaction with the perpetrator in the Weapon Stimulus scenario.

Over half of the officers responded to the gun stimulus with hesitation; this is problematic. Officers are responding to a training simulation with hesitation, in a safe environment. This simulation may offer a glimpse into how the officers would respond in the field to this type of stressor. A majority of the officers that hesitated were shot multiple times by the perpetrator's Simunition bullets. Figure 6 below represents the officers that hesitated and those that responded immediately to the gun stimulus. Unfortunately, when an immediate response was utilized, it was not always a productive response. Some officers immediately reached for their weapon and were shot in that moment. Other officers had other behavioral responses that were ineffective, such as moving too slowly through their decision, rather than a swift follow-through.



*Figure 6.* The officers' initial response (immediate or hesitation) to a weapon being drawn by the perpetrator.

Only two percent of the officers attempted to take control of the perpetrator's weapon by physically engaging the perpetrator. A majority of the officers attempted to escape without engaging the perpetrator. While others attempted to deflect the perpetrator's weapon by pushing it away or downward and then attempting to escape the situation. See Figure 7 below.



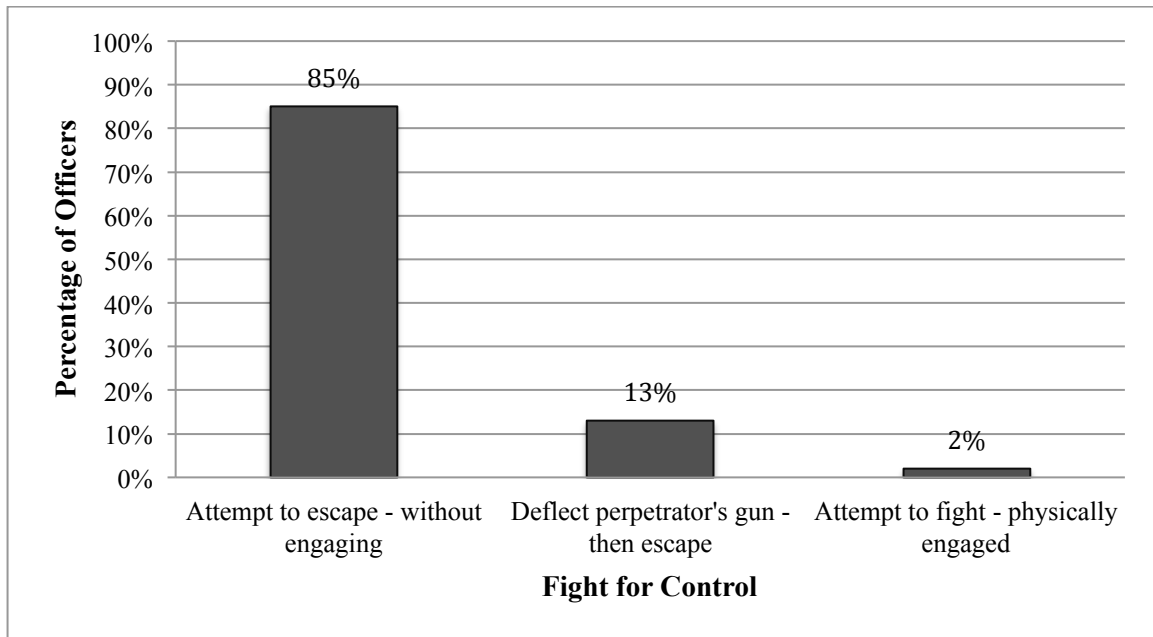


Figure 7. Officers' behavioral responses to the weapon stimulus – escape or fight for control.

Officer hand positioning during the Weapon Stimulus scenario are represented in Figure 8. There was much variability with what the officers were doing with their hands at the time of the gun stimulus presentation. Several officers had their hands hanging freely, some were gesturing with their hands, and others had their right hand resting on the butt of their gun. There were several officers that fell into the “other” category due to the lack of an operational definition for the hand behaviors the officers engaged in. There were many officers that were engaged in hand behaviors that may have hindered their response performance to the gun stimulus, such as hooking their thumbs in their belt, placing their hands on their hips, or placing their hands on the tops of their thighs. If the officers were handling papers that were handed to them by the perpetrator, they were categorized as “hands occupied.”

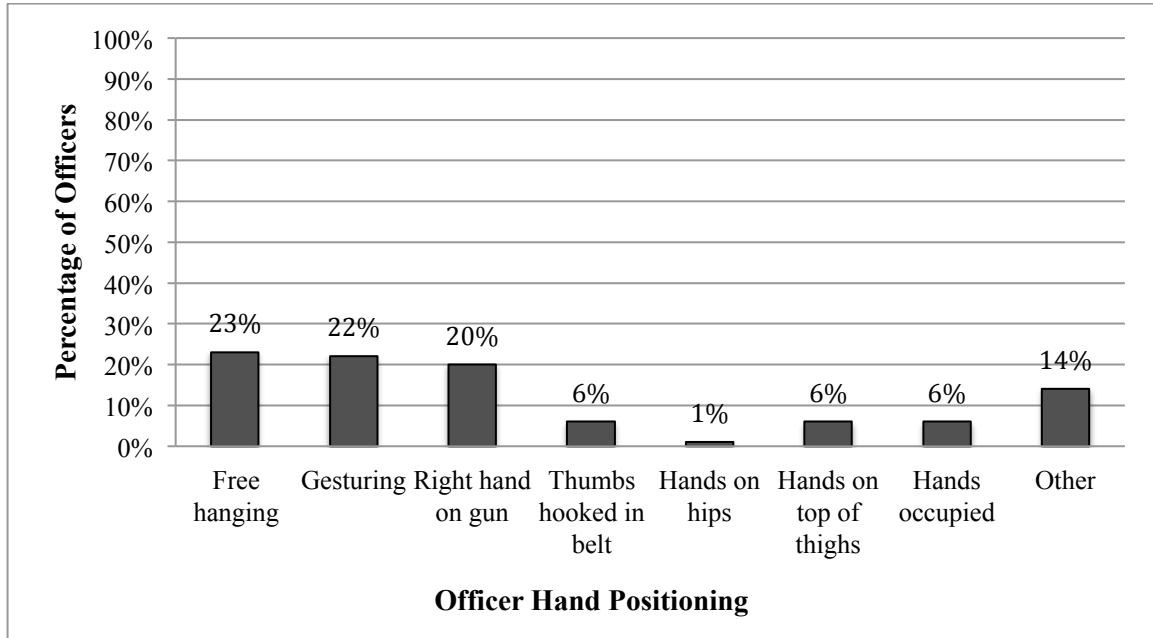
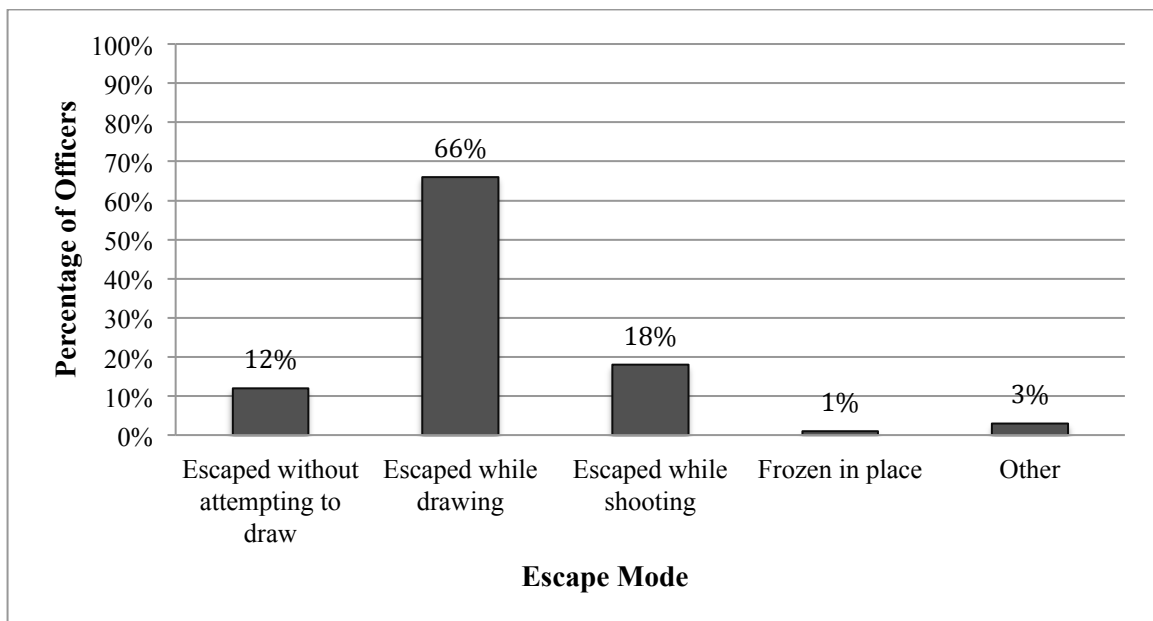


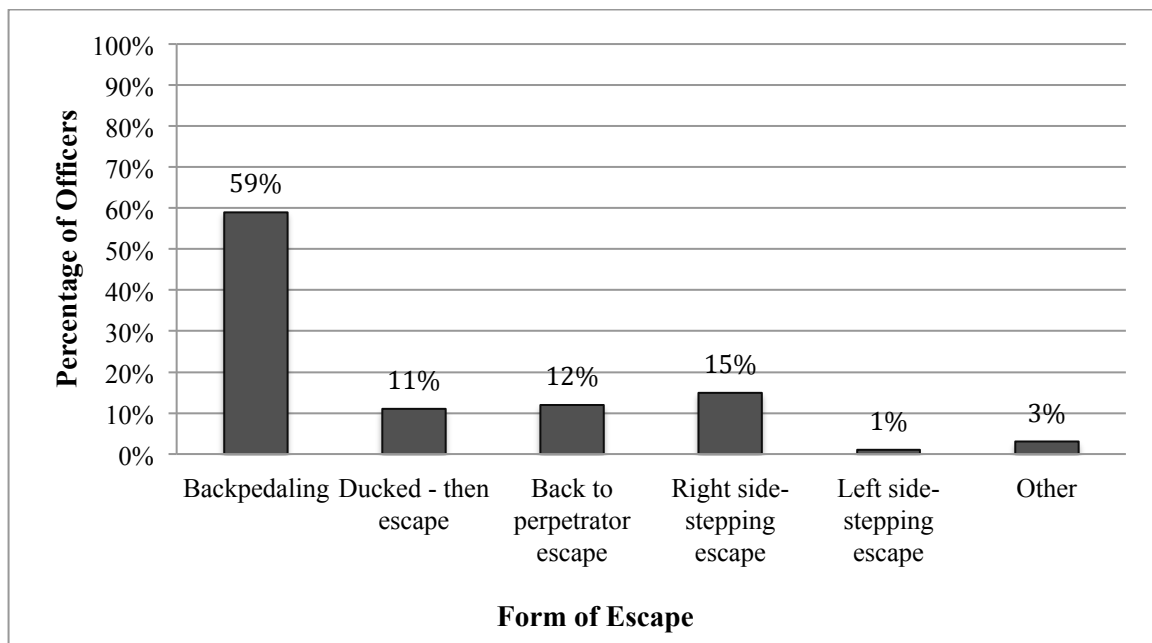
Figure 8. Officer hand positioning during the Weapon Stimulus scenario.

