Police Jiu-Jitsu: Engineering Optimal Outcomes in Use of Force Application to Reduce

Major Injuries to Citizens and Officers

by

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ABSTRACT

Police use of force is an issue that generates considerable public interest. Seeing police use of force in person or via video recordings seldom looks good for the viewer. Police must constantly be aware of their reasons for using force, the methods that they employ, and the decisions that they make in using force. Optimal results come from optimal decision-making, but analyzing whether the training that police receive leads to optimal decision-making is not a topic that has been researched often. By utilizing the martial art of Brazilian Jiu-Jitsu, the Mesa Police Department has taught their officers how to maintain broad focus of attention on their environment and more time to analytically decide how and what force modalities to employ in any given situation. This has resulted in significantly less serious physical injuries to officers and citizens and optimal decisions in critical incidents.

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CHAPTER 1

INTRODUCTION

When people refer to the functional uses of Human Systems Engineering or Human Factors Engineering, their thoughts are often brought to the most notable examples of tailoring technology to human use. This can be as simple as the design of the television remote control or as complex as the remote team operation of an armed military drone from hundreds of miles away. The medical and transportation fields are some of the most examples of this discipline's application in society. The word 'engineering' in this context often brings to mind the actual engineering of products, computers, artificial intelligence, and other technologies which enhance our lives. What is often lost in this focus on technological integration in human experience is the intangible, often unseen aspects of human decision-making.

When looking at almost any field of endeavor there are aspects of technology and aspects of decision-making at work. In the field of law enforcement, these two components are highly visible in the public eye. The police hold a unique and visible position in society. They are the enforcement arm of the government and have the power to use lethal and non-lethal force against citizens to maintain the public order, mitigate threats to law-abiding citizens, and enforce society's laws. The police can use lethal force to prevent the death or serious physical injury of themselves or others and to prevent the escape of imminently violent offenders. Police can use non-lethal force to arrest violators, maintain public order, prevent crime, and prevent injury to citizens. The citizens of any society have a reasonable expectation that their government will pass laws in their interest to maintain society's structure and cohesion, and that government will then enforce those laws fairly and with

reason. In the United States especially, the words 'fairly' and with 'reason' mean the public has a keen interest in seeing that police exercise reasonable judgment and decision-making in enforcing the laws. The public expects police to be even more diligent in exercising reasonable and fair decision-making in the using force.

With this expectation, police in the United States have strived to provide more education, training, and technology to police officers in order to create the conditions favorable for reasonable decision-making on the part of the police. Statutory and case law, advancements in technology, and public perception and opinion have driven training and professional policies to attempt to get consistently solid decision-making in critical incidents involving use of force. There are two concepts which do not receive much attention in American law enforcement yet are vital in training decision-making.

The first concept is the use of effective evidence-based data science to understand whether training and technology are resulting in better decisions. Much of the police research which is done is often done by people without domain experience. The results of this evidence-based research often show a lack of understanding of police procedure or draw incorrect assumptions from the data. In one published article, researchers discussed science and pseudoscience in law enforcement and how some applications of pseudoscience hurt the profession (Lilienfeld & Landfield, 2008). The researchers highlighted valid issues with eyewitness testimony, fingerprint analysis, and guarding against confirmation bias in interrogations. However, they also asserted that the use of 'truth serum' in interrogations and 'hypnosis' in witness interviews was problematic. In fact, they are so problematic that 'truth serum' is never used anywhere in the country and hypnosis is seldom used to the point that most law enforcement cannot even cite an

example. This highlights to law enforcement practitioners that the authors did not really bother to check with the profession before making such assumptions. In another study with well-founded data on use of force and body worn cameras, researchers found that in a large metropolitan police department, specialty units used force more often than patrol officers (Gaub, Todak, & White, 2021). The researchers concluded that specialty units may benefit from enhanced de-escalation type training since their use of force is so much higher than patrol officers. The error in this conclusion is in not understanding that patrol officers are tasked with a number of low risk and mundane tasks such as traffic direction, assisting motorists, and taking reports of crimes from victims in which the suspect is already gone. Many specialty units do none of these low-risk activities, and by contrast some specialty units are charged with dealing solely with gang crime, drug crime, sex crime, or apprehending violent felons which are all much more likely to be violent in nature.

Secondly, while there are pockets of the law enforcement profession which understand the basic scientific premise of human factors in decision-making, few have the knowledge and ability to apply these concepts to police use of force and understand what is going right and what is going wrong in police use of force decision-making on a cognitive level. A famous study undertaken for publication in a non-peer reviewed professional journal established that a suspect with an edged weapon standing twenty-one feet away can charge at and stab an officer before the officer can draw and fire one round into the suspect (Tueller, 1983). This shows a base knowledge of human motor skills but assumes context that is seldom present. First, well trained officers and skilled marksmen were used while not all officers are so talented. Their motor skills in drawing and firing one round were honed. Also, unlike what is depicted in the movies, one round alone seldom stops the

assault. The suspect seldom falls over with just one round at the officer's feet. This article was so well received in law enforcement that the '21-foot rule' is still taught in police academies throughout the country that if someone with an edged weapon is closer than twenty-one feet deadly force should be considered. In reality, based on different skill levels and the propensity for suspects not to immediately stop an assault with just one shot from the officer the odds are that the officer is still going to get stabbed and maybe fatally. A research-based analysis of the 21-foot rule found that factors such as the officers' abilities to draw and fire accurately, officer movement during the assault, and longer distances all refute 21-feet as a 'rule' (Sandal, Martaindale & Blair, 2020). Yet the '21-foot rule' is still taught almost nationally forty-one years after the original article was published.

In stressed decision-making, the difference in good and bad outcomes on the cognitive level is often the element of time. Time is the great equalizer of decision-making. Old West lawman Wyatt Earp related as much in a 1928 interview.

"When I say that I learned to take my time in a gunfight, I do not wish to be misunderstood, for the time to be taken was only that split fraction of a second that means the difference between deadly accuracy with a six gun and a miss. It is hard to make this clear to a man who has never been in a gunfight. Perhaps I can best describe such time taking as going into action with the greatest speed of which a man's muscles are capable, but mentally unflustered by an urge to hurry or the need for complicated nervous and muscular actions which trick-shooting involves. Mentally deliberate, but muscularly faster than thought, is what I mean." (Lake, 1930).

The lesson is clear in police use of force, either deadly or non-deadly force, the difference in successful outcomes may be the skilled use of time. Figuring out how to squeeze more time, the split fraction of a second Marshal Earp spoke of, was an application of human factors thinking towards decision-making observations required by law enforcement before it was as extensively studied.

This is where we see the value of human systems engineering for law enforcement, in a field where it is not often considered or applied. By understanding human factors and theories of attention and decision-making and applying this knowledge to police training and available technology, the profession of policing can train better decision-making in stressful, critical incident use of force situations. Providing an evidence-based impartial assessment of whether the concepts being taught are viable and working for police and the public is essential.

CHAPTER 2

UNDERSTANDING THE LAWS AND POLICIES BEHIND POLICE USE OF FORCE

Police officers and administrators are rarely human systems engineers and human systems engineers are rarely police officers. Without this dual knowledge base, it is important for a human factors specialist not involved in law enforcement to understand the basic underpinnings of use of force laws and policies in police agencies. An old cautionary adage that we often hear is that "words matter". Nowhere do words and meanings matter more than in understanding law and policy that seek to govern human behavior. Without this basic understanding of how use of force is structured and defined in American law enforcement, it is not feasible to understand the significance of research into how human factors can affect this very same human behavior.

As a general matter, each state and territory in the United States has a series of laws authorizing the use of force by citizens and police under a variety of circumstances. This is the legal framework in each state for which the actions of citizens and/or police are to be judged against the actual action of using force. As this research takes place within the Mesa, Arizona Police Department, the laws regarding police use of force in the state of Arizona are applicable. Arizona Title 13 (Criminal Code), Chapter 4 (Justifications) covers the circumstances in which a citizen or an Arizona peace officer may use physical force or deadly physical force against another. The text of this law is as follows:

> 13-409. *Justification; use of physical force in law enforcement*
> *A person is justified in threatening or using physical force against another if in making or assisting in making an arrest or detention or in preventing or assisting in preventing the escape after arrest or detention of that other person, such person uses or threatens to use physical force and all of the following exist:*
> *1. A reasonable person would believe that such force is immediately necessary to effect the arrest or detention or prevent the escape.*

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2. Such person makes known the purpose of the arrest or detention or believes that it is otherwise known or cannot reasonably be made known to the person to be arrested or detained.
3. A reasonable person would believe the arrest or detention to be lawful.

These laws are specific as to circumstances but sometimes vague as to the standard of justification. As an example, the pertinent Arizona law for this research is the statute justifying the police use of physical force which uses the word 'reasonable' or 'reasonably' no less than three times in four lines of text (Justifications, ARS 13-409). This law governs police use of force in effecting arrests or legal detention but is not the only justification statute in Arizona for the use of force. Law enforcement also has a state statute for authorization of deadly force, as well as a number of statutes covering citizen use of force, which equally applies to law enforcement in Title 13, Chapter 4 of the Arizona Revised Statutes.

For all the statutory law allowing or forbidding use of force for a variety of societal goals, it is often guidance from state and federal courts in the form of case law which gives these statutes their meaning. We can look at Arizona's justification for the use of force in law enforcement and note its liberal use of the words 'reasonable' and 'reasonably'. It is not hard to envision a different definition of what 'reasonable' is in the mind of every citizen. In the case of police use of force, the United States Supreme Court has basically defined what 'reasonable' is for police use of force. 'Reasonable' force is that force which due to the ***totality of the circumstances*** would make a police officer feel that the action was reasonable (Graham v. Connor, 1989). It further specifies that when the use of force is judged in the legal sphere at a later date, it must be reviewed in the same spirit as the circumstances at the time and not with the 20/20 hindsight of the passage of time. Graham

v. Connor (490 U.S. 386, 1989) is not the only case law which defines and articulates the spirit in which state and federal statutory law is interpreted, but it is the most influential.

What emerges from this two-pronged set of legal directives is a state statute authorizing the use of physical force by law enforcement under certain circumstances. There is then case law by the country's judiciary (in this case, the United States Supreme Court) which defines by what standards and definitions the state statute and those acting under its authority are to be judged. Police agencies then take these laws and definitions and craft policies and practices in order to define their own agency guidelines. This reflects how agencies want their employees to conduct themselves in applying these laws.

For the Mesa Police Department, where this research was conducted, there is a use of force policy in place which outlines the circumstances in which force can be used and the tools available with which to apply force (Mesa Police Policy 2.1.1, 2023). As with most agencies, and consistent throughout American law enforcement, this policy outlines six levels of subject behavior for police to gauge the level of resistance and apply a reasonable level of force to the subject reasonably in line with the use of force continuum published by the National Institute of Justice (NIJ, 2009). The definition of 'use of force' is widely seen in law enforcement as including everything from the mere presence of the officer through the legal application of deadly force. Uses of force such as mere presence, lawful verbal commands, and the handcuffing of a compliant suspect are not tracked and reported as a uses of force, however. They do not meet the standards as needing a legal justification for using the type of force which could cause injury. What this means in practical terms is there are six levels of suspect behavior and many methods of delivering force by police. The Mesa Police policy outlines the suspect's behavior and dictates what

levels of force can be used for what types of resistance. The reporting of such force as a use of force incident does not occur until such time as the force falls under the legal justifications set forth in Arizona statutory law and case law discussed above.

The six levels of subject actions outlined in Mesa Police Department Use of Force Policy 2.1.1 and their definitions are:

Compliant: This is the vast majority of subjects police deal with. They follow lawful commands and are cooperative. They offer no resistance or aggression.

Passive Resistance: This action offers no physical resistance to an officer's attempts to control the subject. It may include going limp, non-compliance with verbal commands, or refusing to move. It does not include active resistance to police.

Active Resistance: These are physical actions to prevent police control. This includes such actions as pulling away, fleeing, thrashing around, pinning one's arms under their body, or going rigid.

Danger to Self: These are physical actions which indicate intent to self-harm or commit suicide.

Active Aggression: This body of behaviors included non-deadly physical force by a subject to assault or attempt to assault a police officer. It includes punching, kicking, striking, pushing, or other actions which present an immediate threat of physical harm to the officer or another.

Aggravated Active Aggression: This is an assault with the intent or the means to inflict serious bodily injury or death. Deadly force can be used to repel this

aggression. It includes assault with guns, knives, or other weapons; as well as attempts to take an officer's gun or use a vehicle as a weapon.

With these six levels of citizen behavior, the force options police are allowed to use against each now come into play. Much of this comes down to the legal term: reasonableness. What levels of force and force applications are 'objectively reasonable' within a given circumstance, just as what is set forth in Graham v. Connor (490 U.S. 386, 1989), guides what force can be used against a citizen. No objectively reasonable officer would use their baton against a compliant citizen. The obverse of that is facing aggravated active aggression (trying to kill the officer or someone else) no reasonable officer or citizen wants the only use of force to be verbal commands, especially if the citizen is the one the suspect is trying to kill! What police department policy attempts to do is to provide a variety of force options for different levels of behavior by citizens and provide a rough guideline of which options can be acceptable facing these behaviors. This is always within the context of the unique blend of what is objectively reasonable under the totality of circumstances.

The force options available to the Mesa Police Department are also outlined in Mesa Police Department Use of Force Policy 2.1.1. Some of these options are available to all officers and some of them are only available to specially trained officers. The Mesa Police Department, like all American law enforcement, looks at technology for delivering force and continually adds or discontinues using different force platforms as technology advances. With each options listed below there will be a discussion of what these options include or do not include:

Control Holds: This is a loosely defined body of open hand control techniques used to restrain the movements of a person offering any type of behavior other than compliant. It can include such things as using one's hands, arm, legs, or body to control the movements and actions of another. For instance, using one hand to control the wrist of a passively resistant person while using the other hand to push on the back of the shoulder in order to guide the passively resistant person to the ground to be handcuffed would be an example of a 'control hold'. Another use of a control hold is placing the index fingers of each hand under a citizen's ears where the jaw meets the skull and applying moderate pressure to that area which will cause pain but not injury. There are dozens of these techniques and methods which are taught to police, but for the purposes of data collection, the exact nature of each and every method used in every application of a control hold is not tracked. As the lowest, and generally one of the only authorized options against the lower levels of citizen behavior, it is no surprise that this is the most utilized force option in the majority of encounters.