A majority of the officers attempted to draw their weapon while escaping the situation, as seen in Figure 9 below. The next most common response was attempting to fire their weapon while escaping the situation, followed by escaping without attempting to draw their weapon. There were a few officers that behaved in a way that was not operationally defined (i.e., other), and one officer was frozen in place.



*Figure 9.* Escape mode utilized during the escape attempt in the Weapon Stimulus scenario.

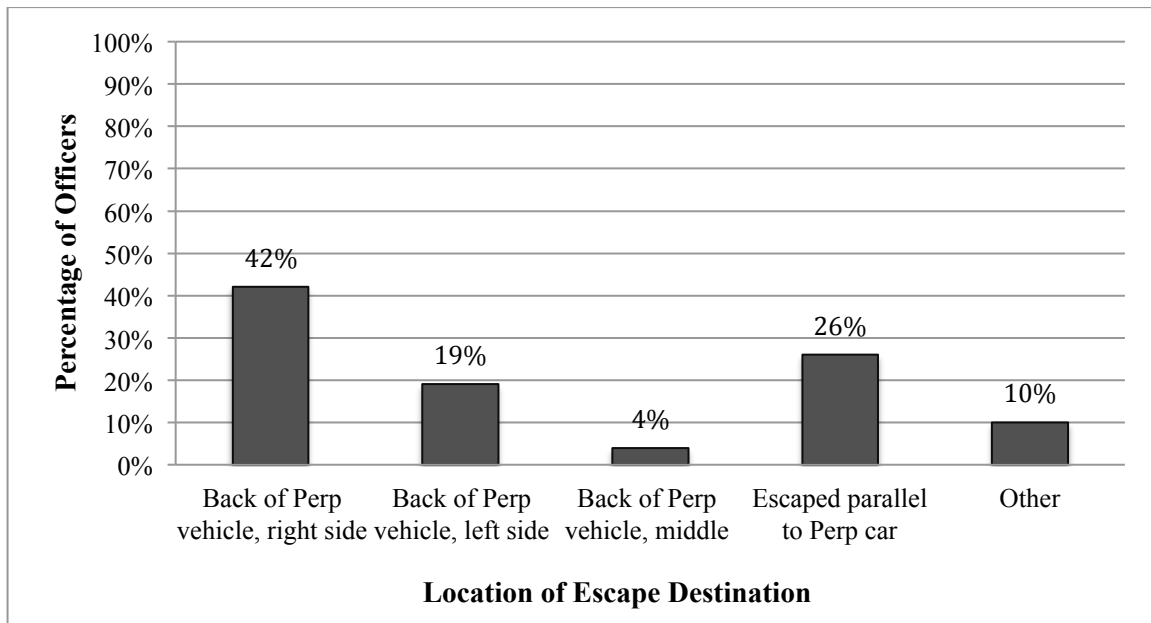
A majority of the officers escaped by backpedaling from the perpetrator vehicle towards their destination, some officers performed this behavior very quickly, while others did not. Several officers attempted escaping with a right sidestepping escape and other officers escaped by turning around and escaping with their back turned to the perpetrator. There were some officers that first ducked away from the weapon stimulus and then attempted escaping, while one officer used a left sidestepping escape and a few other officers utilized a behavioral escape that was not operationally defined (i.e., other). See Figure 10 for a visual representation of the officers' form of escape.



*Figure 10.* Form of escape that was utilized by the officers during the Weapon Stimulus scenario.

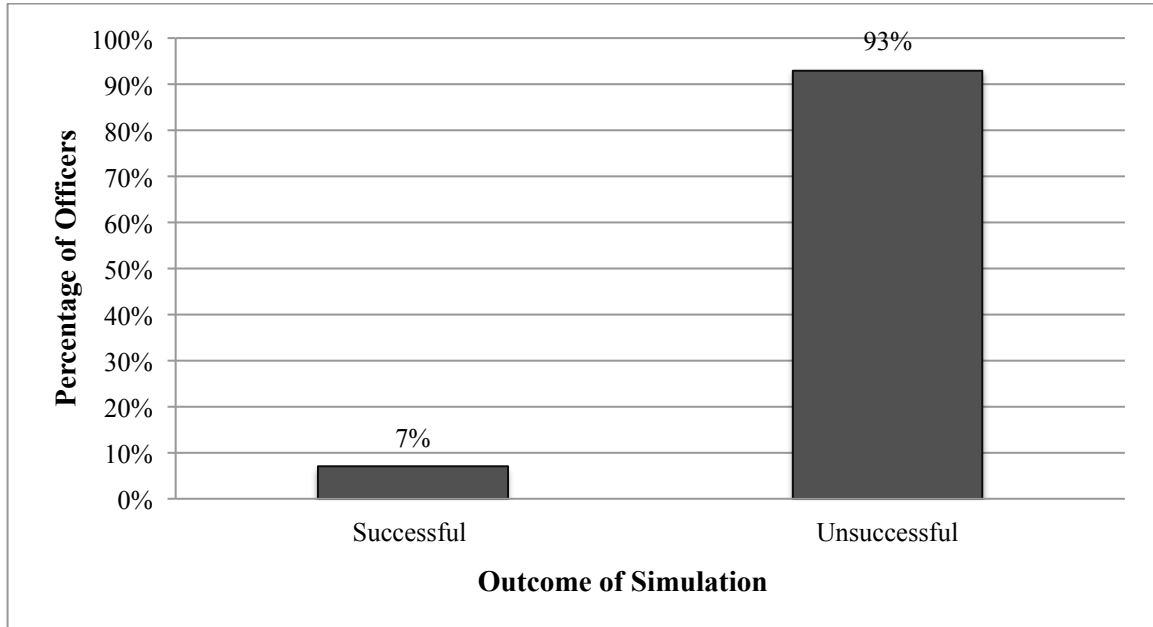
The escape destination of the officers is shown in Figure 11 below. A majority of the officers escaped to the back of the perpetrator's vehicle, ending on the rear right side (passenger side). Several officers escaped parallel to the perpetrator's vehicle, ending

parallel to the perpetrator's car (not seeking shelter). A few escaped to the back of the perpetrator's vehicle, ending on the rear left side (driver's side) of the car. There were only a few officers that escaped to the back of the perpetrator's car, ending at the middle rear of the perpetrator's car. In this behavioral category, ten percent of the officers responded in a way that had not been operationally defined and therefore were categorized as "other".



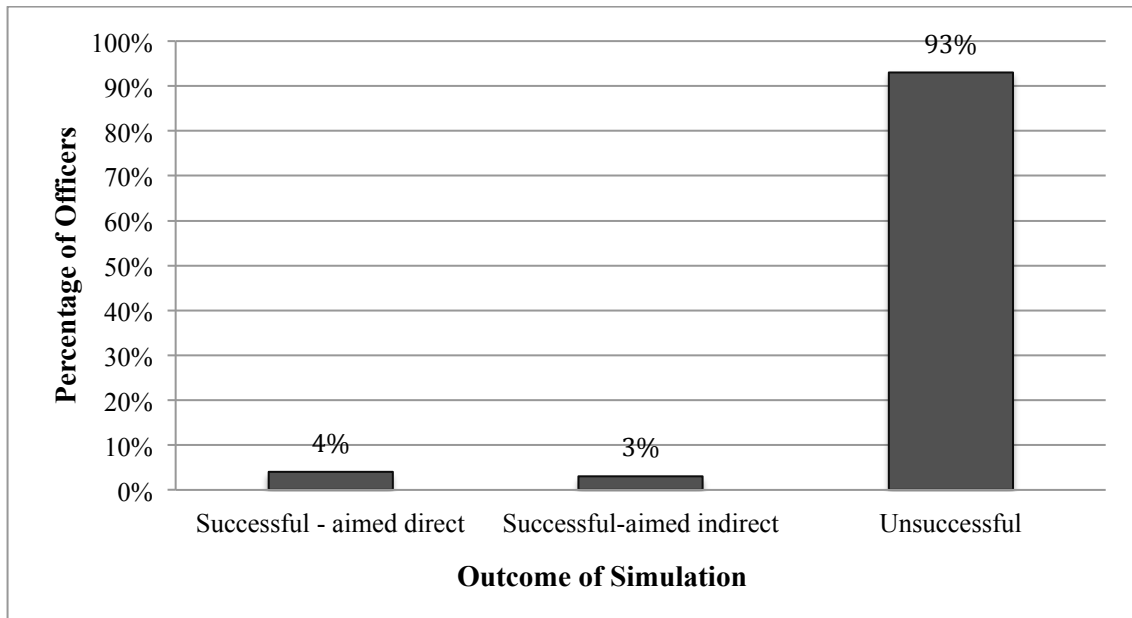
*Figure 11.* The escape destination that was utilized by the officers during the Weapon Stimulus scenario

The majority of the officers had an unsuccessful outcome (were shot by the perpetrator) as shown in Figure 12 below. Seven percent of the officers had a successful outcome in the Weapon Stimulus scenario.



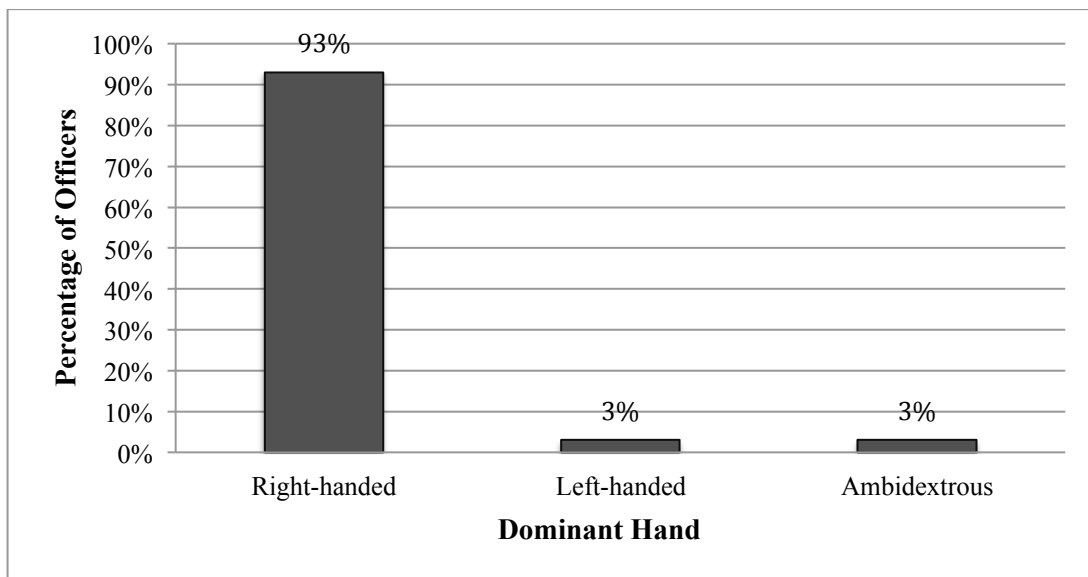
*Figure 12.* The successful (not shot) and unsuccessful (shot) behavioral pattern outcomes of the officers in the Weapon Stimulus scenario

The outcome of the officers was further broken down into two successful outcome categories and one unsuccessful category, as shown in Figure 13 below. There were seven total officers that were categorized as having a successful outcome, four of these officers avoided being shot when the perpetrator aimed directly at the officers and three officers avoided being shot when the perpetrator did not directly aim, but did attempt to fire at the officer.



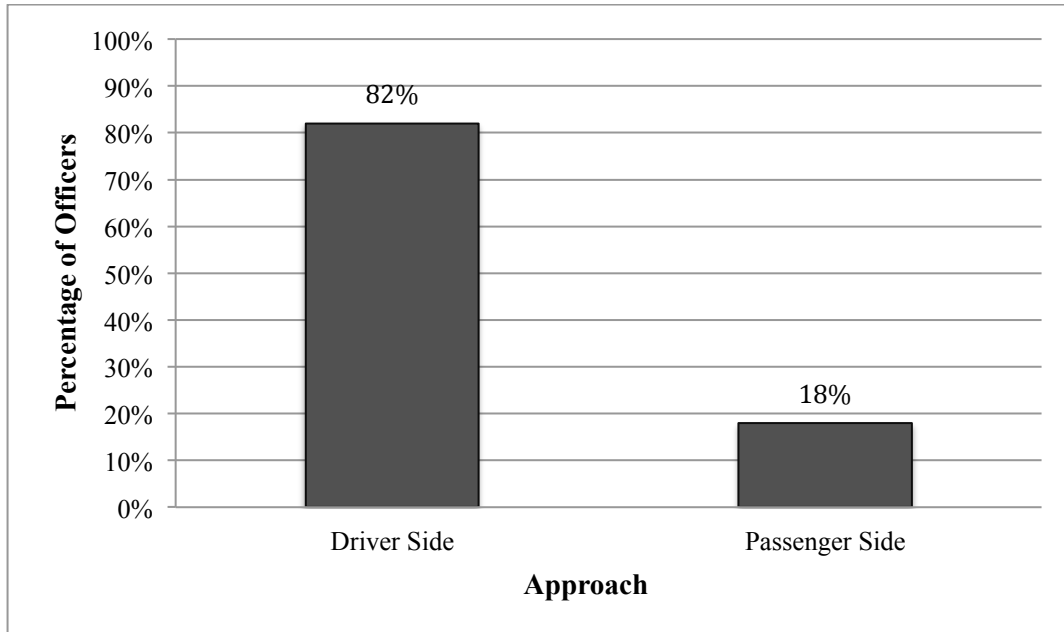
*Figure 13.* The successful behavioral outcome was further categorized, to distinguish the officers who achieved a successful outcome when the perpetrator aimed their weapon directly at the officer, from the officers who achieved a successful outcome when the perpetrator did not aim directly at the officer (perpetrator firing the weapon in both instances).

The officers' handedness was recorded below in Figure 14. The majority of the officers were right handed, with only three percent being left handed, and three percent were ambidextrous.



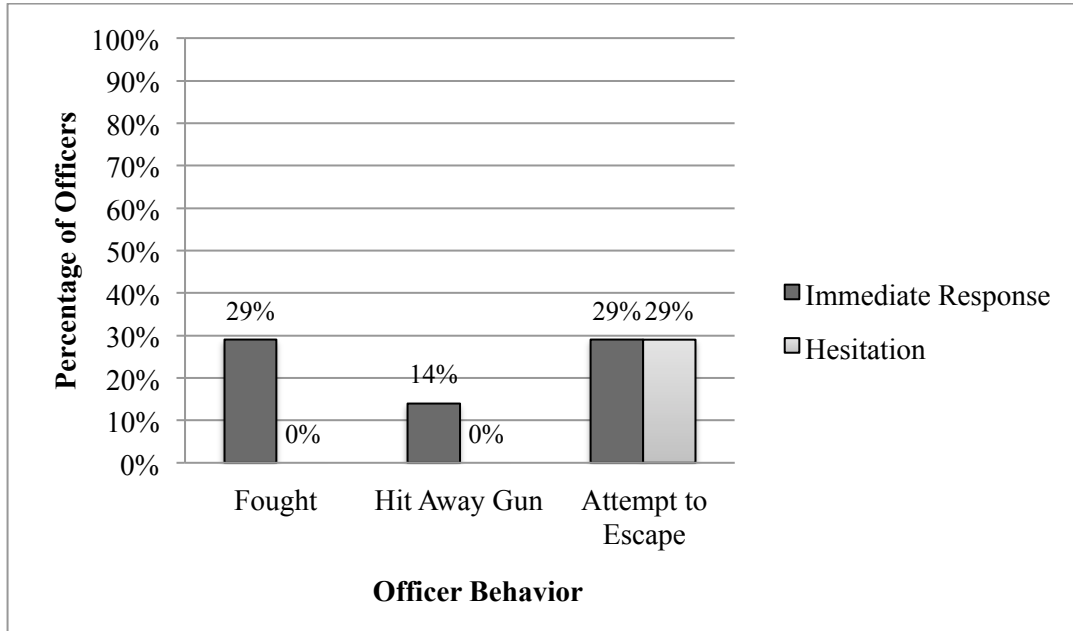
*Figure 14.* Handedness of the officers included in the current study.

The approach used by the officers during the Weapon Stimulus scenario is presented in Figure 15 below. The approach was orchestrated by the FSI for a separate study; therefore the approach cannot be analyzed independently in this study. The information presented below is for informational purposes only for analyzing other data in this study.



*Figure 15.* The approach used by the officers during the Weapon Stimulus scenario. The approach was orchestrated by the FSI for a separate study; therefore the approach cannot be analyzed independently.

There were seven officers with a successful outcome to the Weapon Stimulus; see Figure 16 below. There were three officers that actively did something to meet the resistance. Two officers responded by fighting the perpetrator, obtaining control of the gun. Only one officer hit the gun away and then escaped the situation. Two officers escaped the situation without engaging the perpetrator. It is interesting to note that officers that actively met the resistance did not hesitate, while half of the successfully escaping officers hesitated.



*Figure 16.* The behavioral response, as well as the initial response (hesitation or immediate), of the seven officers who achieved a successful outcome (not shot).

There were 87 officers that had an unsuccessful outcome in the Weapon Stimulus scenario; see Figure 17 below. There were eight officers that actively met the resistance of the perpetrator. Of those officers, five responded immediately by hitting the perpetrator's gun away and three officers hesitated and then hit the perpetrator's gun away. There were 76 officers that attempted to escape the situation without engaging the perpetrator. Of those officers, 56 hesitated and then attempted to escape and 20 of the officers responded immediately with an attempted escape.



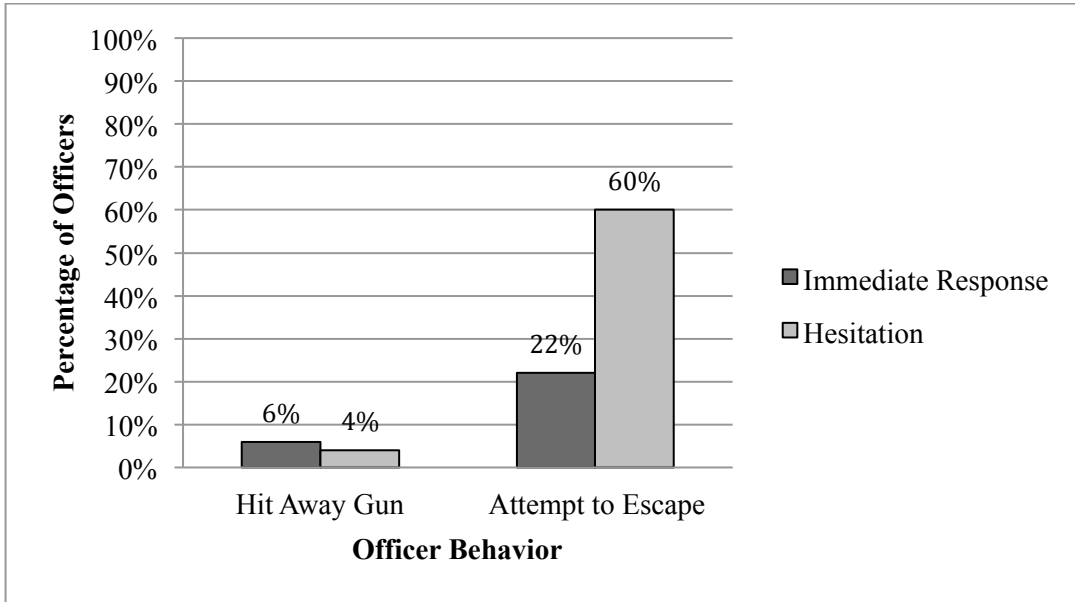
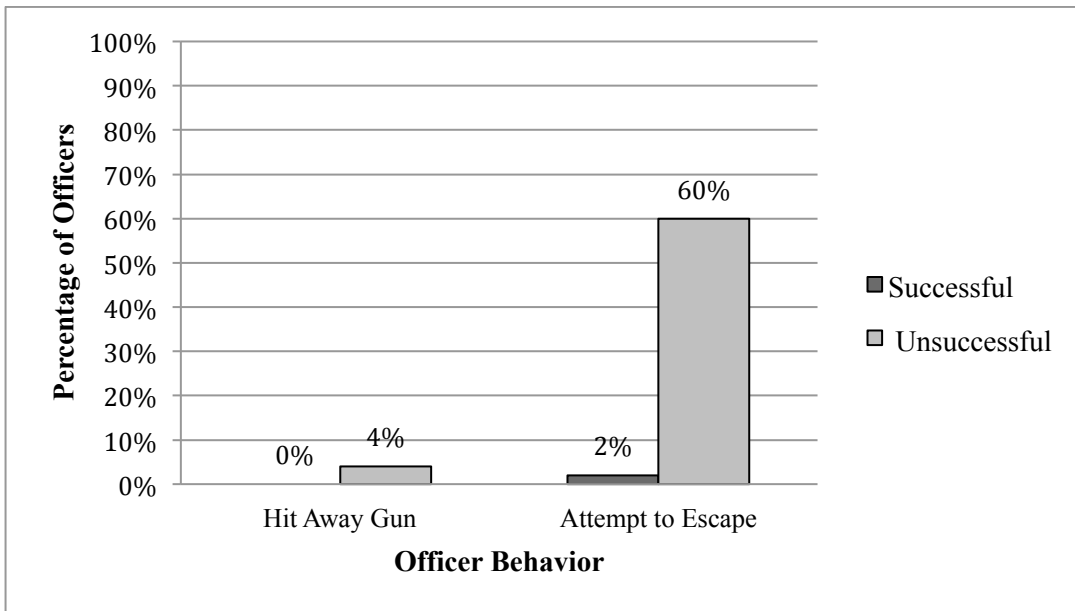