Chemical Agents: Chemical agents are a class of force option which primarily of oleoresin capsicum-based spray that is an oil-based extract from a chili pepper plant. This is basically the "hot" part of the chili pepper plant. People eat chili peppers on a variety of food and do not suffer injury nor die from it. In food it burns your tongue and does hurt someone's pride occasionally, but otherwise there is no harm. Used as a spray for police use of force it can cause temporary burning and irritation of the skin and burning and watering of the eyes causing them to close. The pain is real, but the effects are temporary and there is no injury. Pepper spray

is an effective tool, but it is also a tool of caution because with all aerosol-based sprays it is often impossible to keep the effects contained to the target citizen and not on yourself or fellow officers. That being said, pepper spray as a Chemical Agent force modality is a low threshold type of force that can be used on persons exhibiting defensive resistance and up.

Limited Strikes: Limited Strikes is a class of force options which is very similar to what it sounds like. It is a variety of fist, knee, or arm strikes to a citizen's body in targeted specific areas with an intended result of gaining compliance, but not causing injury. Limited strikes are not delivered to the face, head, groin, abdomen, or other more sensitive injury-prone areas. A limited strike to large muscle groups or nerve blocks for the purposes of distracting actions are the focus of the techniques. For instance, on the outside of the upper leg of humans is a nerve group referred to as the common peroneal. Delivering a targeted strike with an officer's knee to this area can cause a momentary surge of pain and loss of balance to that specific leg, which in turn would allow an officer in a struggle to use that moment off balance to apply a control hold and prone the citizen on the ground for handcuffing. Limited strikes can cause minor bruising and pain, but otherwise generally no major injuries. As such, these uses of force are authorized for any form of defensive resistance and up.

Strikes: Strikes are exactly as they seem. The strikes can be anywhere on the body, including the face, abdomen, etc. Strikes obviously by their very nature tend to cause injury. Very few have not had a fight with a sibling or on the playground in school for and not absorbed a punch to the nose or the eye. Most have also likely

watched a fight on the playground or depicted in a movie. A strike is exactly what we expect to see which is a punch to the face or the gut or somewhere else. Strikes can cause major injuries, but usually not death. As a result, strikes are not something policy authorizes for passive or defensive resistance, but rather for those exhibiting active resistance and above.

Taser: The Taser is a conducted energy weapon. It is shaped and functions similarly to a pistol. It fires two barbed probes connected to wires which are then meant to penetrate the suspect's skin and conducts electrical energy for five seconds. This is supposed to cause electricity-driven muscular lock up between the area of the probes. The effective range for the Taser is between 7 to 25 feet with an optimal range of around 12-15 feet to allow the probes to spread far enough apart for maximum effect. If the Taser is fired at close range the spread of the probes is generally not far enough to cause muscular lock up, in which case this becomes a pain compliance weapon. This weapon is generally not fired towards sensitive areas like the face, eyes, groin, or chest area of a suspect. It also cannot be used in wet conditions or in conditions where flammables are present. The Taser can be used for active resistance and above.

Impact Weapons: An impact weapon can be any in a series of items used for striking. The most common impact weapon for the Mesa Police Department is the ASP expandable baton. This baton can extend from the barrel of the baton two sets of steel tubes to make a ten-inch baton into a much more formidable 24-inch baton. Impact weapons by their nature cause serious injuries and are usually only authorized for persons exhibiting active aggression or higher. Impact weapons can

be flashlights or other batons, such as the side-handle baton, but other batons are not authorized by the Mesa Police Department and officers are discouraged from using their flashlights by policy. However, in a fight when there is a threat of serious injury to the officer by the aggressiveness of the assault, no one is going to fault an officer for using a flashlight that is already in their hand rather than attempting to use the ASP baton still in its scabbard.

Canine: Canine use of force is self-explanatory. It is the use of a police canine to apprehend a suspect through the use of bite and hold techniques. Dog bites can often times be serious and require stitches or even surgery to repair. Due to the seriousness of a dog bite, the use of canines is only authorized for felony crimes or incidents of active aggression and above.

Bean Bag Munitions: Bean bag rounds are less lethal munitions consisting of a cloth bag filled with shot which is fired through a 12-gauge shotgun cartridge. The velocity of the bean bag reaches approximately the same velocity of a major league baseball pitcher throwing one hundred mile per hour fastballs. Bean bags are considered less lethal because they are unlikely to cause death unless someone is shot in the chest with prior medical conditions or in the head or face, but the bean bag is capable of causing serious injury. The round can, but does not usually, break and penetrate the skin and can break thinner bones such as the bones of the forearm or hand. Due to the propensity for injury, bean bag rounds are usually only used in instances of active resistance and aggression and above.

Pepper Ball Area and Direct: A pepper ball is a small munition fired from a specially built rifle platform. The rifle platform does not allow the firing of live

munitions. The pepper ball that it fires is a small projectile filled with the same type of pepper spray component that is in the chemical agents. These munitions are made to break open on impact and spread the pepper spray from the interior of the pepper ball around the area it is fired. The Mesa Police Department allows for the pepper ball to be fired around the area that a suspect is in for active resistance and above and fired into the person, excluding sensitive areas, for persons being actively aggressive. This platform allows the delivery of chemical agents from a distance without having to be as close as one would to deploy the standard chemical agents each officer carries. This platform was first deployed in 2023 for the Mesa Police Department.

FN404: The FN404 is a rifle platform that can fire a chemical munition and is also a less lethal weapon. This weapon was similar but not as versatile as the pepper ball platform but was used in a similar manner until the acquisition of the pepper ball rifles. Generally, the FN404 was utilized by SWAT personnel while the pepper ball rifles are utilized by patrol officers. FN404 munitions can be used in the same manner and with the same authority as a pepper ball round can now be used.

40MM Flexible Baton: The 40mm Flexible Baton platform is also a rifle fired weapon. The rifle cannot fire live rounds, but it does fire a low velocity hard rubber cylinder with reacts much in the same way as an impact weapon and has the same authorizations. This impact weapon can be delivered from a distance and carries the same dangers as a bean bag or an impact weapon if fired into a more sensitive part of the body. This is a specialty weapon typically used by SWAT and some trained patrol officers.

Carotid Control Hold: The carotid control hold, or vascular restraint hold, is a read neck restraint hold which is utilized to temporarily stop the flow of blood to the brain by constricting the carotid arteries in the neck. It causes temporary unconsciousness and allows police to restrain and handcuff a violent suspect in the five or so seconds that the person is unconscious. There have been instances in which the hold has been applied repeatedly to fighting but unhealthy individuals and has resulted in death. In a one-time application of the hold to a suspect, death has never been documented as occurring. However, due to the fact that some repeated use critical incidents have resulted in deaths, each law enforcement agency determines for themselves whether the technique is authorized and at what level of resistance by the suspect. At the Mesa Police Department, the carotid control hold can only be used in those circumstances in which deadly force may be used. This means that this level of force can only be used against aggravated active aggression.

Deadly Force: The final level of force authorized by law is deadly force. Deadly force is only authorized in those circumstances in which an objectively reasonable officer feels the threat of serious bodily injury or death to themselves or a third person as a result of the suspect's actions. This is aggravated active aggression. The primary method of delivering deadly force in most American police departments is through the use of a firearm. When deadly force is authorized however, any number of reasonable, yet unorthodox methods are allowed. This can include using a vehicle as a weapon and using other force methods in a more lethal manner. Shooting someone in the head with a bean bag, hitting them in the head with a baton

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or firing the Taser probe into the face and eyes can call be deadly force options in the heat of the moment.

These force methods are all of the categorized methods of force used by the Mesa Police Department and these were the force modalities which were tracked throughout the course of this study. Not every option is available to every officer at all times and in all circumstances. For instance, an officer may be in a situation in which the use of a canine would be authorized, but no canine officer is present at the scene so this would not be an option during that incident.

It is important to understand the force options and which types of suspect behavior each option can be utilized on. Critical use of force incidents are often fast and dynamic affairs. What availability of options coupled with the officer's acumen in deploying an option often determines what types of force is used to resolve incidents. As one can imagine, the ability of officers to quickly analyze the law, policy, and the suspect's actions to marry that with a force modality to employ leads to human error. Often, it is hard to determine in any given situation what the line is between justifiable and excessive use of force (Alpert & Dunham, 2004). Further complicating this issue is that little research on the effectiveness of techniques, such as de-escalation of force, is published and in the public sphere (Engel, McManus & Herold, 2020).

From this type of research and legal issues that arise in use of force justifications, a mental model taught to police and often referred to as the use of force continuum was largely discontinued from use several years ago. Professional law enforcement organizations and government entities had long used the use of force continuum for policy

development and outlined what force options can be used against what sorts of resistant behavior (National Institute of Justice, 2009). The theory behind this discontinuation is that not all situations are created equal. A continuum may suggest that someone exhibiting Active Aggression can have an impact weapon used against them, however is that reasonable when it is a 90-year-old woman with dementia? A suspect exhibiting defensive resistance may not warrant strikes on a continuum, but is that reasonable with a 110-pound female police officer attempting to arrest a 6'4, 250-pound male? Police scholars suggest that the continuum could result in more force than is reasonable being employed (Police Executive Research Forum, 2012). Legal issues aside, for the layperson seeking to understand the nuances of police use of force, the use of force continuum provides a basic schematic to understand the basic relationship between different force modalities and suspect behaviors. This is with the repeated caveat that no two situations are equal and there are exceptions to every 'rule'.
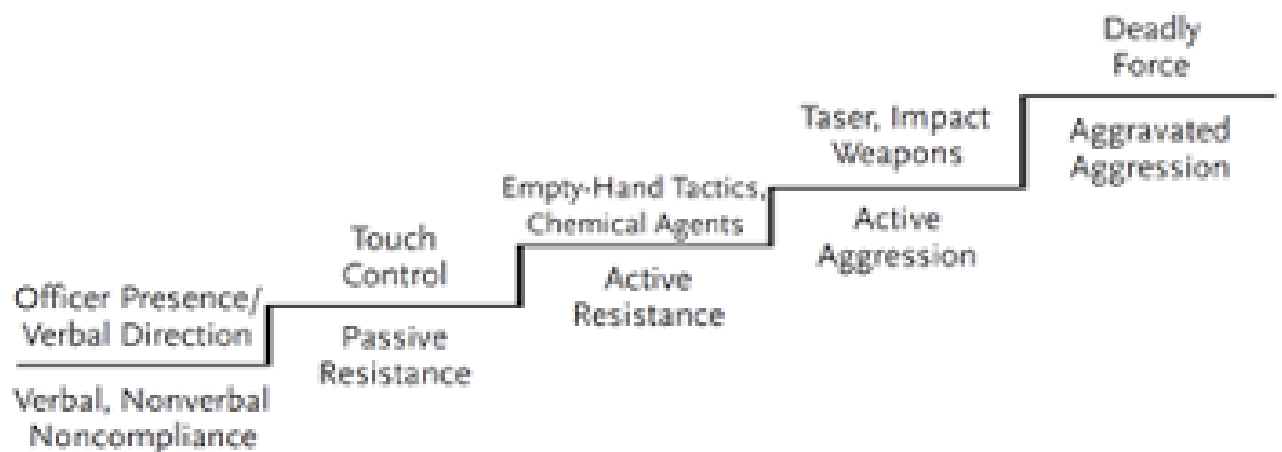
These schematics have been used prior to the last several years to teach police for decades. Each agency would have their own approach, justifications, and/or restrictions on specific modalities. They may also define their modalities and the suspect's behavior

slightly differently. However, the above schematic from the 2012 Police Executive Research Forum report on use of force gives one a basic framework for the modalities of force and their relationships to suspect's actions in general.

The primary overall concept in section one is to give the reader a basic understanding of a very complex issue. Dozens of hours are used in basic Arizona peace officer training to teach recruit officers the laws and the resultant policies on where, when, how, and to what extent an officer may use force in any given situation. This is then followed up with hundreds of hours of training in the use and proper application of each form of force. Finally, scenario-based training in applying the law, policy, force options, and skills of the officers to hypothetical typical situations an officer may encounter must be successfully passed in order to gain peace officer certification in the state of Arizona.

CHAPTER 3

HUMAN FACTORS AND DECISION-MAKING INTERSECTING WITH USE OF

FORCE TRAINING

Using force as a police officer, like many human endeavors, is an exercise in decision-making. Having officers able to quickly surmise a suspect's behavior, how that behavior and the goals of the state align with law and policy, and then determining which viable force method is to be employed is the decision-making process overtly taught. While these are critical and important decisions, they do not scratch the surface of decisions which can, should, and often times are not made in critical incidents. This lack of understanding of the entire breadth of the decision-making process as brought to us through centuries of research and theory can lead to a successful, but not optimal, use of force.

On a very simple level, critical incident decision-making must be thought of as a complex system in which perception, attention, pattern recognition, heuristics and biases, senses, and the experiences and motor skills of a human all work together to form a decision. What occurs in critical decision-making incidents with police use of force is that all of these components of decision-making are enhanced or suppressed by the brain. One's focus of attention narrows and excludes or suppresses information deemed irrelevant (Strayer & Johnston, 2003). Inattentional blindness narrows attention to areas of expected or visible threat at the expense of elements in the environment that do not create an obvious perception of threat (Honig & Lewinski, 2008). What this means in police work, is that if an officer is confronted with an armed suspect, one of the fundamental cognitive responses to this stress might be to focus in on this armed suspect at the expense of perceiving and recognizing that there is another armed person in the periphery of the scene. Perceptual

distortions of one's environment in critical incidents is common with attention being paid to only the most important senses for the task at hand (Hockey, 1970; Bacon, 1974). This is most commonly seen in deadly force encounters with police in which officers' senses realize the importance of seeing the armed man confronting them and they may not recognize or note hearing gunshots or feeling their own pistol's kick when they fire it. Finally, when one considers the presence of a weapon in a critical incident and the memories of what occurred and a 'weapons focus effect' force the attention to the weapon in many cases and not on the ancillary actions of the offender (Fawcett, Peace & Greve, 2016). This phenomenon can be so profound that an officer focused on an armed individual may attribute the sounds of gunshots in the environment to the individual when evidence after the fact shows that it is the officer or fellow officers' gunshots that they are hearing and not the suspect who fired no rounds in the incident.

In police use of force, the basic and broad outlines of decision-making are employed to teach police how to make decisions in critical incidents. If the training is given under basic and broad outlines, then the results can predictably be expected to arrive in the same basic and broad manner. In the case of police training, a deadly force scenario is different than a simple use of force scenario. Deadly force requires the fast and expedient deployment of a firearm trained so thoroughly as to overcome many of the physiological effects of threat outlined above. Non-deadly force by contrast requires the application of multiple different force options and transitioning through the force options, which requires a level in-progress decision-making that is not present in deadly force.