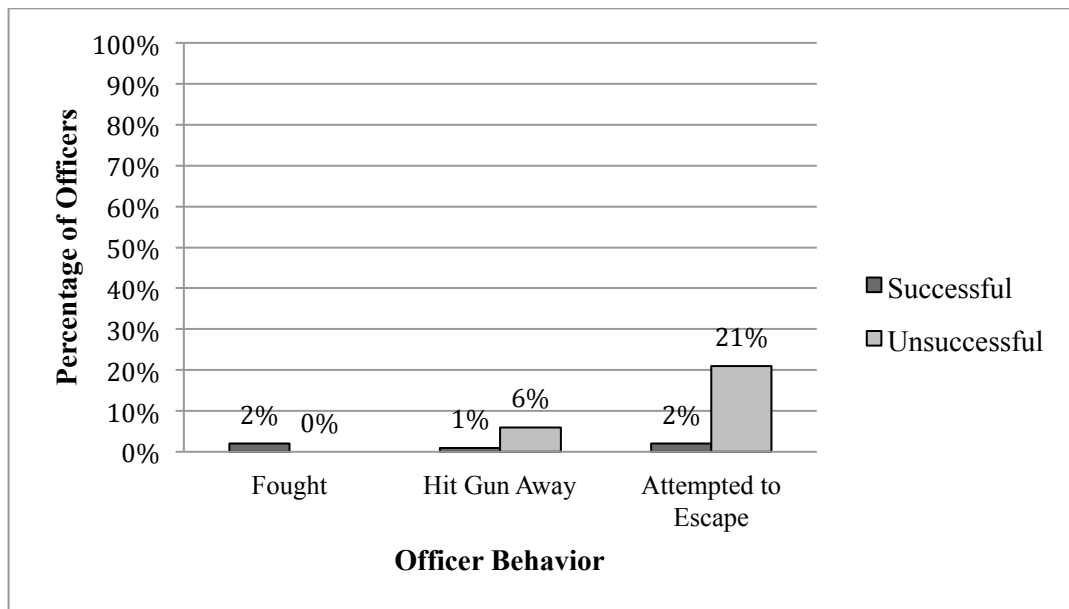
Figure 17. The behavioral response, as well as the initial response (hesitation or immediate), of the 87 unsuccessful officers (shot).

Figure 18 represents the officers that hesitated and then attempted a behavioral response. There were zero officers that were successful at hitting away the perpetrators' gun when they hesitated out of the four officers that hesitated. Only two percent of the officers survived out of the 56 officers who attempted to escape the situation after hesitating.



*Figure 18.* The behavioral response, as well as the outcome (successful or unsuccessful), of the officers who hesitated in the study as an initial response to the weapon stimulus.

Figure 19 represents the officers that responded immediately to the gun stimulus with a behavioral response. There were only two officers that attempted to fight the perpetrator and gain control of the weapon and they obtained a successful outcome. There was only one officer of the six that responded by hitting the gun away that obtained a successful outcome. Of the 21 officers that immediately responded by attempting to escape, only two officers obtained a successful outcome.



*Figure 19.* The behavioral response, as well as the outcome (successful or unsuccessful), of the officers who immediately responded as an initial response to the weapon stimulus.

A majority of the officers attempted escaping the situation while drawing their weapon, which appears to be associated to a decrease in successful outcome. Several officers drew their weapon very quickly and were discharging their weapon during their escape; however, a majority of the officers exhibiting this behavior had an unsuccessful outcome. The Other category represented below, as seen in Figure 20, is made up of

officers who responded by fighting the perpetrator or hitting the gun away. There was one officer who became frozen in place when the gun stimulus was presented.

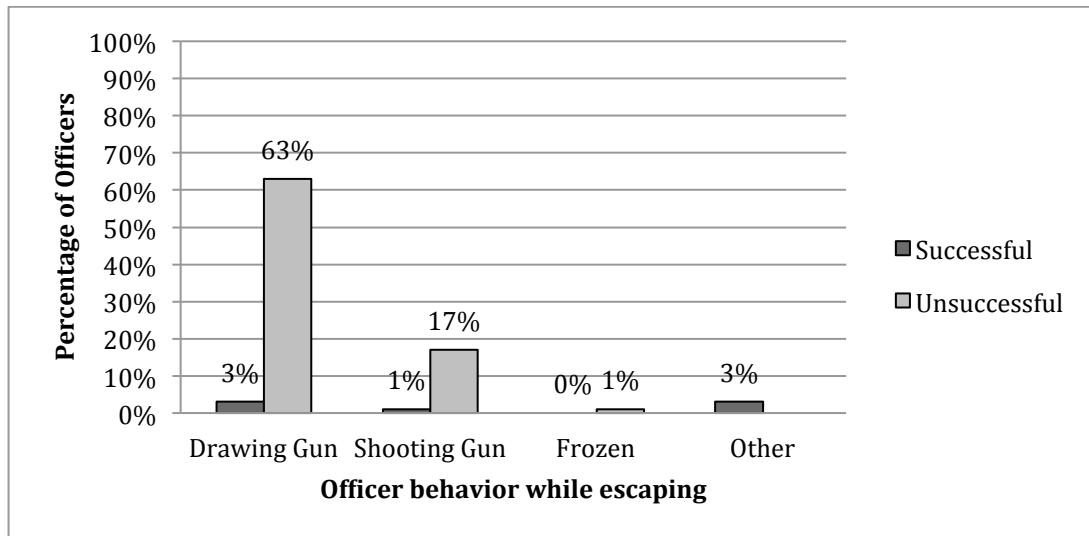


Figure 20. The behavioral response, as well as the pattern outcome (successful or unsuccessful), of the 94 officers while they attempted to escape the weapon stimulus.

### Heart rate patterns identified

A paired t-test was conducted, in addition to the descriptive analysis used, to analyze the heart rate mean outcomes for each scenario within the training simulation. A Bonferroni correction was used to correct for the three t-tests used, resulting in a critical alpha level of 0.02 ( $0.05/3 = 0.02$ ). Expected Outcome HR mean ( $M = 80.60$ ,  $SD = 13.93$ ) was significantly lower than Verbal Aggression mean ( $M = 116.23$ ,  $SD = 19.70$ ),  $t(93) = 19.37$ ,  $p < 0.01$ . Expected Outcome HR mean ( $M = 80.60$ ,  $SD = 13.93$ ) was significantly lower than the Weapon mean ( $M = 123.16$ ,  $SD = 19.91$ ),  $t(93) = 4.69$ ,  $p < 0.01$ . Verbal Aggression mean ( $M = 116.23$ ,  $SD = 19.70$ ) was trending towards being meaningfully lower than the Weapon mean ( $M = 141.80$ ,  $SD = 128.58$ ),  $t(93) = 1.96$ ,  $p = 0.05$ . These results are represented in Figure 21 below.

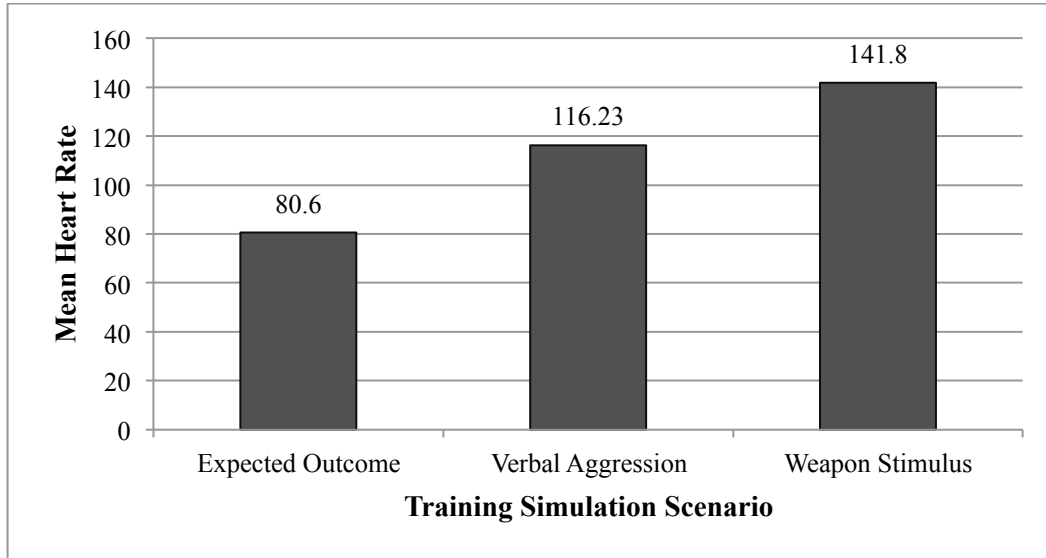


Figure 21. The mean heart rate of the 94 officers across the training simulation scenarios.

The Weapon Stimulus heart rate information for each officer is presented in Figure 22 below. The figure compares the Weapon Stimulus heart rate of each officer to his or her unique age-predicted maximum heart rate. There is much variation between the unique officers' heart rates and their age-predicted maximum heart rate. Some officers' heart rates approach their age-predicted maximum and other officers are rather distant from their age-predicted maximum. The mean heart rate for the Weapon Stimulus, the age-predicted maximum, as well as the difference between the Weapon Stimulus heart rate and the age-predicted maximum heart rate is presented in Figure 23 below.

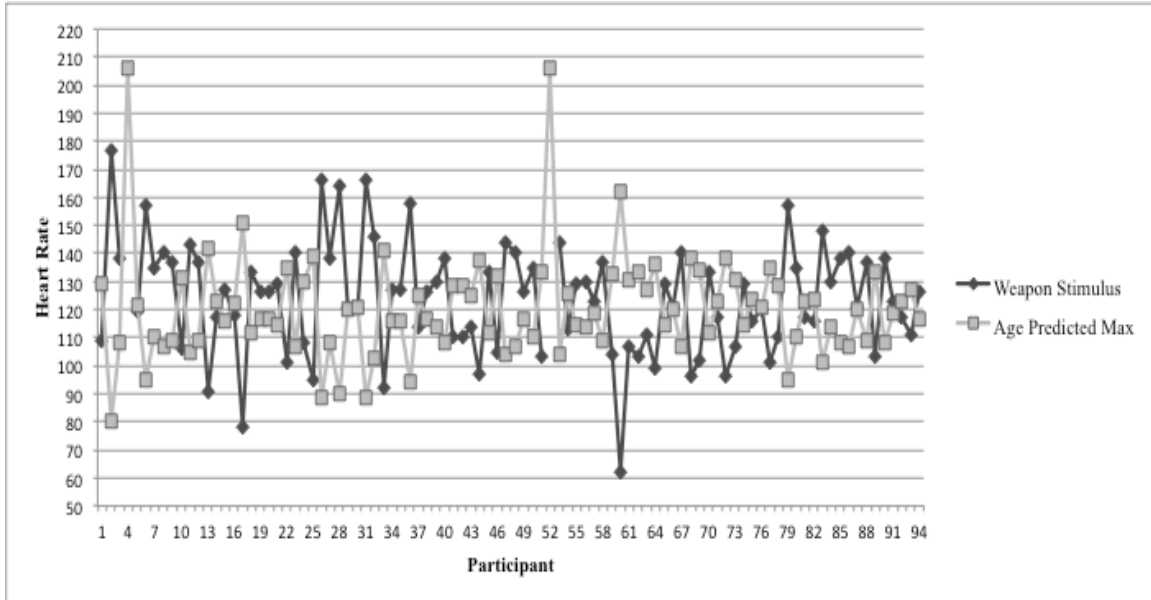


Figure 22. Heart rates of the Weapon Stimulus scenario and the Age-Predicted Maximum heart rate for each of the 94 officers in the study.

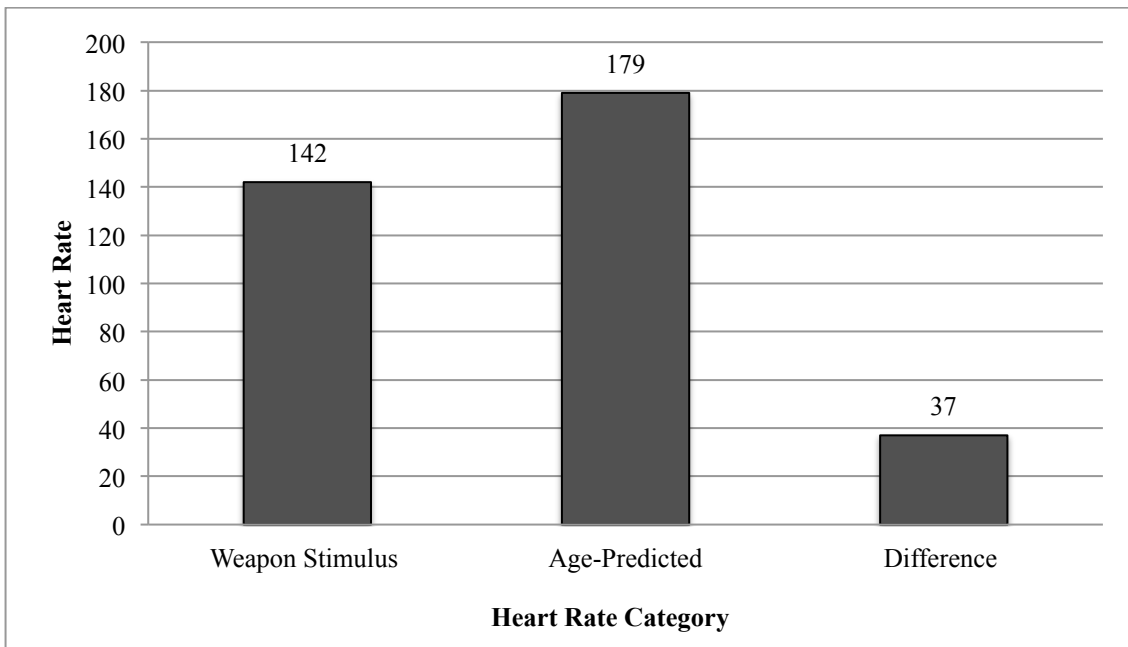
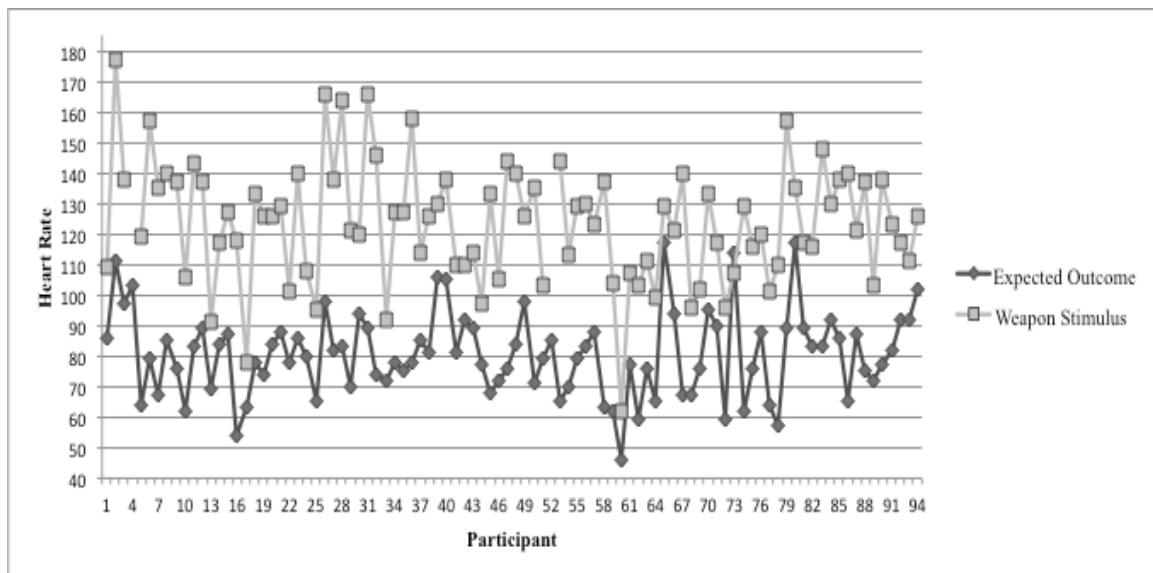


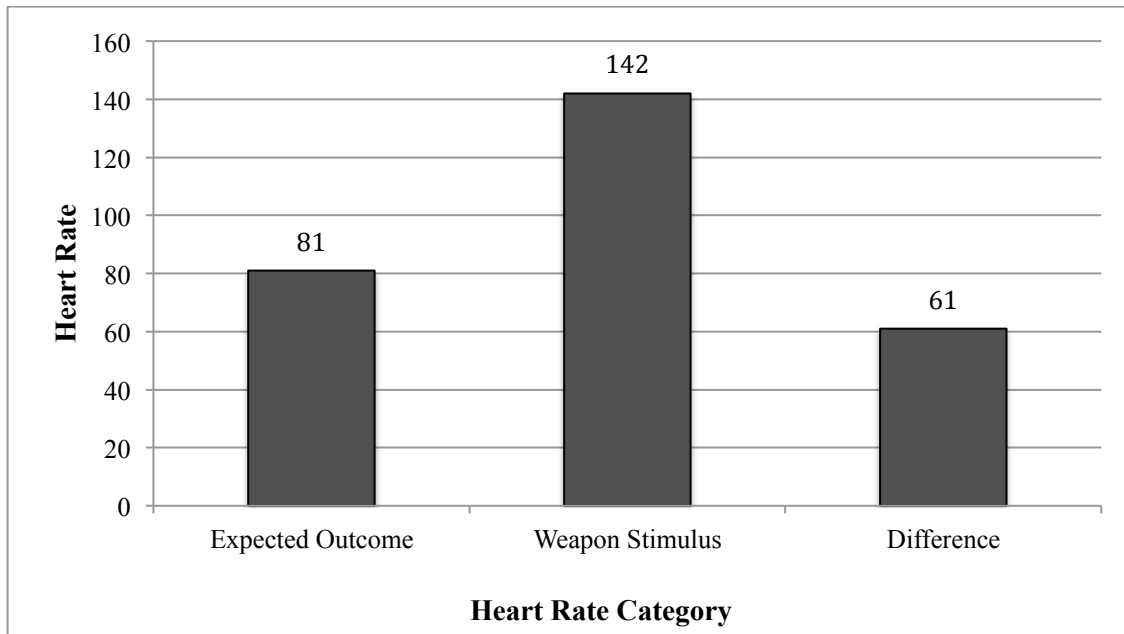
Figure 23. Weapon Stimulus mean heart rate and the Age-Predicted Maximum mean heart rate of the 94 officers are represented here. The mean difference between the Weapon Stimulus and the Age-Predicted Maximum is also presented.

The Expected Outcome heart rate of each officer is compared to his or her Weapon Stimulus heart rates. See Figure 24 below for a visual representation of this comparison. Officers have a significant increase in heart rate for the Weapon Stimulus

scenario in comparison to the Expected Outcome heart rate. It is interesting to note that some officers do have much lower heart rates in the Expected Outcome and subsequently have a lower heart rate in the Weapon Stimulus scenario. Although, some of the officers with a rather low heart rate in the Expected Outcome scenario increase substantially in the Weapon Stimulus scenario, some surpass their peers with higher Expected Outcome in the Weapon Stimulus scenario. The mean heart rate for the Expected Outcome, Weapon Stimulus, as well as the difference between the Expected Outcome and Weapon Stimulus heart rate means is presented in Figure 25 below.