With police, the environment is to respond to critical incidents with time compressed decisions to employ varying levels of force (from verbal to lethal) depending

on the context. The outcome of those decisions and applications of force hinge on the psychological and physiological stress responses of the officers involved (Arnetz, Arble, Backman, Lynch & Lublin, 2013; Arnetz, Nevedal, Lumley, Backman, & Lublin, 2009). This is not unique to law enforcement as there are physiological responses to stress in our daily lives (Weber, Angerer, Apolinario-Hagen, Boylan, 2022). Simply saying that the environment drives the decision-making in police use of force does not look deep enough into the decision-making processes at play under an ecological psychology umbrella.

As we know, experience leads to recognition of patterns in one's environment to shape decision-making (Klein, 2015; Roberts & Cole, 2018). For use of force, it is important to train people to notice the threat in the environment first. We have all evolved physiological and psychological stress responses, and we can train people to be more aware of aspects of their environment such as what threat is (Sharps, 2022). These stress responses can change due to the environment. City dwellers in the United States are probably more versed to a stress response to a mugger than to a tiger roaming the streets. Getting someone to perceive, through experience, the salient pattern in the environment is not always simple, however. Some of the most groundbreaking findings in perception show how this could be a problem for law enforcement, such as a person's ability to not perceive something as obvious as a man in a gorilla suit right in front of their eyes (Simons & Chabris, 1999). When stress is a factor, even police witnesses perform poorly in recall and recognition (Hope et al., 2012). Police under stress from physical exertion were significantly worse at recalling details of a scenario afterwards.

In essence, what police do with use of force is train people to perceive and react to threats. This learned response is intended to meet the criteria of law and policy. To assess

if this works, there first must be some understanding of the basic frameworks of decision-making research and human factors. Then the methods of police training must be analyzed for the optimal outcome. Understanding the human parameters of decision-making and cognitive ability are the key to police training leading to optimal outcomes.

Human decision-making research is plentiful for this purpose. It deals with both psychology and cognitive sciences and provides us with a number of intersecting theories of human decision-making to assess what is going on in real world actions. Human behavior in any specific instance can be related back to the ecology (environment) of the situation (Gibson, 1966). One example of this principle is that children from stressful environments (where they have to interact with their environment under stress) show more aptitude for signal detection and long-term memory for environmental factors (dangers) relevant to them (Frankenhuis & Werth, 2013). The principle can be defined by a study of street vendors in Brazil that found they had lower than average education and a stressful environment and could not reliably perform simple mathematical tasks in a classroom. However, they could perform the same tasks efficiently in the environment of selling their products on the streets of Brazil (Schliemann & Carraher, 2002).

This concept is reiterated in police research which found officers in critical incidents pay varying levels of attention to elements of their environment primarily based on their assessment of relevance to survival (Shomstein & Yantis, 2004; Hsieh, 2002). This is manifested in the idea that an officer involved in a fight will pay more attention to the subject they are fighting with and less attention to a bystander for the duration of the fight. This relatively simple concept is the framework of ecological psychology in which the science of human behavior is related to the context of one's environment (Barker, 1968;

Heft, 2001). In short, if you live with an ecology of threat and danger then you become attune and aware of that danger and the methods for mitigating negative consequences. If you do not live with threat and danger, then you may be blissfully unaware of its presence until it is too late.

Law enforcement training seeks to embed this signal detection of threat into their officers' perceptions so that they can take appropriate action through the use of force. Officers learn to recognize signs of deception to varying degrees of success or failure (Stromwell & Granhag, 2003). Police research has shown that law enforcement is good at teaching officers how to identify behavioral cues which are predictive of impending assault or resisting arrest with violence (Johnson & Aaron, 2013). Many of these behavioral cues are obvious, such as raising one's fists which should be seen as a threat by laypersons too. A review of police training indicated a pattern of teaching other less blatant behaviors which could be precursors to assault, such as clenching one's jaw or tensing of the body (Johnson, 2018). Police are taught to view a golf club or a bat as something that can be used as a weapon and not as something designed to hit balls for sport.

Where law enforcement training for crisis seems to go awry is when the components of a decision are put under the microscope. The industry had a past in which it fully understood the concepts of recognizing and reacting to threats. This reaction to threat, though, was specifically trained as a singular force reaction to address the threat. Perceiving a deadly threat for instance necessitated a trained lethal response with a firearm. No other option was trained even though literally any type of force that would stop the threat of death to the officer was acceptable. Research into police use of force never deals with the decision-making aspects and how to achieve better decisions. It typically focused

on historical outcomes of the force and patterns of use of force and not the cognitive issues behind the force. This concept ignores the aspects of a decision which occur after basic perception of threat.

Dual Process Theory defines the decision-making process as two separate processes comprised of an Intuitive System and an Analytical System of decision making (Kahneman, 2011; Evans, 2003; Kahneman, 2003). The Intuitive System is the "fast" system in which decisions are made based on heuristics and biases in a rapid fashion without much analysis, while the Analytical System is the "slow" system in which there is time to analyze the decision which is about to be made and an analysis based on knowledge and experience of the pros and cons of each aspect of the decision can be done (Kahneman, 2011). As could be expected, errors in Intuitive System decision-making are higher than they are with Analytical System decision-making, but often times Analytical System decision-making can be too slow to accomplish the task at hand. In essence, use of force training expects that the police officer perceives the threat, and presumably react to it intuitively. To teach these reactions, each force modality and defined above is generally taught as a 'siloed' or solo use of force option (Hickman, 2005). In theory, if you train the perception of the threat and then train a solo and unintegrated force responses then you get a single intuitive response to the threat.

This means that there is a higher degree of error likely by the nature of intuitive decisions. Our intuitive decisions, at their very fastest, are overtrained or instinctual automatic responses to our environment employing heuristics and influenced by biases and noise. We often do not even recognize biases which affect our decision-making and judgment (Dror, 2020). It is not a surprise then when research shows that officers are

trained to perceive and then react with a solo option force modality in an intuitive manner to a deadly threat often experience more errors in time compressed and stressful shooting situations (Nieuwenhuys, Savalsbergh & Oudejans, 2015).

Solving this problem lies not at the cognitive levels of the Dual Process Theory, but rather what mental capacities make up the dual process response. What type of processes in the human psyche form the basis for an intuitive or an analytical action? This question is more complicated than it seems. Our analytical decision-making most often falls under deductive reasoning in that we analyze the situation and then make a logical determination as to the action necessary. Intuitive decisions, of which at least the initial response by an officer in a use of force scenario falls under, can primarily be thought of as abductive reasoning. Deductive reasoning is much more cause and effect related in that we draw more obvious conclusions based on the observation. This would be something akin to looking outside and seeing everything wet and deducing that it rained, or ruling out rain as a possibility as only your lawn is wet which means it was watered. Abductive reasoning is best defined as drawing a conclusion based on what information is evident, but maybe without some of the benefit of time and analysis to determine what other information may be out there that could affect the decision (Peirce, 1883). In abductive reasoning more of a probability assessment. Dealing with a suspect and having him reach to his waist band would lead a police officer to conclude it is probably for his identification or a weapon than it is to be a sandwich he was saving for later. What is "evident" depends entirely on a specific individual's own experience and bias shaped perception. That stimulus information affects reaction times as we will see (Hyman, 1953). In a critical force incident, the perception of the threat and the analysis of what is necessary to resolve it with the list

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of available and trained force modalities is a quick decision. Because it is often so quick, at least the initial selection of a force option occurs without all facts having been observed and cataloged. The premise of abductive reasoning is that this selection of a course of action occurs so quickly that other options cannot be properly weighed with the full scope of information available. The fast intuitive decision-making process is playing the probabilities and choosing an outcome 'most' likely to succeed. When the 'silo' trained officer's abductive reasoning is sharp, or lucky, or both then a method of force is selected, applied, and successful. What then becomes the issue is how and why a force option is selected.

Abductive reasoning, in the sense that it is decision-making based on observable clues but with incomplete information as to cause, is similar in structure to a predictive process theory. The roots of predictive process theory stem from Bayesian principles in that everything we do is a cognitive measure of probability based on prior knowledge of conditions that may be related to the event (Bayes, Price, 1763). Predictive process is a constant flow of top-down processing information in which the brain attempts to predict actions and needs for action and then correcting and assessing that response for error in a more bottom-up processing flow of information evaluating the prediction (Clark, 2013). Predictive process then could be viewed as an ongoing process of your brain determining the probabilities that some action will occur or that we will need to take an action, and then readjusting this assessment based on our determination of error in our original assessment. Consider someone getting ready to leave their house for the day. They look outside and see grey cloudy skies and make a prediction that it may rain, and an umbrella may be necessary. By the time they walk out the door and reach for the umbrella propped by the door, they

see that the grey clouds are starting to break up and adjust their assessment for 'error' and now decide the umbrella is not necessary. This is a predictive process, and it is also an example of abductive reasoning. We have made an assessment as to the probability of rain and then readjusted that prediction based on new information (error). When we look at predictive process theory in many other fields, we are talking about mathematical formulas. Terms such as statistics, probability, or even Bayesian Theorem represent a calculative process. In cognition, we should not view this as our brain precisely calculating out mathematical odds of outcomes based on actions, but rather as constant assessment and adjustment of the assessment as to what we need to do in any given moment to interact efficiently with our environment.

These decision-making and cognitive processes are often referred to with the neuropsychology term 'executive function.' Executive function primarily refers to the neurological processes involved in attention, behavior control, cognitive inhibition, and working memory. Executive function changes throughout one's life as we neurologically develop. Within the context of learning, environment is often thought of as the most important factor. One's perceptions based on their experiences and development drive their daily activities and attention (Gibson & Gibson, 1955). The interesting juxtaposition of some of the research into executive function is that it is done with children, as one can see the developmental aspects begin to enrich and behavior control enhance. However, some contend that executive function as we grow into adolescents and adults is primarily for novel environmental situations outside of the normal psychological processes (Norman & Shallice, 1980). These 'novel' situations involve decision-making (i.e., Dual Process Theory), error assessment and correction (i.e., predictive process), dangerous situations

that require novel or not well-practiced motor skills (i.e., police use of force), and situations which require a possible override of a basic response (i.e., fight, flight, or freeze). In essence, it becomes clear that with our police, we have to train our officers in executive function responses which may run counter to all they have learned and developed neurologically over the course of their lives. The common adage about police work is that police "run towards the sound of gunfire instead of away". If a child grows into an adult, develops, and fine-tunes executive function, from perception to attention to action, then the realization must come that society trains their police to counter that instinct and does little to research its effectiveness in decision-making. Rather the research focuses solely on the results.

The reality is all of our predictive actions have time limits. We have only so much time for decision-making and the circumstances of the decision dictate the amount of time. Our decisions, especially those based on time constraints are heavily influenced by inherent bias and the heuristics each person can employ through their experiences (Kahneman & Tversky, 1974). The amount of time needed to make decisions brings the principles of bounded rationality into focus. The principle of bounded rationality is that human decision-making rationality has limits and those limits often times lead us to decisions that are merely satisfactory for our purposes and not optimal (Kahneman, 2002). To reach the optimal decision, we presumably need enough time to analyze our options and select the best option even though any number of satisfactory options will serve the purpose of the decision that we make. If we are 'analyzing' our decisions, then we are thinking analytically: the Analytical Process of the Dual Process Theory. The reality of the world, though, is that we only have time to analyze for a finite period of time. In rapid intuitive

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decisions, humans only have a very rapidly dissolving moment in time to decide and act. Because this period is so quick, the predictive process only allows so many, if any, corrects for error and the decision is then more guided by the principles of bounded rationality in that a satisfactory but maybe not optimal decision is reached and executed.

One of the most common and widely discussed components of decision-making is the premise that the more options available to a person, the longer they will take to select an appropriate option (Hicks, 1952). As discussed earlier, for deadly force only one option is trained, but for non-lethal force encounters there are many options to choose from. The time constraints for deciding quickly suggest that an officer would be too slow if they weighed each option, but rather must choose an option quickly. Further, while officers are attempting to decide between multiple options, there is also the issue of the outside stimuli in the environment rushing the selection of a force modality. Studies in driving found that the greater the divided task load was, the more time it took people to respond to the appropriate stimuli (Levy, Pashler & Boer, 2006). This effectively means that in an incident with only one stimulus and one use of force for the officer to select then there is plenty of time to perceive and react. In the real world though, the presence of multiple competing stimuli for an officer to triage in any given situation, combined with multiple force options to choose from, can combine to suck all of the available response time away. It would stand to reason then that officers using abductive reasoning only truly consider the options they are most familiar with in the moment. Police research has found that 51% of officers consider only one force option in a confrontation and another 29% only consider two, despite the fact that there are multiple options at their disposal (Hines, Westera, Alpert & Allen, 2018). If officers are only selecting one or two options for use in a force incident

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then it would stand to reason that this decision is not just about what external factors and behaviors are at play to necessitate the force, but also what options and skills the officer feels most comfortable in deploying. This is likely partially due to having been silo trained with only one option at a time, which mentally does not create the cognitive pathways for quickly analyzing and employing many different options based on the circumstances.

A glance at the above research into the number of modalities typically employed in a force incident compared to the number available hints at an uncomfortable fact. Silo training for use of force ignores, and to some degree counters, the executive functions of task switching and cognitive shifting. Task switching is the cognitive flexibility to switch tasks and is inhibited by acute stress (Plessow, Kiesel & Kirschbaum, 2011). Little research on this is done in law enforcement outside of deadly force which is primarily in the area of shoot/don't shoot research and the influence of priming on these decisions (Lewinski, Hudson & Dysterheft, 2014; Taylor, 2020). When law enforcement does task switching research between deadly force and non- lethal force modalities it can be decisively shown that these are not equal tasks (Taylor, Sipe & Bartel, 2021). Police switching from lethal to non-lethal force took more than twice as much time to switch tasks than those who went from non-lethal to lethal force. This suggests a more trained lethal response and little training on the de-escalation task of moving to lower levels of force. One can assume from the above-stated research regarding the number of non-lethal modalities employed by officers in any given scenario that their task switching abilities are very limited.

All of this adds up to a complicated decision-making stew and not all of the ingredients are in the pot yet. In essence, law enforcement trains their police to perceive and react to threats with force. This training represents the building of schema, signal

detection, and pattern recognition in their environment to detect threats and respond. For the response, police are provided with a number of force modalities and situations in which they can be used based on the officers' threat perception. However, these modalities are generally taught individually to the officers with little time teaching them how to integrate different options available into the problem of resolving an incident with force. When the necessity to use force does arrive, the time to decide and act is short. Officers often spend what little time that they have triaging the external environmental stimuli and selecting a use of force that matches the environment. This use of force selection is obviously subject to the unconscious implicit biases of the situation. An officer who has had an ineffective or poor result from a use of force, say an impact weapon, will be unlikely to select that option even if it is the optimal method for the specific circumstance. In this way, the officer makes one decision as to force which may be viable but may not be optimal. If the result of this force selection is poor, then the officer due to the biases present and the siloed training may not have the cognitive ability to assess error and make an adjustment in the middle of the fight. In this scenario, which plays out across the United States thousands of times per day, the question is what ingredient in the stew are we missing in understanding these responses?