*Figure 24.* Heart rates of the Expected Outcome and the Weapon Stimulus scenario for the 94 officers in the study.



*Figure 25.* Expected Outcome mean heart rate and the Weapon Stimulus mean heart rate of the 94 officers are represented here. The mean difference between the Expected Outcome and the Weapon Stimulus is also presented.

Officer Expected Outcome scenario heart rates are compared to the Verbal Aggression scenario heart rates in Figure 26 below. There was a substantial difference between the officers' Expected Outcome heart rates and the Verbal Aggression scenario heart rates. While the mean Expected Outcome was significantly different from the Verbal Aggression mean, you can see some officers have a much larger difference between the two scenarios than their peers. The mean heart rate for the Expected Outcome, Verbal Aggression, as well as the difference between the Expected Outcome and Verbal Aggression heart rate mean is presented in Figure 27 below.

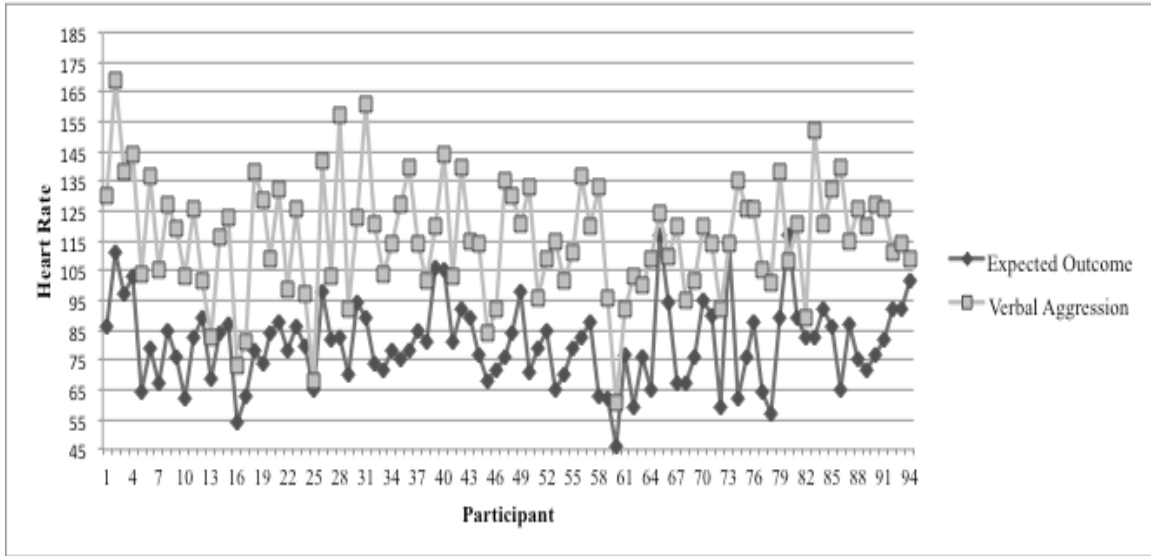


Figure 26. Heart rates of the Expected Outcome scenario and the Verbal Aggression scenario for the 94 officers.

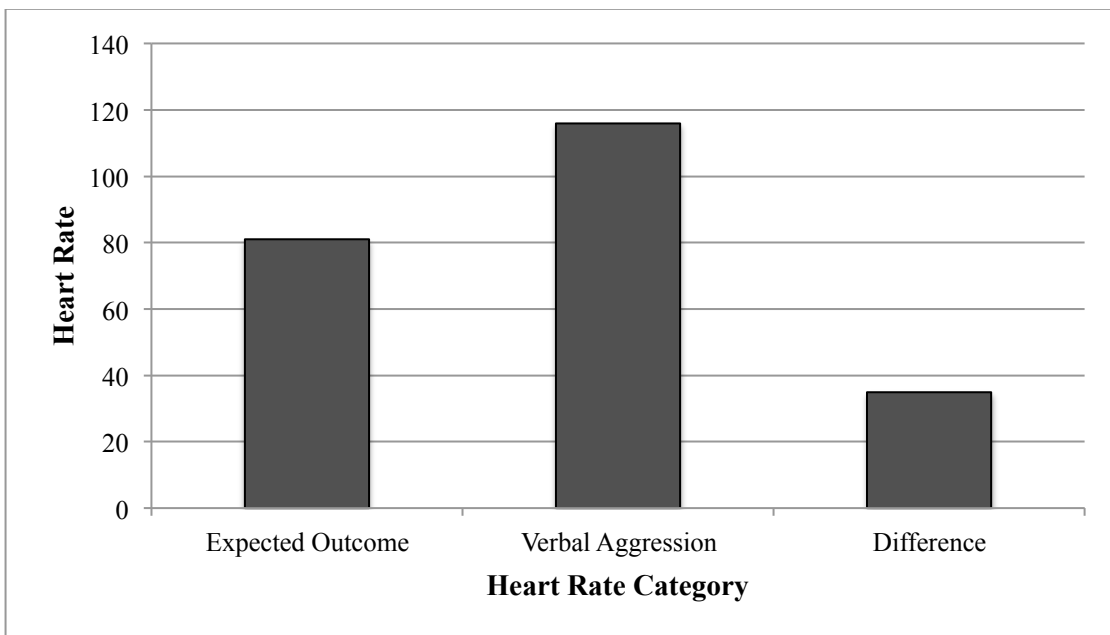
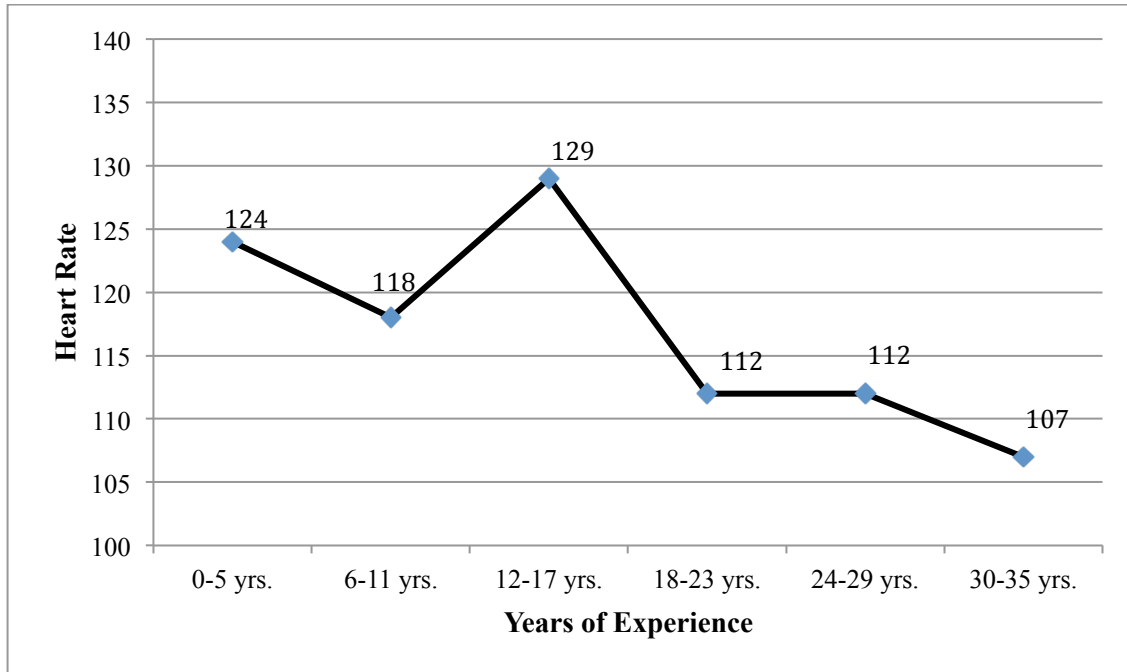


Figure 27. Expected Outcome mean heart rate and the Verbal Aggression mean heart rate of the 94 officers are represented here. The mean difference between the Expected Outcome scenario and the Verbal Aggression scenario is also presented.

Heart rate mean for the Weapon Stimulus scenario was analyzed based on a five year range; this is presented below in Figure 28. The officers with zero to five years of experience had a mean heart rate of 124, officers with six to 11 years of experience had a mean heart rate of 118, and officers with 12 to 17 years of experience had a mean heart



rate of 129. Officers in the 12 to 17 years of experience range represent the highest mean heart rate in comparison to the other years of experience ranges. Those with 18 to 23 years of experience, as well as those with 24 to 29 years of experience had a mean heart rate of 112. The lowest heart rate was signified by the officers that endorsed 30 to 35 years of experience with a mean heart rate of 107.



*Figure 28.* The 94 officers' mean heart rate for the years of experience; the years of experience were categorized based on five-year increments.

### **Officers with successful outcomes**

The officers that achieved the successful outcomes had a mean age of 34 years old, with a range between 27 and 41 years old; see Figure 29. All of the officers in the successful outcome category went by the title Officer. The sex of the officers is available in the Figure 29 as well.

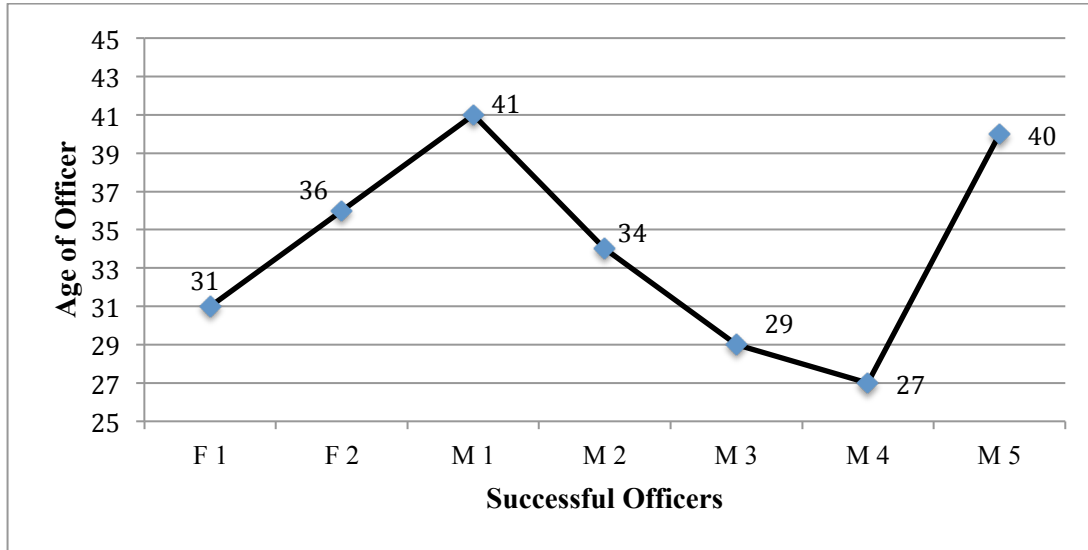


Figure 29. The ages of the seven officers who achieved a successful outcome (not shot) are presented here.

The years of experience in law enforcement for the successful officers was the same as the years in traffic stops, with the exception of one of the female officers having six months more experience in law enforcement than in traffic stops. The mean years of experience for the successful outcome officers was nine years, with a range of one-and-a-half years to 19.5 years. See Figure 30 below for details.

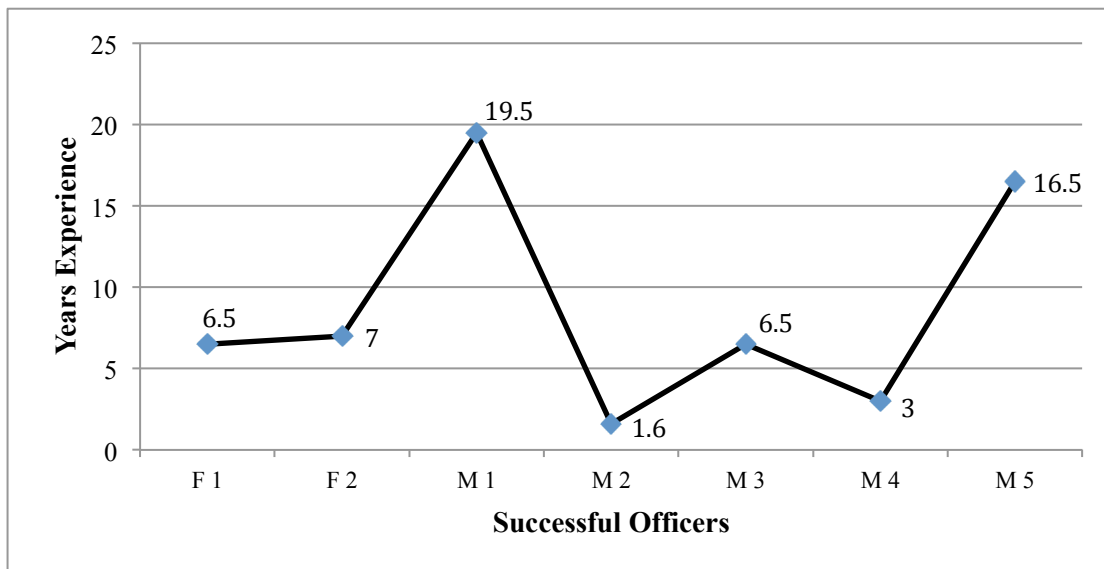
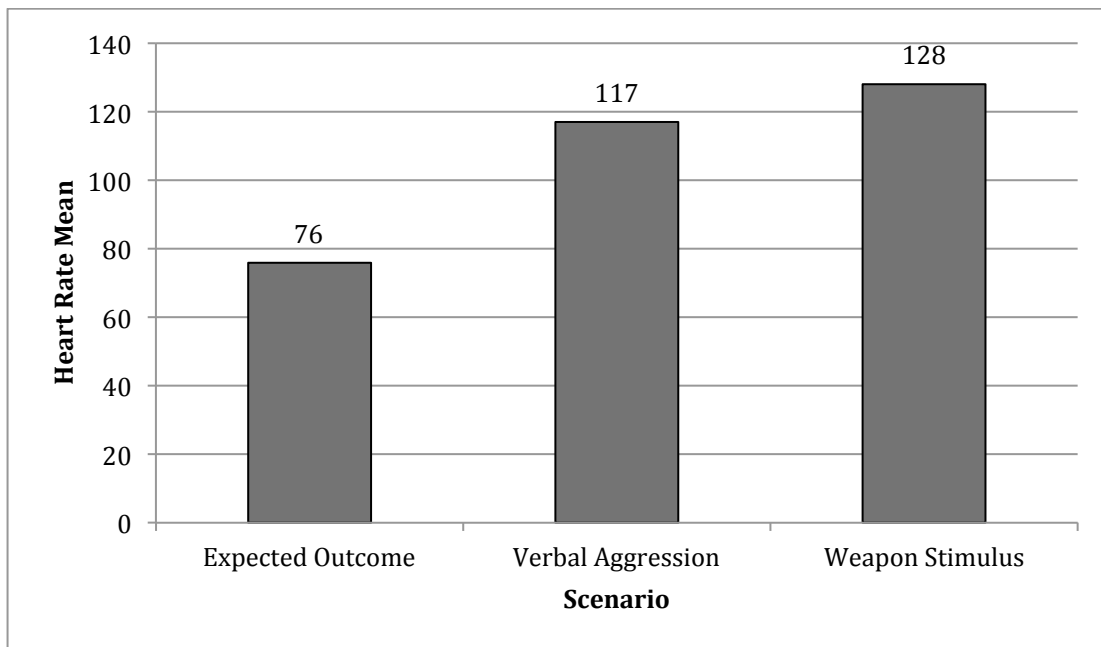


Figure 30. The years of experience in traffic stops for the seven officers who achieved a successful (not shot) outcome are presented here.

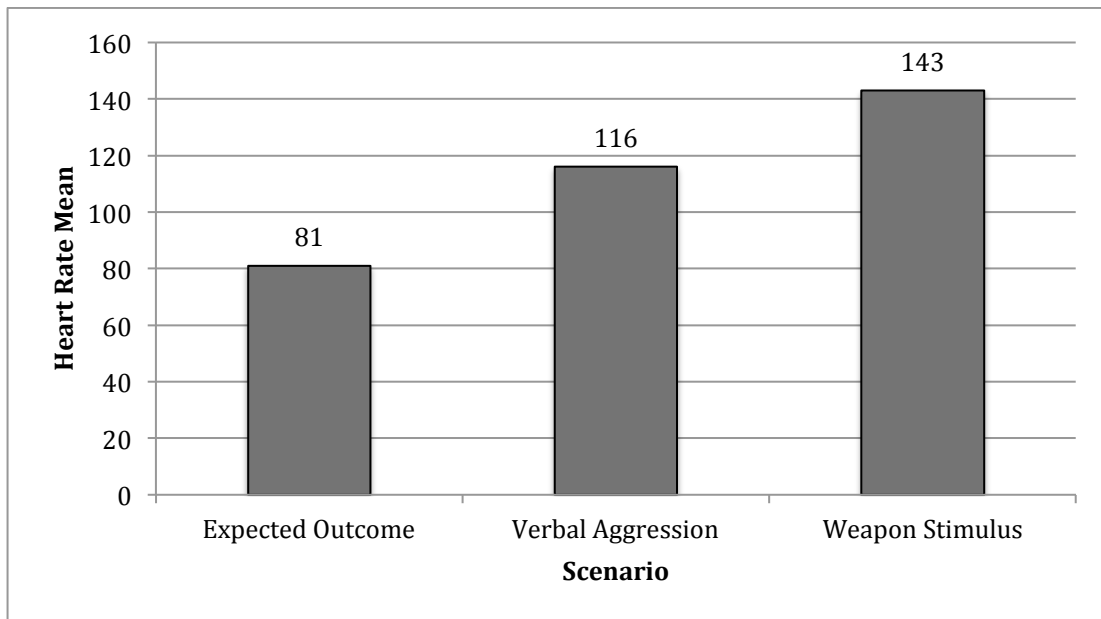
The successful outcome officers mean heart rates are displayed in Figure 31 below for each of the three scenarios. The seven officers mean heart rate for the Expected Outcome scenario was 76 beats per minute, this increased to a mean of 117 for the Verbal Aggression scenario, and to 128 for the Weapon Stimulus scenario. The increasing heart rate does indicate an increase in the stress or excitement, which coincides with the scenario; however, the mean stays well below even the oldest officer's age-predicted maximum heart rate that would be lower than the youngest officer's ( $208 - 0.7 \times (\text{age})$ )  $41 = 179.30$ ) (Tanaka et al., 2001). This indicates, that the officers maintained control of not only the situation, but also their physiological arousal.



*Figure 31.* Heart rate mean for the seven officers who achieved a successful outcome (not shot) are presented here. The heart rate mean is presented for each training scenario within the stimulation.

The unsuccessful outcome officers mean heart rates are displayed in Figure 32 below for each of the three scenarios. The 87 officers mean heart rate for the Expected Outcome scenario was 81 beats per minute, this increased to a mean of 116 beats per

minute for the Verbal Aggression scenario, and to 143 beats per minute for the Weapon Stimulus scenario. The increasing heart rate supports the hypothesis for the need for desensitization training, particularly when comparing these mean heart rates to the successful officers.



*Figure 32.* Heart rate mean for the 87 officers who were unsuccessful (shot) are presented here. The heart rate mean is presented for each training scenario within the stimulation.

An officer's repertoire can make the difference between life and death. Table 1 below provides the successful officers' behavioral patterns. There are clear patterns that are emerging, even with a small successful sample. For example, five out of the seven officers did not hesitate and the officers that actively met the resistance of the perpetrator did not hesitate. There were two officers that hesitated and one of the two officers was on the passenger side and was able to escape without being shot due to the angle the perpetrator had to shoot at. The seven officers displayed even weight distribution on both legs, offering additional support that this weight distribution allows for the most effective escape body positioning.

*Table 1. Repertoire of the Seven Officers who achieved a Successful Outcome (Not Shot)*

Sex	Weapon HR	Initial Action	Behavioral Response	Escape Mode	Weight	Posture	Hands	Side
F 1	118	<b>Immediate</b>	Fought	No escape-fought	Evenly	Erect	Gesture	Driver's
F 2	144	Hesitation	Escaped	Drawing	Evenly	Erect	Free Hanging	Driver's
M 1	107	<b>Immediate</b>	Fought	No escape-fought	Evenly	Bent at Waist	Other	Driver's
M 2	116	<b>Immediate</b>	Escaped	Shooting	Evenly	Erect	Right Hand on Gun	Passenger
M 3	110	Hesitation	Escaped	Drawing	Evenly	Bent at Waist	Other	Passenger
M 4	157	<b>Immediate</b>	Escaped	Drawing	Evenly	Erect	Other	Passenger
M 5	148	<b>Immediate</b>	Deflected & grabbed while shooting	No escape-Deflected	Evenly	Bent at Shoulder	Right Hand on Gun	Driver's

### **Discussion**

This study provides support that hands on training should be emphasized with reality-based desensitization simulations and close-proximity combat defense skills. Training focusing on the importance of remaining alert with an effective repertoire is crucial in these time-sensitive situations. This is evident in the behavioral patterns, as well as the heart rate means, of the successful outcome officers in comparison to the unsuccessful outcome officers.