The answer to this is attention theory. Humans have varying degrees of ability to function under stress or in threatening situations and that is thought to be a result of a person's ability to "chunk" strategies to minimize attentional requirements. In other words, people vary in the degree to which their response has been taught to the point of automaticity (Intuitive Decision-Making) and their confidence in their ability to cope with the situation (Nideffer, 1990). We as humans do perceive relevant information in the

environment. Police officers are taught to channel that perception, at least in the job, to threat perception. Police do this with varying degrees of success because of the four factors listed above and how they are trained to respond. The answers to why these responses are not optimal are theoretically within the realm of attention.

Sports psychologists have long considered that there are four quadrants of cognitive attention within the framework of decisions are made to varying degrees of effectiveness (Nideffer, 1976). The four quadrants are defined as follows:

Internal Broad Focus of Attention: The internal broad focus of attention is the internal process of planning and strategy. In a sports task it could be studying the playbook, watching game films of your opponents, and developing a strategy specific to the strengths and weaknesses of your team and your opponent. It can be integrating practice of the plays and actions that will make up the strategy to assess for errors and adjust the game plan. In law enforcement, much of this is a mental exercise taught to the officers. Learn the relevant tasks and skills and then determine and think about your ability to deploy a specific method. Then in conjunction with the skills for what could occur and go wrong officers are implored to think of how they would respond. For example, after being trained, an officer may think and plan what they would do and what actions they would take if a gun were pulled on them during a traffic stop.
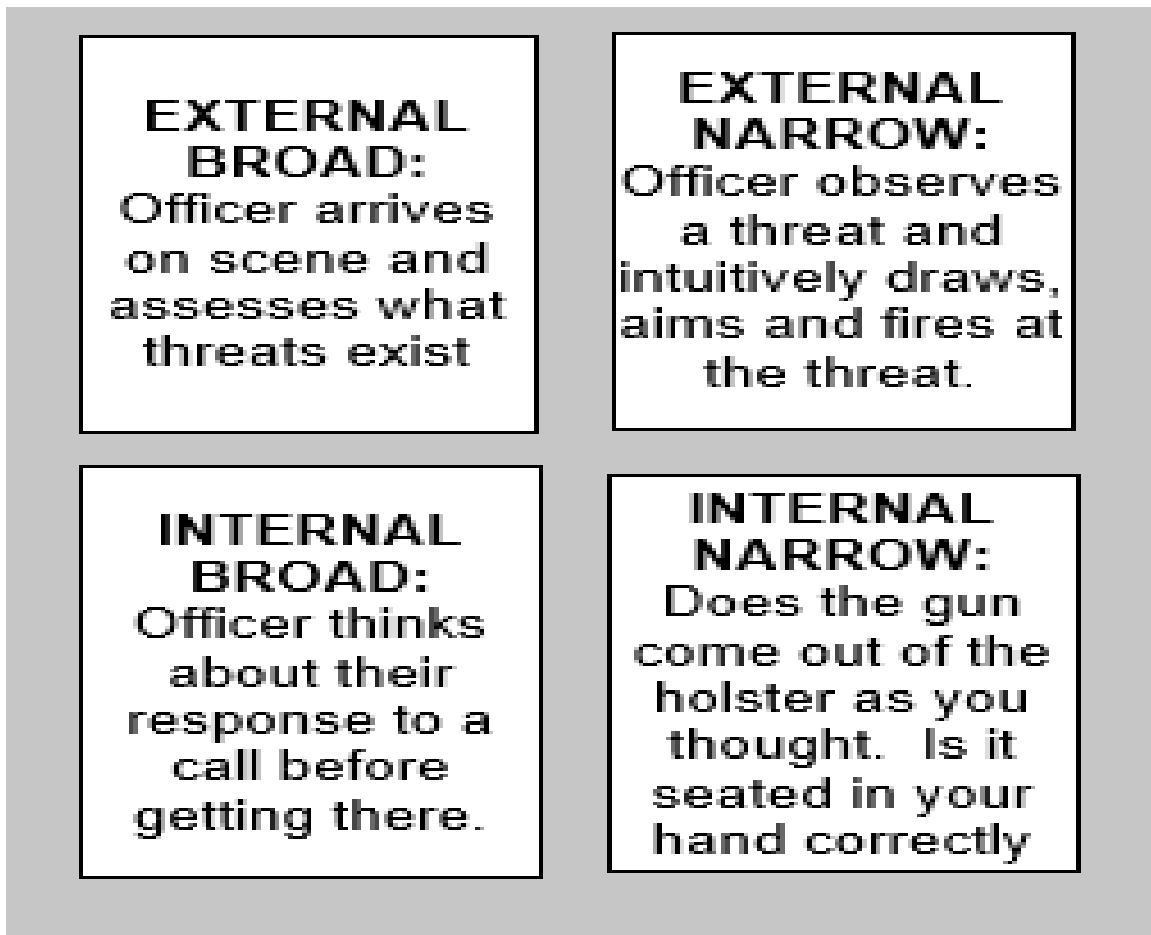
Internal Narrow Focus of Attention: When involved in the process of an action or a decision, one's internal narrow focus of attention is a lightning quick assessment of yourself and making sure that the action is occurring as it should. For sports, this could be the quarterback receiving the snap of the ball or the basketball

player at the free throw line. Each, upon receiving the ball will make an unconscious mental assessment as to whether the ball was delivered into their hands in the position that they like it to be in their hands. This can result in a slight adjustment in the process of the action if there is time or compensation if time allows. For a police officer, it equates to the quick assessment that they drew their pistol efficiently and have a good shooting grip on it, or that they drew their pepper spray, and the business end of the nozzle is facing away from them.

External Broad Focus of Attention: The external broad focus of attention is the basic external focus on what is occurring out in the environment. The detection of stimulus and the processing of that stimulus to determine what extent someone reacts to their environment. The external broad focus of attention in its simplest form is the very definition of ecological psychology in that it is the process of human behavior and decision-making as it relates to the context of the environment (Gifford, 2014; Barker, 1968; Heft, 2001). In sports, it is an awareness by the quarterback of how the play he is running is working out or a basketball player attempting to read defenses and mismatches as he comes up the floor. For a police officer, the most apt description of the eternal broad focus of attention is his arrival on a call. Are there threats or hazards? Where are the victims, suspects, and witnesses? Is there evidence visible at the scene and do I need more or less backup officers to deal with this unfolding situation? Based on the specific situation and the needs and goals of an individual entering any type of environmental situation, external broad focus of attention is the primary phase of analyzing and triaging the stimulus coming in for action. The brain is constantly scanning the world around

us and predicting what will require its action in the near and distant future (Bellini-Leite, 2022).

External Narrow Focus of Attention: The final quadrant of attention in the external narrow focus of attention. This is the action end of the attention quadrants. Once someone has assessed their environment in the external broad focus of attention and made a decision as to what stimulus to act on then the attention goes to an external narrow focus of attention as the task or action that has been decided upon is acted out. Imagine a quarterback starting the play with the snap of the ball and in an external broad focus of attention determining if his offensive line is holding and whether any of his receivers are open. Once he finds an open receiver, he goes into an external narrow focus of attention. He zeroes in on the receiver he has chosen, and all of his attention goes to delivering that football to that receiver via a pass. A police officer arriving on a scene and assessing it to find a possible threat in the environment will immediately focus in on that threat and react to it with whatever force they deem necessary in the situation. Other factors of the scene do not matter until the threat is dealt with and the focus of attention is solely on the threat and resolving it. An example of the attention quadrants as it might apply to a police shooting would look like this.

| EXTERNAL BROAD: Officer arrives on scene and assesses what threats exist | EXTERNAL NARROW: Officer observes a threat and intuitively draws, aims and fires at the threat. |
| INTERNAL BROAD: Officer thinks about their response to a call before getting there. | INTERNAL NARROW: Does the gun come out of the holster as you thought. Is it seated in your hand correctly |

These focuses of attention move seamlessly from one area to another and back again in split seconds often times. This is similar in the function of Dual Process Theory with the mind going back and forth with intuitive and analytic decision-making almost imperceptibly. All of the cognitive framework of decision-making is working simultaneously and at once. Think of a person standing over their sink ready to wash their dishes and the imperceptible movement in and out of different focuses of attention and decision-making processes. The internal broad focus of attention is having washed dishes in the past and found an efficient method of sorting what goes to the washer and what is hand washed, what needs dried and what can air dry, and even in what order the dishes are washed as to not spoil the dish water with a greasy frying pan first. This is an internal broad

focus of attention and also analytical decision-making and is occurring at the same time our dish washer is viewing the sink and in an external broad focus of attention deciding which dishes meet which criteria from the internal broad assessment of the order. They turn the water on and feel it and it is too hot. Immediately, and likely imperceivable, they adjust the water. This is both an intuitive decision and an external narrow focus of attention. It is also a predictive process error assessment and realignment. The mind is moving in and out of the focuses of attention and decision-making processes all within the span of seconds while washing dishes.

For a police officer in a critical incident needing to use physical force to resolve a threat, time is the vital issue. Speed is of the essence. For an optimal result, we have to rely on the heuristics and cognitive biases that can help or hinder the rapid decision-making necessary in that environment (Tversky & Kahneman, 1974). Depending on the information provided in the environment, such as with dispatched comments to the officers arriving on scene, the decisions officers make can result in errors with deadly consequences. Research showed that officers primed to respond to a man with a gun would shoot the subject in a scenario with a cellular phone significantly faster than an officer primed to believe the subject had a cellular phone and in fact encountered someone with a gun (Taylor, 2020). Police have been trained in many responses to the threat but little of this training is about integrating different options together, assessing or adjusting responses for error, or thinking analytically to adjust when things do not go as planned. There are discussions of how to do these cognitive cartwheels under stress in training, but the scenarios and skill-based aspects of the training are often not integrating this. The interest is in whether you can properly use the impact weapon and know the correct situation to use

it in and not on what one will do if the impact weapon does not work. When an officer is instructed to analyze and adjust their responses without specific training, they are basically relying on the officer's perceptions of their ability to de-escalate the situation and each individual officers' characteristics to perform that task (White, Mora & Orosco, 2019). If we silo train officers to consider and implement only one option at a time rather than making a decision on multiple options to resolve the situation then we end up with officers deciding based on their individual skills and characteristics. If an officer is trained and skilled with using an impact weapon and goes to that option unsuccessfully in the field, then they may never choose that modality again no matter how well the modality fits the unfolding crisis. Again, we must factor in the all-important aspect of time into this equation. There is only so much time to match the suspect's behaviors to applicable force options, decide which option to employ considering the skill and characteristics of the officer, and finally consider the implicit bias against force options available to them which may not have worked for them in the past and are now never a consideration. This is likely cognitively due to the siloed training of force options in which only one force modality is mastered at one time with little to no overlap into transitioning to other options. In siloed training, law enforcement is teaching the actual application of the force and not the cognitive decisions behind how and when to apply a given modality.

Further, little to no research exists on transitioning between force options and silo training suggests it is not done. The previously cited research bolsters this theory in that officers consider only one modality in 51% and only two in 29% of incidents. On transitioning research between lethal (pistol) and non-lethal (Taser) force options, it was found that very little training is done on this and that reaction times are significantly

different in these transitions. Officers attempting to transition from a lethal pistol to a less-lethal Taser took more than four seconds to complete the action while those transitioning in reverse from a Taser to a pistol did so in a little over 2 seconds on average (Taylor, Sipe & Bartel, 2021). The difference is so significant as to create in law enforcement circles a justified opinion that this type of transition from a lethal to non-lethal weapon in an active fight is so slow as to be an extreme danger to an officer attempting it. What are the results when officers select a force option and then, through changing circumstances or ineffectiveness of the modality chosen, must transition to a different option? The answer is often error. Sometimes this error is grievous. Officers' pistols and Tasers are shaped and function in an almost identical manner. Pistol use is instructed to the tune of more than two weeks of academy time while Tasers are instructed for less than a day. The result is that in more than one incident, an officer had intended to deploy a Taser and instead had a 'slip' error and went to the more well-trained and identical process of drawing and firing their pistol instead (Martin, 2016). Even with only deadly force, many hours of training in just that skill, and highly stressful situations tend to bring out unintentional shooting errors (Nieuwenhuys, Savelsbergh & Oudejans, 2015).

What all of this means in definitive terms is that in order to judge police use of force performance and determine optimal versus error responses, we have to look at cognitive models of decision-making, perception, and attention. Using these models to determine both the effectiveness of the actual action taken in a critical incident and the training which led to the action are imperative to determine if officers are being trained to provide the most optimal response. Teaching officers the importance of using time and space in use of force confrontations leads to better awareness and more time to make grounded decisions

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in stressful circumstances, and officers portray that confidence with the added time and space (Crawford & Burns, 2008). The issue then pivots to what in use of force statistics can someone look at to make this determination. What metric can give law enforcement the answers they need for optimizing training and response? Without any type of evidence-based research into the results of use of force decisions and the relationship to the training that officers receive, it is hard to conceive of a way to judge officers' actions in critical incidents. Even law enforcement industry experts operating on presidential authority basically had no answer to determining optimal use of force. Their primary recommendation to U.S. law enforcement was to accept their biases and begin to acknowledge their past and present mistakes while providing mindset and de-escalation training to lead to more 'equitable' outcomes (President's Task Force on 21st Century Policing, 2015).

What other research into police use of force there is does not account for the cognitive processes which could show how errors are being made and rectify them somewhat. What the research does do is outline what is good and bad in the actual results. For instance, research tells us that the use of physical force by officers (strikes, grappling, etc.) increases the odds of injury to suspects and police while the implementation of tools such as Tasers and pepper spray reduced these injury chances (MacDonald, Kaminski & Smith, 2009; Alpert, et al 2011). The types of force police used also was a factor in the injuries they suffered to a great degree with electronic (Paoline, Terrill & Ingram, 2012). Three research studies tell police that if you strike someone in the face in a fight, officers and the suspect both stand a greater risk of injury than if you merely used a Taser or pepper spray. Most police officers would tell you that they did not need the research to tell them

that. Which is a good thing because they are not generally taught that research to begin with! Police need research to tell them what training and force methods lead to better cognitive decision-making, more efficient transitioning between force modalities when first options do not work, and what is least likely to severely injure them. The answers to this quandary actually come in the form of ancient art rather than new technologies and make up the body of this paper's research topic.