The mean heart rates compared across the scenarios offer evidence for the utility of RBT desensitization procedures to be incorporated into the current training tactics. The majority of the officers' heart rates in the Expected Outcome scenario were within normal limits (i.e., 60-100 beats per minute). The heart rate mean of the Verbal Aggression scenario was significantly higher than the Expected Outcome mean, indicating that officers became increasingly stressed within a verbally aggressive situation. The Weapon Stimulus scenario heart rate mean was also significantly higher than the Expected Outcome mean, indicating that officers became highly stressed when confronted with the gun stimulus. This provides support that the reality-based presentation of the situation does access how the officers may respond in the field, further evidencing the need for RBT.

The heart rate mean of the successful officers was lower than the heart rate mean of the unsuccessful officers. The Expected Outcome mean of the successful officers' was 76 beats per minute, whereas the mean for the unsuccessful officers' was 81 beats per minute. The Weapon Stimulus heart rate mean for the successful officers was only 128 beats per minute, whereas the unsuccessful officers' heart rate mean was 143. This

supports the theory that the officers with the successful outcome were responding to the gun stimulus with a lower physiological arousal level than the unsuccessful officers. Officers that are able to maintain lower physiological arousal levels (i.e., lower heart rate) in stressful circumstances may be able to respond more effectively and with more control. This idea is represented well by the results comparing the heart rates across the scenarios of the training simulation. The Weapon Stimulus heart rates overlap with the age predicted maximum for a majority of the officers. This offers support that officers may not be able to respond appropriately when tested under that type of circumstance. This holds true when comparing the officer's Expected Outcome heart rates to their Verbal Aggression heart rates, as well as their Weapon Stimulus heart rates.

The unsuccessful officers were categorized by years of experience in traffic stops to compare the group mean heart rate across years of experience for the Weapon Stimulus scenario. Officers with 12 to 17 years of experience had the highest mean heart rate (mean heart rate of 129). Officers with zero to five years of experience had the next highest heart rate mean of 124. Those with six to 11 years of experience had a mean heart rate of 118; this was followed by the 18 to 23 years of experience group and the 24 to 29 years of experience group, both having a heart rate mean of 112. The lowest heart rate mean was the officers that had the most years of experience in traffic stops with a mean heart rate of 107. These results support that officers with the most experience may have the least hyper-vigilant response and the novice officers may have the highest physiological arousal. This is certainly not true of every unique officer in the study; however, when considering the heart rate mean of the years of experience, it offers support. This would indicate that novice officers are not receiving the RBT that would

prepare them for high stress, unanticipated situations in the field, leaving officers to rely on their past experiences rather than their training. Complacency over time is supported by the officers in the 12 to 17 years of experience group, as they represent the highest heart rate mean, in addition to representing the mean and the mode of the current sample. If training included additional RBT to prepare officers for the high stress, unanticipated situations that may be encountered in the field the novice officers may have a lower heart rate and the most seasoned officers may have the highest if considered under the complacent theory. However, an ideal goal would be to reduce baseline physiological responses for novice officers that would be maintained over time with in-services and further decrease with acquired years of experience.

Of the seven officers that achieved a successful outcome, 70 percent exhibited an immediate and controlled behavioral pattern to the gun stimulus. Of the “immediate responders” two fought the perpetrator, while one deflected the perpetrator weapon and grabbed the perpetrator’s gun, and two officers made a quick escape. The remaining 20 percent hesitated and then exhibited a controlled escape. This suggests that it is best to immediately respond to the stimulus, in addition to having a controlled response - not simply a reaction.

There were four officers (of the seven successful officers) that maintained an erect posture throughout the scenario, two officers were bent at the waist but in a “ready to move” fashion rather than a relaxed stance, and the last officer had a “mostly” erect posture, but was slightly bent at the shoulders to see into the vehicle. Four of the seven officers were using the driver’s side approach and the remaining three officers used the passenger side (approach was orchestrated by FSI and was not a reflection of officer



preference). Overall it appeared that the driver's side approach was beneficial for the verbal interaction that took place during the simulation, however the passenger's side approach was beneficial when there was a weapon stimulus. This is an issue considering that one is not aware of how the situation will unfold in a majority of the traffic stops conducted. While Minnesota recommends the use of the passenger side approach, it is at the discretion of the officer. Therefore, the officer should seriously consider the pros and cons of each approach. If traffic and environmental contexts do not present an additional threat, the passenger side approach may be the best option in most situations.

The officers that either fought or deflected to gain control of the perpetrator shared two common features: intent and control. These two features were expressed by the lack of uncertainty during the act and evident determination. The four officers that chose to escape the situation without engaging the perpetrator did so by a "running backpedal" maneuver. Three of these officers escaped parallel to the perpetrator's car, while quickly drawing and attempting to discharge their weapon, while one officer escaped to the rear right side of the perpetrator's car for shelter. It is interesting that the previous three officers did not seek shelter, but they did have intent and control of shooting at the target, which may have played a part in their escape destination choice. Another important piece of the successful officers' repertoire was that three out of the four officers, that were either drawing or shooting their weapon during the escape, were on the passenger side of the perpetrator car. This may have allowed them more time and room to exhibit the weapon-drawing behavior without being shot by the perpetrator. Therefore, the drawing while escaping behavioral pattern may not be conducive to a successful outcome when using the driver's side approach.

The seven officers that obtained a successful outcome offer a starting point to identifying a potentially successful repertoire. It is true that every situation is unique, however, behavioral patterns such as maintaining an equally balanced weight distribution on both legs and avoiding locking the knees, could be something that would be generalizable to most situations. In addition, offering additional training procedures on how to obtain control in a close-proximity situation when there is a lethal weapon present is another training procedure that would be generalizable to most situations.

Over half (64%) of the officers in this study responded to the weapon stimulus with hesitation. Of the 36% officers that responded immediately, only five achieved a successful outcome. This may be due to officers responding too fast, with an impulsive reaction. This uncontrolled and unpracticed response may have the same effects as the hesitation response. For example, of the 87 unsuccessful officers, there were 12 officers that attempted deflecting the perpetrator's weapon away before attempting to escape. Of the 12 officers, five officers immediately responded by attempting to deflect the perpetrator's gun away with one officer achieving a successful outcome. This may be due to how the officer deflected the perpetrator weapon. The officer deflected the weapon with intent of obtaining control and also shot the perpetrator with his own weapon. In addition, the officer did not simply deflect the weapon to escape; he deflected the weapon to obtain control of the perpetrator. The 11 other officers attempted deflecting the weapon to escape and it was done impulsively, without clear intent of obtaining control. The deflection appeared to be more of a "swatting maneuver".

Based on the results it does appear that hesitation is a large factor that impedes an officer's ability to achieve a successful outcome. In addition, moving too slowly can

create a similar sequence of events to the hesitation response. This highlights the importance of thorough training, increased use of desensitization or reality-based training methods, as well as an increase in the frequency of these training periods (e.g., more frequent in-services). Training establishing the importance of avoiding hesitation is a key factor because the hesitation is what would put them at the greatest risk.

The officers of the unsuccessful outcome shared common behavioral patterns as well. A majority of the officers hesitated and then attempted to escape (60%) without engaging the perpetrator. While some hesitated and then attempted to impulsively deflect the weapon (4%). A majority of the officers attempted a backpedaling escape mode (59%); the lack of their success may be related to the hesitation endorsed. The next most frequent escape pattern among these officers was the right-side stepping escape pattern (15%), followed by the officer turning and running away with their back to the perpetrator (12%). There were some officers who first ducked and then attempted running away (11%) and one officer attempted a left-side stepping escape pattern. In regards to the escape destination, a majority of these officers escaped parallel to the perpetrator's car (20 officers).

It is interesting to point out that there were 20 unsuccessful officers that attempted the parallel escape route that was used by the seven successful outcome officers. However, an important distinction needs to be made: all seven successful officers were utilizing the passenger side approach when they used the parallel escape route. Of the 20 unsuccessful officers that used the parallel route, five were also on the passenger's side, however, all five hesitated; the remaining 15 officers were on the driver's side. In addition, 39 of these officers escaped to the right rear of the perpetrator's car, 18 escaped

to the left rear, four escaped to the middle rear of the perpetrator's car, and five officers escaped somewhere else defined as "other". These findings do offer support for the utilization of the passenger side approach, as well as actively engaging the perpetrator to obtain control of their weapon. In addition, the seven officers that were successful may have achieved the outcome due to the intent and control they exhibited rather than the specific escape pattern the officers used.

There were 59 unsuccessful officers that attempted drawing their weapon simultaneous with escaping, 16 officers were able to extract their weapon and attempted discharging while escaping, seven officers simply attempted escaping without drawing their weapon, and one officer was frozen in place. The results indicate that 63 percent of the officers that attempted to draw their weapon during escape ended with an unsuccessful outcome, with only three percent of the officers being successful when they attempted drawing their weapon while escaping. For the officers who attempted discharging their weapon while attempting an escape only one percent of the officers achieved a successful outcome and 17 percent of the officers were unsuccessful. These results suggest that attempting to outdraw the perpetrator while attempting to escape will likely lead to an unsuccessful outcome. These results regarding the officers' attempts to outdraw the perpetrator supports previous findings (Lewinski, 2011), and supports findings that firing while under pressure without appropriate training is less accurate (Nieuwenhuys et al., 2012).

The results of this study support the findings that using appropriate force for the situation is a necessary quality. In addition, quick decision-making in the field of law enforcement could mean the difference between life and death. Learning skills in a

similar environmental context that the skill will need to be replicated in may improve the officer's ability to execute the skills in the field. The current findings, while only qualitative, offer further support for Broome's 2011 findings that RBT does induce a panic response in officers during a training simulation. The findings indicating that hesitation is a common response that officers are making due to lack of exposure and increasing the RBT could potentially allow officers to recognize the threatening stimulus and respond the way they were trained (Klein et al., 1986; Kobus et al., 2001)

This study points out that training officers how to *regain* control once control has been lost is equally as important as training officers how to maintain control. Three of the seven officers within the successful outcome offered a good example of using appropriate force and regaining control once it has been lost. In order for the officers to have the confidence to use appropriate force they must first acquire mental readiness through training efforts. Mental readiness would allow the officers to make quick decisions, improve their resilience baseline, and be prepared to *move* (T. Beck, personal communication, 09/28/2013). In a high stress, potentially lethal situation, an officer's survival ultimately depends on the quality and thoroughness of their training.

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