An important concept in this research is that the layperson and the public in general tends to think about police use of force as a less complicated concept than it actually is. In discussions of police use of force, the public often focuses on 'reducing' police use of force or using 'less' force. Public perceptions of police use of force can be influenced by the media sources, which report the use of force, as well as the public's perceptions of the reporting party (Miethe, Venger & Lieberman, 2019). Studies of media reporting on social media about police use of force showed that they were evenly divided between 'justifying' the police action or 'challenging' the police action, but that it was dependent on what media source was reporting (Ash, Xu, Jenkins & Kumanyika, 2019). Entertainment media often shows police on popular police procedural shows often using excessive force, violating search and seizure principles, arresting the wrong suspect before finding the right one, and eliciting confessions with abuse and threats. Research into this phenomenon found that most viewers felt that this was the way that law enforcement worked and were accordingly less likely to view some of this behavior as beyond the norm or even morally wrong (Donovan & Klahm, 2015). If police are using force when appropriate and in a reasonable manner in accordance with law and policy, then we should not have a goal to reduce the use of force. This research was not undertaken to document 'less' force use or 'reduced'

force use. **The goal of this research was to document better decision-making in use of force by Mesa's police, and as a result a more optimal outcome for the officers and citizens.** This would be similar to studying the military. The military's goal is to fight and win wars. Research in how to get the military to kill fewer enemy soldiers and destroy less enemy infrastructure is counterproductive. The military is there to do those exact things. The goal is to make the military more efficient at killing soldiers and destroying infrastructure so that maybe they can be more surgically precise in doing it which could potentially lessen the need to do more. The police are the same in this respect. If a violent encounter dictates the need to use a higher level of force such as an impact weapon, then we want the police to use the weapon efficiently. We do not want the goal to be for the officer to use less force than necessary or reduce the scale of the force, which could lead to injuries to officers, bystanders, and suspects. The goal of this research is thus to document that an optimal application of force is being chosen as a function of the PJJ training.
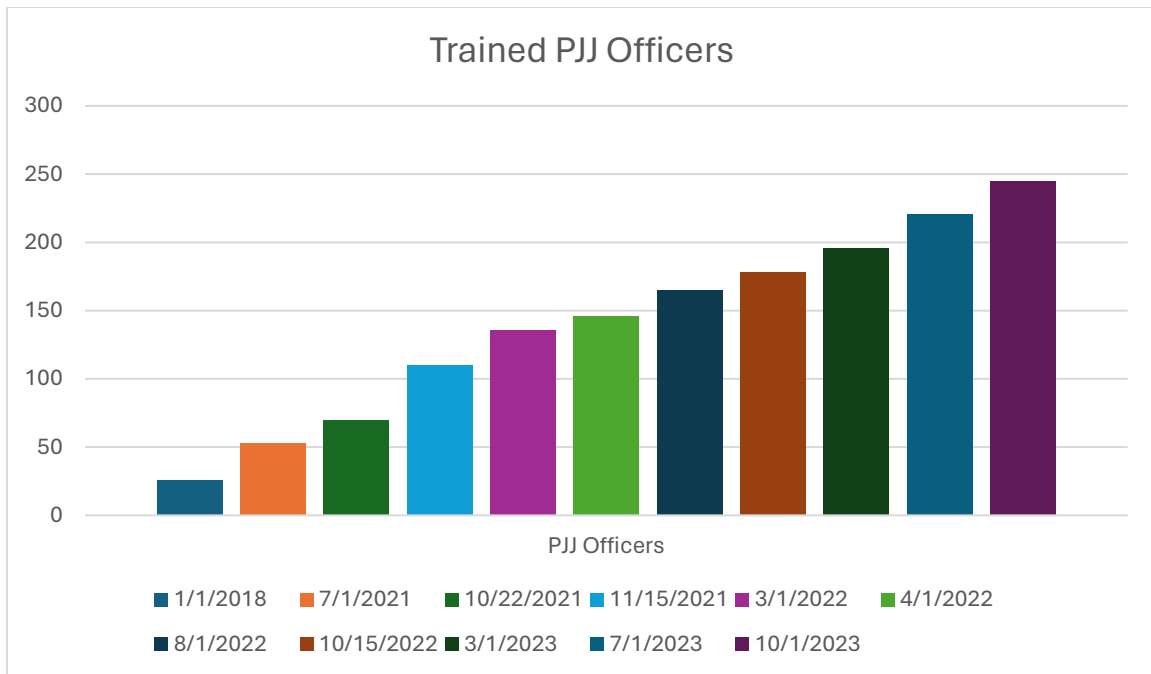
CHAPTER 4

METHODS

To get away from siloed training and more into use of force training with heavier cognitive and decision-making emphasis, the Mesa, Arizona Police Department looked to the ancient martial art of Brazilian jiu-jitsu. Brazilian jiu-jitsu is a grappling form of martial art that emphasizes controlling your opponent through flowing from techniques based on effectiveness over striking and kicking to subdue. This does not mean that there is not a place for those methods in law enforcement. It means that there is a more integrated approach to teaching when and under what circumstances they are appropriate. The basic principles of jiu-jitsu were modified slightly for team techniques and to comply with law and policy to form 'police jiu-jitsu' (PJJ).

The Mesa Police Department did not want to implement a training program in such a critical area without some form of research into whether or not it was working. Too often in government, programs are implemented with little research into the impact of the program as previously discussed with the lack of research into outcomes of de-escalation training (Engel, McManus & Herold, 2020). Research exists that bolsters the Mesa Police Department's belief that better outcomes in decision-making could be had through implementation of police jiu-jitsu. One piece of research showed that police with martial arts training have more confidence in applying force than those without (Torres, 2018). Further research showed that officers with martial arts experience performed with less anxiety better than those without (Renden, Landman, Savelsbergh & Oudejans, 2015).

The parameters of the Mesa Police Department's Police Jiu-Jitsu Program were relatively straight forward. The Mesa Police Department currently employs between 800-

850 sworn police officers, as well as non-sworn detention center personnel who also use force in maintaining the city's jail. As with any large employer, there is an ongoing process of hiring and training officers to meet basic police staffing levels and replace officers lost through attrition. The intention of the program was to begin with police recruits in the city's police academy and begin training them starting with the first academy class of 2021. The police department typically runs two to three academy classes per year with 30-50 or more recruits graduating as certified officers in any given class.

A rough estimate of the growth of the PJJ Program and the officers trained in it, as expected, began to grow rapidly beginning with the first academy class of 2021 reaching field training in approximately July of 2021. Once the officers were in field training, they could be expected to find themselves in use of force situations and applying what they learned to the force incidents. There were other veteran officers who took the initiative to start training in PJJ and all previously certified lateral officers from other agencies were trained in PJJ. Officers, as employees in every field, could be expected to retire, resign, transfer to a non-sworn departmental position, or otherwise end their status as a police officer with the city of Mesa. Also, use of force incidents do include force incidents by non-sworn detention staff which numbers approximately fifty employees. With these caveats, when we look at only academy PJJ officers joining the department ranks, we can get a sense of the rapid growth in those numbers, which cannot help but place the force incidents in context as they grew by 2022 and 2023 to be more incidents than involved non-PJJ officers.

Trained PJJ Officers

Legend:
- 1/1/2018
- 7/1/2021
- 10/22/2021
- 11/15/2021
- 3/1/2022
- 4/1/2022
- 8/1/2022
- 10/15/2022
- 3/1/2023
- 7/1/2023
- 10/1/2023

The police academy training in defensive tactics began implementing jiu-jitsu principles with that first academy class in January of 2021. Instead of teaching an array of control holds, limited strikes, and strikes on an individual basis, officers were taught to use these techniques in conjunction with each other with the goal of moving through different options to control a suspect versus applying a specific modality for a specific circumstance. **Cognitively this requires an officer to move in and out of external broad and external narrow focuses of attention within the use of force to assess for errors and whether the force is accomplishing the goal of submission of the suspect.**

In addition to training police jiu-jitsu as the method for hands-on use of force, the Mesa Police Academy changed the way that scenario training was administered. Typically, in siloed training, officers would be taught how to use a force modality and then went through a scenario in which they had to determine whether to use that form of force or not and then to effectively deploy the modality. The decision-making in these scenario-based

trainings was whether or not to use the force modality that the scenario was designed for and not whether to use that option or another equally justified or effective option. As an example, the use of a Taser or a chemical agent in a use of force incident are usually equally justified for the same circumstance. If you can use a Taser, you can typically use a chemical agent also or in lieu of. In previous silo training, training scenarios would only account for the decision to use the Taser for example. A chemical agent was never an option and so not a decision an officer could make regardless of the viability of the alternative. In the newer scenario training, which seeks to expand on the cognitive flexibility of PJJ, the methods of using all of the modalities are taught first. Then officers go into the scenario with multiple applicable options just as it occurs in real world events. The scenario often calls for whatever modality is chosen to 'fail' to subdue the assailant and requiring the officer to transition to another modality to be effective. This method incorporates not only the decision to use or not use a specific modality, but also requires the officer to decide between multiple modalities and transition between multiple modalities. The essence of this is that the cognitive flexibility used by officers in the application of PJJ is equally applicable to all modalities and in all instances prior to and leading up to a confrontation as well.

The Mesa Police Department also provided and built an incentive program for officers out of the academy in which they can participate in training sessions, receive discounts for area jiu-jitsu businesses, and can practice the skills as part of their daily shift. This provided continuity in maintaining skills for the jiu-jitsu officers, who at the end of academy training graduated as a white belt in jiu-jitsu. In addition, it would be detrimental to officer safety for untrained officers to respond to assist jiu-jitsu trained officers without

an understanding of the basic methods the jiu-jitsu officers were trying to employ. Each non-jiu-jitsu officer received approximately 4 hours of baseline training in the jiu-jitsu methods primarily used to subdue struggling suspects from the ground, where most handcuffing of violent suspects takes place. The training gave guidance on where to position yourself and what actions to take in assisting in the restraint of the suspect. The training did not go as far as to instruct officers on the myriad of techniques and methods taught to new recruits. While it may not always be as scientifically clean as having a completely isolated control group to compare the treatment group to, the necessity to provide this baseline of knowledge for the safety of the officers and citizens involved in these non-laboratory, real world critical incident data research.

When arresting violent or resisting suspects, getting them on the ground in a prone position is the primary goal as it is then easier to subdue and handcuff the suspect. Non-PJJ officers are typically taught to do this with one officer on each side of the suspect in a prone position, attempting to control the suspect's torso. Additional officers then concentrate on controlling legs and arms. This method is usually effective, but with each officer on each side of the suspect attempting to control one of the suspect's arms, this task is harder than it seems. Someone pulling their arms under them from this position requires significant force to overcome in many cases and non-PJJ officers typically escalate to limited strikes or strikes to get this accomplished.

The primary method for PJJ officers to subdue someone on the ground is taught as controlling the hips, controlling the head, and then controlling the legs of the suspect in that order. This limits movement of the suspect and maximizes the ability of officers to subdue and handcuff the person with fewer other force options necessary. This process is

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referred to as 'segmenting' the suspect. By controlling the hips and then the head of the suspect, the ability to move and effectively fight with officers is diminished greatly. Officers can then concentrate on controlling and handcuffing the suspect's arms. Incapacitating a suspect's arm by holding it in place while other officers concentrate on handcuffing the other arm is more efficient than the method trained to non-PJJ officers as police are not dividing attention between both arms at the same time and rather concentrating on restraining one arm while holding the other static.

Photo: Mesa Police Officers training the ground segmenting procedure for suspects.

The police department wanted to ensure that the program was valuable and provided tangible results in force outcomes. Therefore, executive staff wished to have an evidence-based method of determining the viability of the PJJ Program. Determining the best method of research proved daunting. One option was to track the use of force of individual officers. Tracking the use of force of individual officers for long periods could prove problematic as officers may move to assignments less likely to employ force or

separate from employment, which would hinder the collection of relevant sample sizes. However, as most agencies do, the Mesa Police Department tracks all force incidents with data. Instead of looking at the statistics of an individual officer, a more viable alternative was to analyze the data created by the reporting of a force incident. The determination was made that instead of tracking specific officer subgroup use of force (i.e., patrol, detectives, undercover, etc.), the research would encompass each and every use of force incident occurring in the city of Mesa during the period of the research.

Data analysis to obtain baseline control numbers was analyzed for each and every reported force incident for the Mesa Police Department between January 1st, 2018, and June 30th, 2021. This period encompasses the timeframe prior to the first police jiu-jitsu trained officers going into patrol service. Then, with the first academy class receiving police jiu-jitsu training leaving the academy and going to patrol, a study period of July 1st, 2021, to December 31st, 2023, was analyzed. For the historical period, a survey of department members was conducted and approximately twenty-six sworn officers or detention personnel were identified as practicing jiu-jitsu students in their personal lives. Use of force incidents can involve one officer or multiple. In order to differentiate PJJ use of force from non-PJJ use of force, any incident in which a jiu-jitsu officer participated was classified as a PJJ use of force and any incident in which no jiu-jitsu officer participated was classified as a non-PJJ use of force. For the control period, 2160 use of force incidents occurred and were analyzed for the 42 months. Of these, 1953 use of force incidents were non-PJJ uses of force and 207 of them were PJJ uses of force. This translates to 46.5 non-jiu-jitsu uses of force per month and 4.9 jiu-jitsu uses of force per month average. It is easy to see that the analysis for the pre-PJJ implementation period gives a snapshot of what the
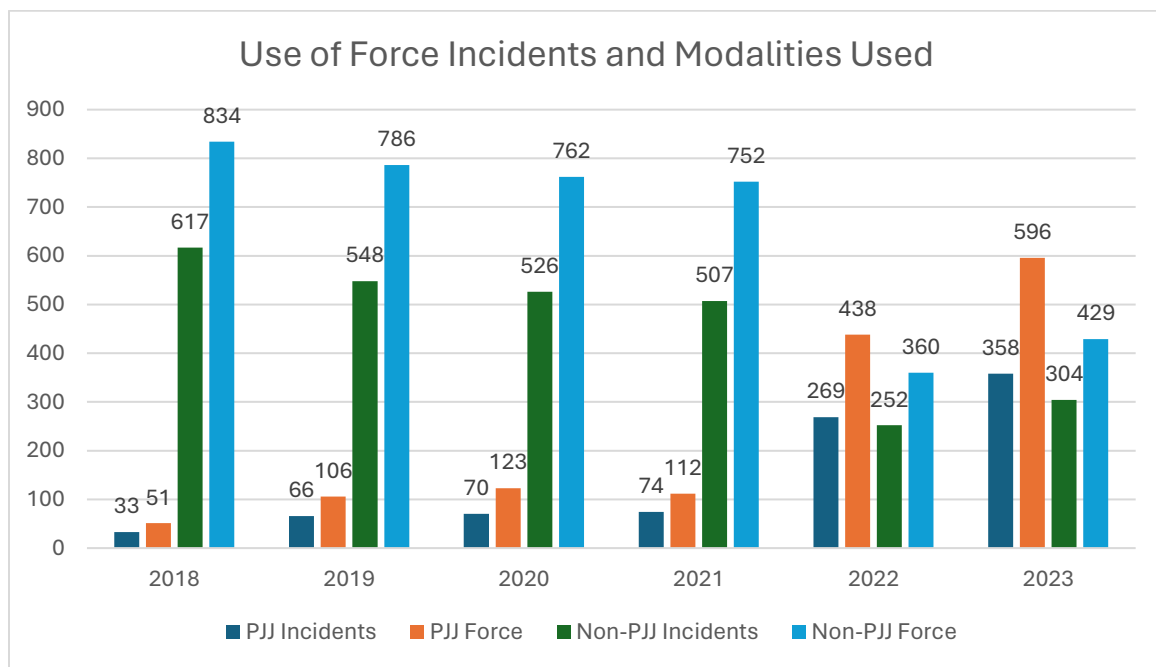
benefits of the program might be but is not very statistically compelling due to the low number of Brazilian jiu-jitsu officers at the time.

For the pre-PJJ implementation group data (January 2018 through June 2021), tabulation occurred in six month increments as some months had few or no jiu-jitsu use of force incidents for tabulation. In six-month increments prior to the integration of PJJ trained officers and with only 26 officers using jiu-jitsu principles, the jiu-jitsu use of force accounted for as little as 3% (n=11 of 310 incidents in 6 months) of total force used. Jiu-jitsu use of force during the historical data period never accounted for more than 13% in any six-month increment. During the period of research (July 2021 through December 2023), the data was tabulated monthly as PJJ use of force continued to grow dramatically to relative parity with non-PJJ use of force.

During the research period, 1464 use of force incidents were analyzed over the 30 months. This was comprised of 663 jiu-jitsu uses of force and 801 non-jiu-jitsu uses of force for an average of 22.1 PJJ and 26.7 non-PJJ uses of force per month. Obviously with only 26 PJJ officers in the control group using force, the percentages of PJJ force are considerably lower than non-PJJ force incidents. As new academies of officers trained in police jiu-jitsu graduated to patrol, the percentages per month of PJJ and non-PJJ use of force became more fluid and comparable.

From the use of force incidents, three sets of datapoints were extracted. The first and maybe most important is the number of force modalities used in the incident. This does not involve repeated uses of the same modality, but rather an ability to transition to other modalities when one is not working. For instance, the data collected does not specify whether or not two or more control holds are used. Regardless of the number of controls

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holds employed in an altercation, it is only tabulated as one force modality. It would be virtually impossible to review body worn camera and/or thousands of officer reports to determine if it were noted how many and what type of control holds were utilized. In cognitive theories presented earlier, employing more force modalities per incident may indicate that officers are better at mentally processing when something is not working in a fight and moving onto some other modality. The force incidents and modalities used per incident for PJJ and non-PJJ officers were tabulated and show a decided increase in PJJ incidents as more and more officers are trained in the tactics.

Use of Force Incidents and Modalities Used

A grouped bar chart titled "Use of Force Incidents and Modalities Used" showing data from 2018 to 2023 for four categories: PJJ Incidents, PJJ Force, Non-PJJ Incidents, and Non-PJJ Force.

Year	PJJ Incidents	PJJ Force	Non-PJJ Incidents	Non-PJJ Force
2018	33	51	617	834
2019	66	106	548	786
2020	70	123	526	762
2021	74	112	507	752
2022	269	438	252	360
2023	358	596	304	429

The purpose of this graph is to illustrate that in the pre-PJJ implementation period significantly fewer PJJ incidents occurred. As more officers were trained and deployed with PJJ skills, the number of incidents went up for PJJ and down for non-PJJ officers as there was more likely to be a PJJ officer at a force incident. There also was not a significant increase or decrease in use of force incidents per year in the department throughout the course of the study. This means that the Mesa Police Department had roughly the same

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number of force incidents per year, year in and year out, for the course of the research. It is significant in later data analysis to not that PJJ related use of force incidents from 2018-2021 when added together did not even equal the single year PJJ incidents for 2022 and 2023.

The other relevant data was determined to be severe injuries suffered by citizens and injuries suffered by officers in force incidents. While use of force is going to cause injuries, in theory using more optimal methods and realizing when a transition to another form of force may be necessary should create less risk of injury to the officers. It is, however, also important to analyze whether the new methods cause more citizen injuries also as that may be a less than ideal result. In looking at the classification of injuries that the police department uses, it was clear that many would be considered minor injuries. These include bruises and abrasions, lacerations, and punctures (this wound classification deals with wounds caused by the probes of a Taser). Serious or major injuries were classified as broken bones, sprains and strains, internal injuries, canine bites, and gunshot wounds. The obvious allowance in this type of classification is that canine bites and internal injuries could be minor, while an injury like a laceration could be very serious. It would be impractical to go through thousands of reports and attempt to determine which wounds are serious and which are not, so the basic classifications are necessary. Consensus can be reached that a bruise is generally not serious and broken bones are always serious, so the wounds are classified depending on how likely they are of being serious or minor. Further, the overall tabulation of whether an incident is a PJJ use of force or not lends to these statistics. If a jiu-jitsu trained officer is present, then the incident is a jiu-jitsu use of force. It would be unfeasible to attempt to ascertain in any given use of force whether the PJJ

officer or the non-PJJ officer assisting caused a specific injury. The reason for this is that in any given use of force where multiple officers are involved it is unlikely to determine which force modality employed caused any specific injury and it is highly unlikely to get this information through the review of body worn cameras as they are often obstructed during use of force incidents by suspect and officer movements. In the tabulations for major injuries, it should be noted that gunshot wounds were not included. Deadly force is included in the use of force incidents as a modality used as often times there are other levels of force used also. However, no amount of jiu-jitsu application is going to get an officer out of a situation in which he needs to use deadly force so the resultant major gunshot wound injuries cannot be considered an injury caused in the role of using jiu-jitsu in use of force.

The raw data was analyzed for force modalities used by calculating the number of force modalities divided by the number of incidents in that period to determine the average number of force modalities used per incident. On a practical level, this number should never be much greater than '2' because that would be suggestive of your first option never really working. Most incidents are resolved with the use of only one modality, and some will take two or more up to five before resolving.

The raw data for serious/major injuries to officers and citizens was calculated by adding up the number of those types of injuries divided by the months in the period to determine how many major injuries occurred on average per month from use of force incidents. Injuries for the historical period, without large samples of PJJ incidents, were tabulated and divided by six for the six-month period of each data set. This gives a number

of injuries per month average that can then be compared to the research data on a month-to-month basis.

In order to see if the data highlighted an actual change in methods for the officers or to determine if one could differentiate the cognitive processes at work, random samples of use of force by officers through body worn camera was observed after force incidents took place. The camera placement often obstructs the view of the altercation and makes the footage for analytics not practical. However, observing the footage to compare results to see if notable changes in officers' actions could be determined was useful.

Overall, this research involves a total sample size spanning six years. A total of 3624 use of force incidents with 5349 force modalities utilized were analyzed. This accounts for the sum total of all use of force incidents occurring in the day-to-day law enforcement operations for the Mesa Police Department. These use of force incidents include each and every incident in which the Mesa Police Department utilized reportable force against a citizen. No force instances were excluded from analysis in the research.

CHAPTER 5

RESULTS

This data was analyzed with the following hypothesis:

H_1: There will be a significant difference in the use of force and force modalities deployed between PJJ-trained officers and traditionally trained officers. The difference will result in reduced severe/major injuries to officers and citizens.

H_0: There will not be a significant difference in the use of force and force modalities deployed between PJJ-trained officers and traditionally trained officers. The difference will not result in reduced severe/major injuries to officers and citizens.

Statistically significant results were observed in three categories. The area in which statistically significant results were obtained is in the average number of force modalities employed per incident, average number of major injuries caused to citizens per month, and the average number of major injuries caused to officers per month. In the historical data analysis, these results were significant. The results were maintained in all three categories for the research period data analysis.

The initial data calculations focused on the totality of force modalities used per incident in all use of force for the Mesa Police Department on a year over year basis for 2018 through 2023. This resulted in a department-wide average in force modalities employed on average per incident for all use of force incidents in the timeframe.

Average Modalities Used Per Incident
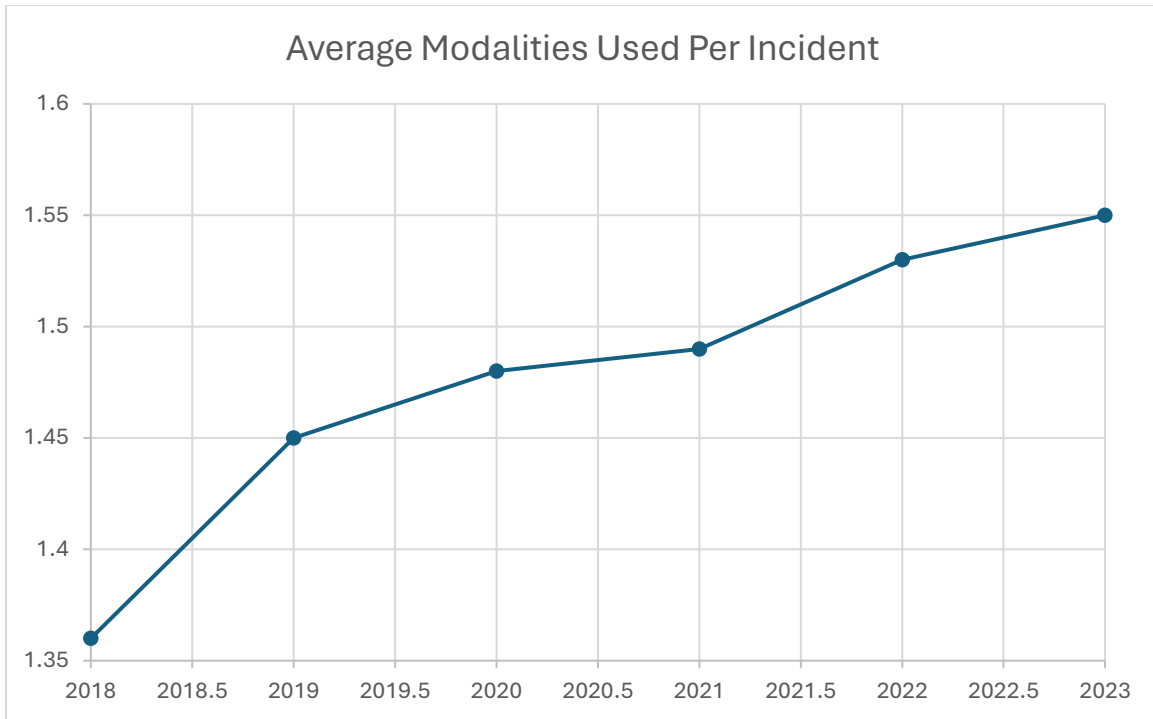
It is important to again note that the PJJ implementation period began in mid-2021 and that prior to the implementation the Mesa Police Department's modalities used per incident was as low as 1.36 and never at or over 1.5 modalities per incident. After implementation of the program, the rate climbs over 1.5 modalities per incident average. As police departments are constantly providing and modifying training, more analysis must be done to show that this increase is due to the implementation of the Police Jiu-Jitsu program.

If we aggregate the six-month numbers of the pre-PJJ implementation period and the month-to-month numbers over the course of PJJ implementation into a year-to-year comparison and conduct and independent T-test, we have a clearer view of this difference in the force modalities per incident and have a significant result. Non-PJJ use of force incidents had lower average number of force modalities employed per incident (M=1.42, SD=0.01) than PJJ officers over the same period (M=1.62, SD=0.04). There was a

significant difference, *t(10)=4.87754, p=0.0006, p<.05*, between the average number of force modalities employed by PJJ officers vs. non-PJJ officers in year over year comparison. The effect size is Cohen's d=6.859943.
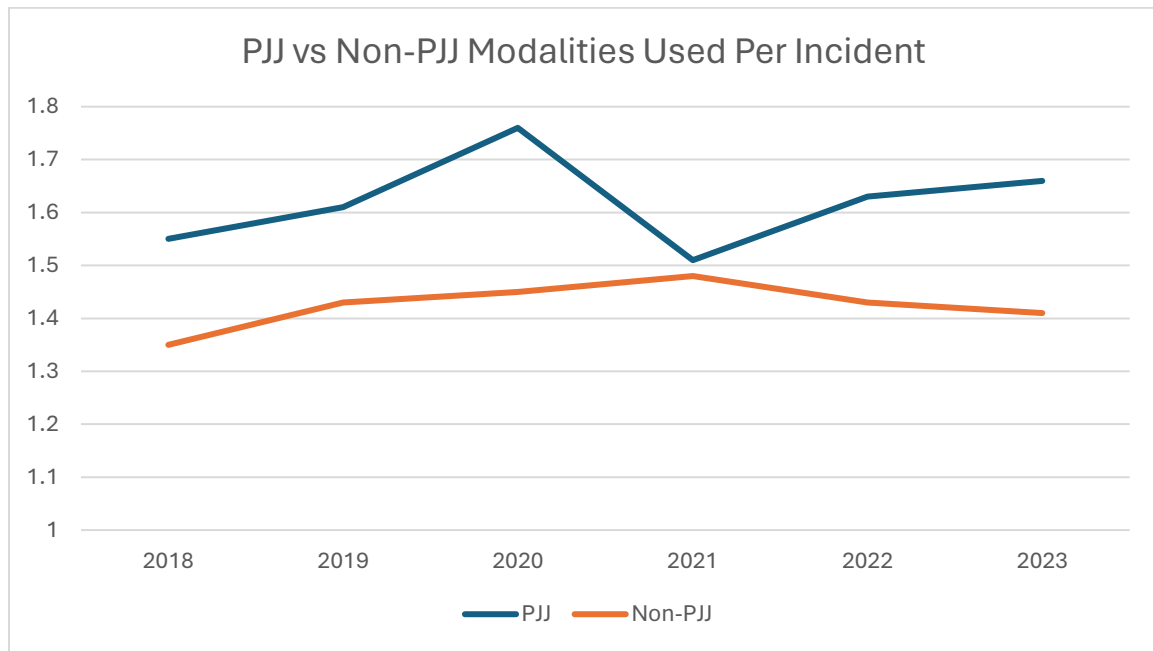

In viewing the above graph of the force modalities on average used throughout the entire data period and grouped by years, we can see that PJJ officers, even prior to the implementation of the program and with a much smaller sample size at that time, were consistently and always above 1.5 force modalities per incident while non-PJJ officers were never at any point at 1.5 force modalities. This seems to confirm that the increased PJJ use of force incidents and the accompanying higher rate of force modalities used by PJJ officers is responsible for the steady increase in the department's overall rate.

For the pre-PJJ implementation data analysis, an independent T-test was performed for the seven six-month periods which encompassed the timeframe. Non-jiu-jitsu use of force incidents had lower average number of force modalities employed per incident (M=1.42, SD=0.02) than jiu-jitsu officers over the same period (M=1.61, SD=0.18). There

was a significant difference, *t (12)=-2.70454, p=0.019, p<.05*, between the average number of force modalities employed by jiu-jitsu officers versus non-jiu-jitsu officers during the historical data period from January 1st, 2018, to June 30th, 2021. The effect size is Cohen's d=1.483.

For the research period between July 1st, 2021, and December 31st, 2023, an independent T-test was performed for the thirty one-month periods which encompassed the timeframe. Non-jiu-jitsu use of force incidents had lower average number of force modalities employed per incident (M=1.40, SD=0.02) than jiu-jitsu officers over the same period (M=1.66, SD=0.02). There was a significant difference, *t(58)=-7.35508, p<0.001, p<.05*, between the average number of force modalities employed by jiu-jitsu officers versus non-jiu-jitsu officers during the research period. The effect size is Cohen's d=13.
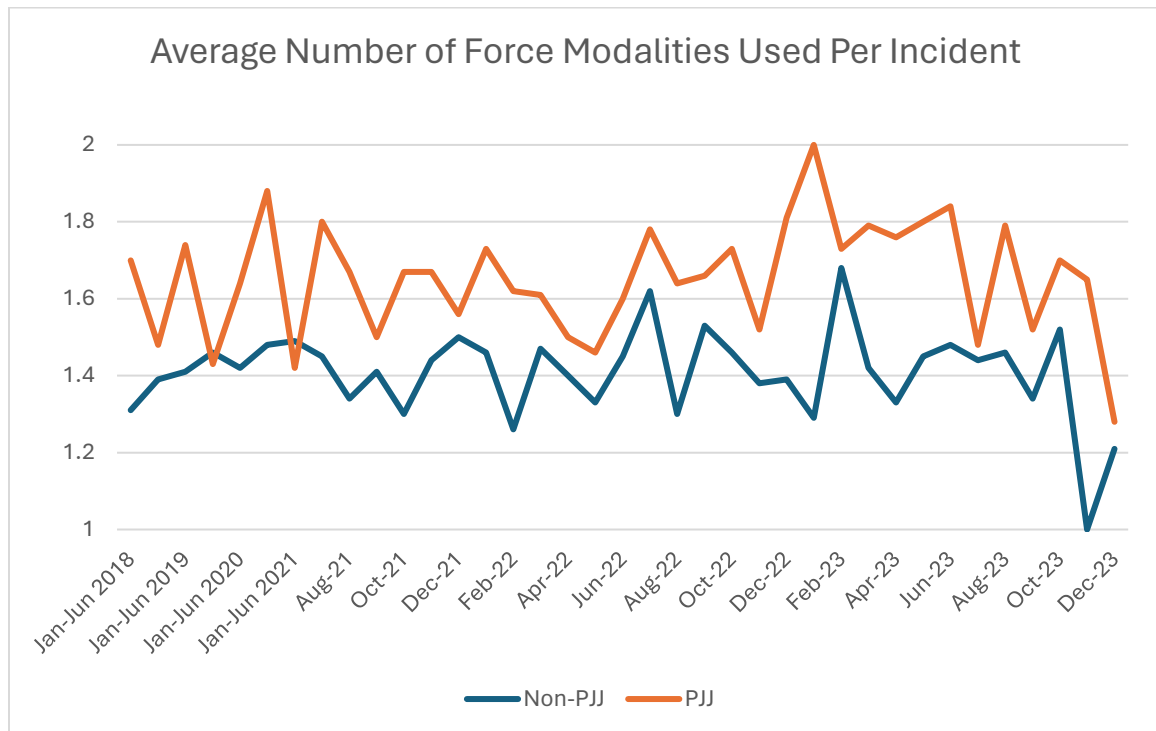
It is of note that prior to the implementation of the PJJ program, there was already a statistically significant difference in with an extremely small PJJ sample size compared

to the non-jiu jitsu sample size. After the implementation of the PJJ program and the resultant increase in sample size of PJJ use of force incidents, the gaps in significant data points only grew larger. One interesting observance on the above chart is that prior to the implementation of the program and through the first six months of the program, one can see that the non-PJJ officers' use of force drove the department-wide averages significantly. By December of 2021, PJJ officers were in large enough numbers on the street to show an impact on the department-wide averages. Within group differences between the historical data and research data showed there were no significant differences within the PJJ and non-PJJ groups.

The major injuries sustained by citizens and police officers was also tabulated on a year over year basis from 2018-2023. No differentiation was made in the tabulations of PJJ and Non-PJJ officers at this juncture, but merely a tally of all major injuries in use of force incidents for the entirety of the study period.

Major Injuries to Citizens and Officers
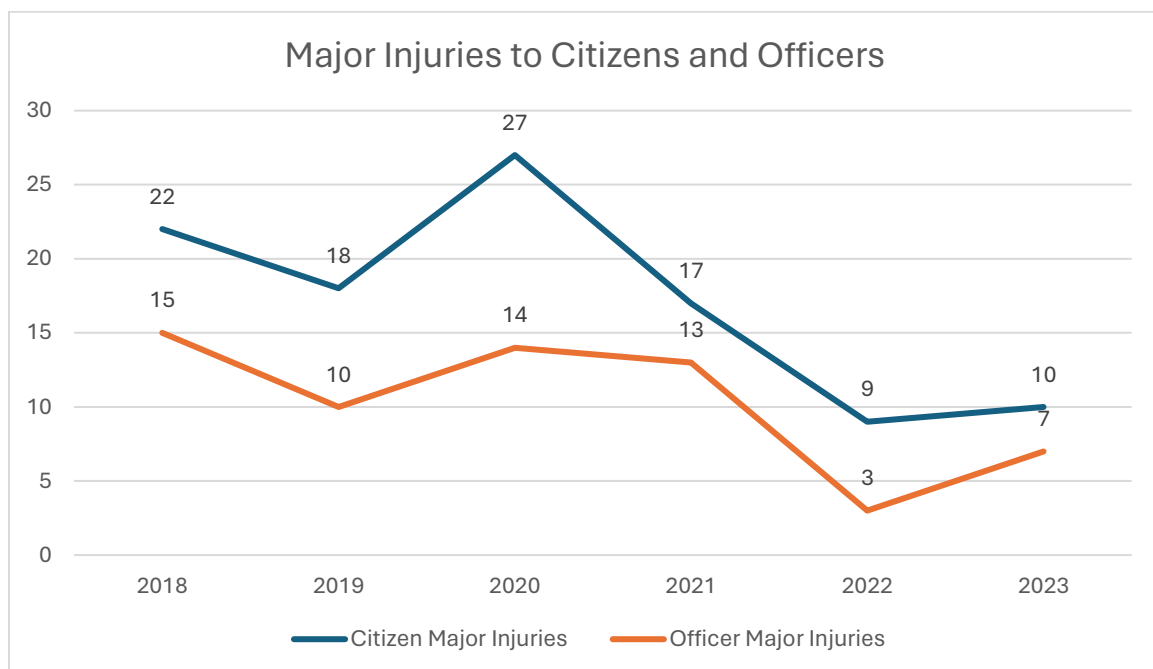
It is clear, as with the force modalities analysis, that the major injuries sustained in all department use of force incidents take a precipitous drop in 2022 and 2023. Again, it is worth noting that all of the PJJ incidents from 2018 through 2021 combined do not equal the number of incidents in either 2022 or 2023 for PJJ officers. A more thorough analysis was done to credit PJJ training with this drop in injuries.

For the historical data analysis on citizen major injuries, an independent T-test was performed for the seven six-month periods which encompassed the timeframe. Non-jiu-jitsu officers averaged higher citizen major injuries per month (M=1.5, SD=0.48) than jiu-jitsu officers over the same period (M=0.38, SD=0.03). There was a significant difference, *t(12)=-4.13466, p=0.001, p<.05*, between the average number of major injuries caused to citizens per month by jiu-jitsu officers versus non-jiu-jitsu officers during the historical data period from January 1st, 2018, to June 30th, 2021. The effect size is Cohen's d=3.29.

For the research data analysis on citizen major injuries, an independent T-test was performed for the 30-month long periods which encompassed the timeframe. Non-jiu-jitsu officers averaged lower citizen major injuries per month (M=0.33, SD=0.3) than jiu-jitsu officers over the same period (M=0.47, SD=0.33). There was no significant difference, *t(58)=0.92355, p=0.359548, p>.05*, between the average number of major injuries caused to citizens per month by jiu-jitsu officers versus non-jiu-jitsu officers during the historical data period from July 1st, 2021, and December 31st, 2023.
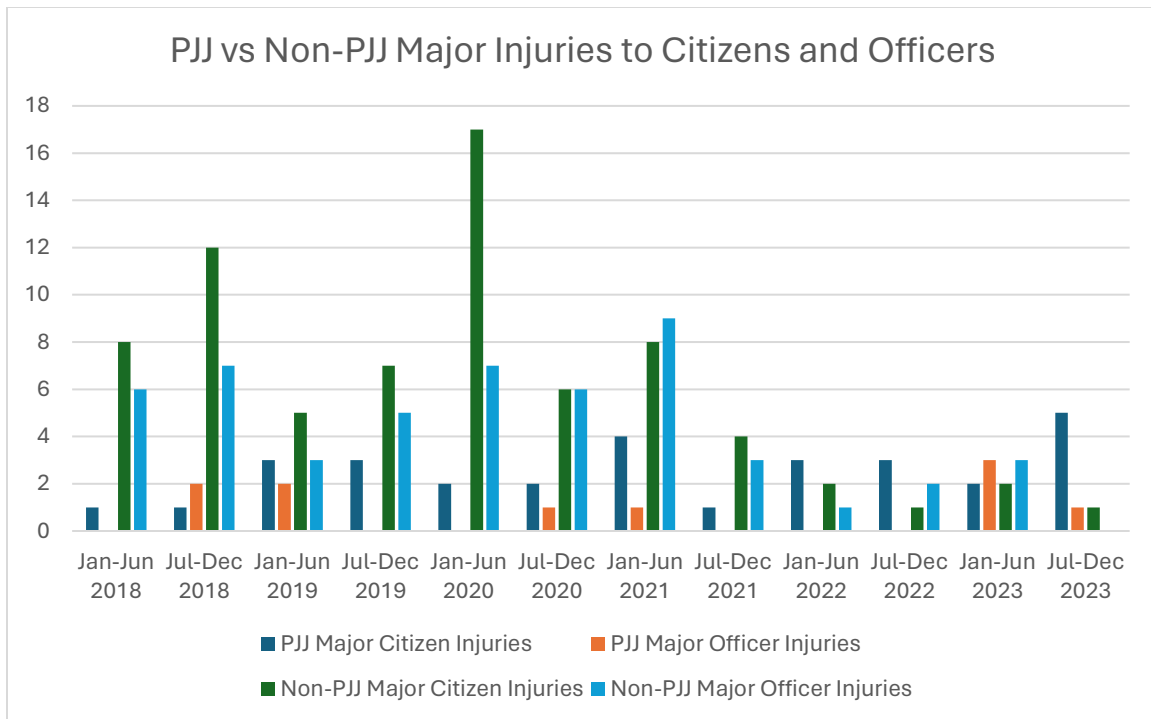
For the historical data analysis on officer major injuries, an independent T-test was performed for the seven six-month periods which encompassed the timeframe. Non-jiu-jitsu officers averaged higher officer major injuries per month (M=1.02, SD=0.1) than jiu-jitsu officers over the same period (M=0.14, SD=0.02). There was a significant difference,

t(12)=-6.69653, p=0.000022, p<.05, between the average number of major injuries caused to officers per month by jiu-jitsu officers versus non-jiu-jitsu officers during the historical data period from January 1st, 2018, to June 30th, 2021. The effect size is Cohen's d=12.203404.

For the research data analysis on officer major injuries, an independent T-test was performed for the 30-month long periods which encompassed the timeframe. Non-jiu-jitsu officers averaged higher officer major injuries per month (M=0.30, SD=0.36) than jiu-jitsu officers over the same period (M=0.13, SD=0.12). There was NO significant difference, *t(58)=-1.32493, p=0.19039, p>.05*, between the average number of major injuries caused to officers per month by jiu-jitsu officers versus non-jiu-jitsu officers during the historical data period from July 1st, 2021, and December 31st, 2023.

Of note for the major injury data is that PJJ officers maintained numbers that were not significantly different pre and post implementation of the program despite a huge increase in use of force incidents attributable to an ever-increasing number of PJJ officers going into service. Non-PJJ officers were able to lower the major injuries that they were causing to citizens to levels similar to the PJJ officers. They also, while still causing themselves more than double the major injuries to officers than PJJ officers, reduced the major injuries they suffered by two thirds.

PJJ vs Non-PJJ Major Injuries to Citizens and Officers

Legend:
- PJJ Major Citizen Injuries
- PJJ Major Officer Injuries
- Non-PJJ Major Citizen Injuries
- Non-PJJ Major Officer Injuries

This breakdown of the major injuries to citizens and officers in six-month intervals through the course of the study highlights that non-PJJ officers before the implementation of the program never caused less than five major citizen injuries nor less than three major officer injuries per six-month period. By contrast, PJJ officers only caused five major citizen injuries in July-December 2023 and never more than that number. PJJ officers suffered no major injuries for eighteen total months of the historical period and for 18 months in the research period. All major injuries after the implementation of the research period were significantly lower. Within the non-PJJ officers' use of force injury averages, one can see that there were six-month periods where they might average anywhere from 2 to 2.83 major injuries per month to citizens and over two major injuries to themselves. By contrast, between July 2021 and March 2023, PJJ officers suffered no major injuries to themselves and only caused more than one major injury (n=2) to a citizen one time in November of 2023.

Major Injuries to Citizens and Officers
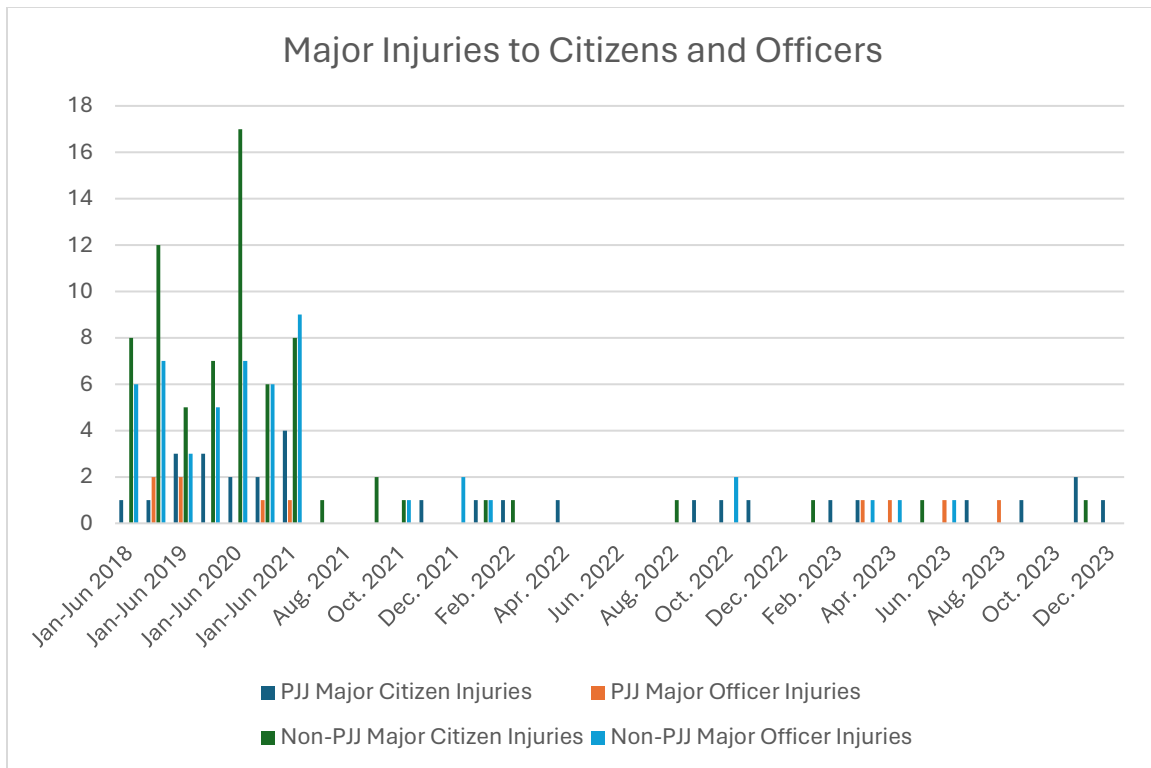
If we look at the above chart, while showing both the six-month intervals of the historical period and the month-long research intervals, it highlights the contrast as PJJ use of force incidents all increased significantly in the period as more trained officers went into service. The significance of this optic is we can readily see that PJJ officers between July 2019 and March of 2023 suffered only one major injury to an officer out of hundreds of incidents. After the implementation of the PJJ Program, PJJ officers caused fewer serious injuries to citizens in the 30-month research period (n=11) than non-PJJ officers caused in two of the six-month historical research periods (July-December 2018: n=12; January-June 2020: n=17). When we consider that major injuries are a financial and personnel disadvantage for agencies, these types of prevented injuries cannot help but have a large impact for the agency.

By viewing these statistics through slightly different lenses we can see that the actual story contained in the statistics is consistent. Whether calculating the force modalities used per incident in six-month periods, month to month, or year to year we have consistent and similar significant results. When we compare major injuries with different methods, we can see that we have significant results when viewed by major injuries per month. Due to small numbers, it may not be significant when calculated on a per incident basis. However, it is indisputable that while there are significant results depending on the calculation method, the Mesa Police Department is causing significantly fewer serious injuries in aggregate to themselves and citizens since the implementation of the PJJ program.

CHAPTER 6

DISCUSSION

For the police executive, it is easy to look at this research and reduce it to a simple premise. The use of police jiu-jitsu appears to cause officers to hurt themselves and citizens less seriously. This is a tangible benefit. A number that translates into other 'good' numbers. Less serious injuries to officers leads to less medical bills for the agency, less attrition through medical retirement of officers, and less negative media or government attention for alleged use of excessive force. Fewer serious injuries to citizens leads also to less medical debits to the agency because it is the taxpayer that foots the bill when an arrestee ends up in need of medical attention. Citizens without serious injuries find much less standing and support for lawsuits against agencies. People often have trouble proving excessive force and injury when the injury is a bruise alone. The police executive may look at the average force modalities used per incident and conclude that this number does not mean much to them.

For the cognitive scientist, psychologist, or human systems engineer they may find the serious injury rate compelling but may view the numbers and relationship to the force modality averages unusual. After all, the data shows that PJJ officers use more force modalities than non-PJJ officers. That means that they use more force, but seriously injure themselves and others less. The instinct of this for the layperson is that they want to see less force used, not more. Citizens sometimes see a culture of coercion and excessive force within law enforcement (Terrill, Paoline & Manning, 2003). Many also feel that police policies are to blame, and that police violence is a public health issue (Obasogie & Newman, 2017). Research even shows that specialty units use more force than patrol

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officers and that maybe retraining is necessary without consideration of the fact that specialty units concentrate on arresting criminals while patrol officers will equally deal with criminals and grandma crossing the street who needs no force used against her (Gaub, Todak & White, 2021). Certainly, in today's law enforcement world where de-escalation is the buzz word, any finding of a use of *more* force seems counter-intuitive. However, we need to be cognizant of the fact that more force does not necessarily mean more severe. It can mean, equal or even lesser by degrees, depending on the modalities employed. Because more force should theoretically lead to more injuries, a connection must be made between the use of more force modalities per incident and a reduction in serious injuries to officers and citizens. That connection is cognitive decision-making.

When we talk about cognitive decision-making processes, attention, perception, and our senses we typically talk about them with very few examples other than the theoretical. In order to understand the impact of these models on the statistical findings, we need to identify these cognitive processes in the actual actions of the officers. Analyzing the body worn camera footage of Mesa officers in these use of force incidents with domain knowledge of the actions of the officers as it relates to their training gives us this cognitive connection.

The first thing we must acknowledge is that critical incidents in which police use force are to varying degrees an activation of the amygdala's 'fight, flight, or freeze' response. The amygdala activates a neural response to threat in which we quickly analyze and enact a response to threat, including an increase in biological immune and short-term stress management response in the body (Dhabhar, 2018). We can easily acknowledge that before police get into a physical confrontation with a suspect, they have a response from

the amygdala whether they are a PJJ trained officer or a non-PJJ trained officer. The officers, by the virtue of their training, primarily are supposed to choose 'fight' as the option. As the officers begin the confrontation, the time compressed situation will result in an intuitive fast response. This initial intuitive response will be the result of experience, training, confidence in their specific abilities, and the unique and specific stimuli present in their environment (Klein, 2015). We know from research that this experience and training in police jiu-jitsu will provide a different level of confidence in the officers' abilities to manage the situation and anxiety about entering the conflict (Torres, 2018; Renden, et al 2015). We also know that silo use of force training should limit the responses of non-PJJ officers (Hines et al, 2015; Hickman 2005). From this baseline and acknowledging that no two force incidents look the same, reviewing the body camera footage of the different classes of officers illustrates these cognitive processes.

Non-PJJ Officers: In reviewing body camera footage of non-PJJ officers in a confrontation, several telling patterns were noted. Non-PJJ officers often 'threatened' the use of a force modality that they were not mentally prepared to use in an effort to quell the confrontation before it started. Most often, this was a threat to use chemical agents or the Taser by displaying the modality but never actually using it. In each instance, the officer would have been justified in actually using those force modalities they would choose to put that force option away and go to a 'hands-on' control holds response. Those officers are displaying a lack of confidence in the actual deployment of those modalities and are instead going to a control holds option in which they are comfortable with. This is consistent with the research on the anxiety being higher and confidence levels lower for non-PJJ officers deploying force (Torres, 2018; Renden, et al 2015). Their decisions to

engage in control holds is quick and intuitive decision-making. They use the technique that is most familiar and comfortable to them, and which seems to them to be the most applicable in the moment based on their skills, training, and experience (Klein, 2015). This is naturalistic decision-making in action. There is also a transition from an External Broad focus of attention to an External Narrow focus of attention as the confrontation moves from assessment to action. When this technique does not work, just as they are trained to do, they give verbal commands to the suspect to comply. These commands become more frantic in tone as the initial technique does not work which is indicative of panic. If the technique does not work, officers continue attempting to use a limited number of control holds until the suspect complies or more officers arrive, or transition to limited strikes or strikes while still attempting to use control holds. If the officer transitions to strikes or limited strikes, this can be thought of as an analytical decision and a rapid switch from External Narrow action to External Broad assessment and back to the next External Narrow action. If the officer continues to use control holds without transition to any other modality, then they remain in External Narrow focus of attention until the situation resolves. An External Narrow focus of attention is not a decision-making focus of attention. No decision-making or abductive reasoning is occurring.

The limited strikes are meant to put the suspect off balance or fixated on the area being struck so that officers can get them handcuffed. For instance, while attempting to get a prone suspect's arm out from under him to handcuff, a limited strike might be delivered to the long muscles in the upper leg as a way of distracting the suspect with pain from his arm so the arm can be controlled. Strikes can be delivered to areas such as the face and when non-PJJ officers go to strikes as an option it is most likely to this area. Body worn

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camera shows that in great numbers, officers deliver these strikes to the back of the head or the top of the head. Generally, when officers are hurt seriously in confrontations it is most often a broken bone or a sprain. The majority of this is hand and wrist injuries from ineffectual striking the back and top of suspects' heads. This is consistent with research showing officers are much more likely to be injured in hands-on confrontations than when using other modalities (Maguire & Paoline, 2023).

The final telling pattern on body worn camera review emerges when the non-PJJ officers first or second option does not work. These officers have been silo trained in delivering tactical force and not strategic force. They have been silo trained in the technique, the motor skill, and not in how to strategize the fight when that technique does not work. They do not consider the myriad of options on their belts such as batons, Tasers, and chemical agents. They have not practiced or thought about what to do in those situations in Internal Broad (planning) focus of attention beforehand. Now they go to an Internal Broad focus of attention and try to cognitively pull another plan from their minds. Because these officers were silo trained with each use of force modality individually, no mental 'planning' was done on moving to other options. An Internal Broad focus of attention when action is required is basically panic. Officers visibly become frenzied, re-applying the same failed technique they originally tried unsuccessfully. They strike the back of the head and break their hands. They strike the suspect in the face and break their bones and cause them serious injury. They repeat commands which may be nonsensical, such as screaming for the suspect to 'get on the ground' when the suspect has already been taken to the ground in the fight. Officers attempting to each attempt to control and handcuff each arm at the same time often ended up losing their handcuffs in the struggle, handcuffing

the suspect in front, or handcuffing each wrist with a separate pair of handcuffs. They increased their risk of being bitten or spat upon, and increased the suspect's wrist of bumping or striking their head on the ground because the head was not typically controlled as per the officers' training. They could be heard frantically radioing for emergency assistance and the situation was not resolved until the suspect willfully surrenders or enough officers arrive to take the suspect into custody regardless of how many strikes were delivered in the meantime. If, while engaged in control holds and strikes to control a combative suspect, a non-PJJ officer decides to employ another modality (Taser or chemical agent) they will completely disengage from the suspect to deliver the next modality. There does not seem to be an understanding that maintaining the control hold and then using the chemical agent will further the success of the control hold because they have never used Internal Broad focus of attention to plan or strategize that possibility beforehand. In fact, they have been trained to deploy a modality such as a Taser in a siloed fashion and from distance, so they disengage in order to deploy a Taser in the manner of their training.

PJJ Officers: Watching the body camera of PJJ officer confrontations shows significant differences from non-PJJ officers. Cognitively these officers have been trained in jiu-jitsu as an entire menu of options rather than silo trained. Because they are more focused and comfortable with deploying force, they seldom threaten with a force modality they are not willing to use. PJJ officers' confrontations generally start the same as non-PJJ officers with an Intuitive Decision to enact a control hold and a quick switch from an External Broad focus of attention to an External Narrow focus of attention as the action starts. However, from this point, PJJ officers engaged in a series of calm commands to the

suspect and communicating through the arrest process with fellow officers. This communication consisted of announcing what control hold they were using and instructing others to take other segmenting positions and/or to concentrate on controlling one arm at a time for handcuffing while containing the other. Officers appeared to not remain in an External Narrow Focus of attention as they attempted to subdue suspects. They noted ancillary stimuli within their environment requiring attention, such as a backpack on the suspect, which a non-PJJ officer would not have noted while in an External Narrow focus of attention. Other responding officers would realize that there was no role for them and would stand by to assist rather than attempt to find a role in the altercation. PJJ officers would only use limited strikes and strikes when they had a strategic location to deliver them. They did not deliver strikes to the back of a suspect's head and waited to deliver limited strikes until muscle and nerve groups they had been taught were exposed. PJJ officers more readily noted when a method was not working and would quickly move to other methods, such as a chemical agent or a Taser if needed, without disengaging from the original modality.

If we break down the training and the actions of the officers described above through the lens of cognitive decision-making theory, it is easy to see the relationship between the force modalities used versus the serious injuries caused to officers and citizens. The scenarios described above were observed in one form or another on multiple body worn camera reviews of force incidents. No statistical data can be drawn from this other than what was reported and analyzed for this research, but observing these patterns repeat themselves over and over again with different officers in different circumstances where

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one can apply a cognitive decision-making or attentional theory to a real-world action makes the statistical data make sense.

Through the course of the research period, the average number of force modalities used in a use of force encounter within groups from the historical to the research period barely moved (PJJ officers 1.61 to 1.66; Non PJJ officers 1.42 to 1.40). Out of thousands and thousands of incidents and force modalities used, there was no statistical significance and little movement in what PJJ and Non-PJJ officers did before and after the implementation of the program.

To explain this, we need look no further than Nideffer's Quadrants of Attention. For the layperson, looking at this through a sports perspective gives us a relevant analogy. In the sport of football, a series of scripted plays are developed for the offense and defense designed to either score or stop the other team from scoring. These scripted plays require each player to take a specific action or series of actions to complete the play. Studying and practicing the plays and the opponent's tendencies makes up an Internal Broad focus of attention as the players develop their game plan and strategies for executing the plays. This is like police use of force training. Officers are taught in the academy what the laws and policies are, what the force options are and when they can be used, how to deploy the force options depending on the actions of the suspect, and how to decide which available force options out of many to use in specific circumstances. They practice, participate in scenarios, study laws, and procedures and mentally develop their personal strategy based on their training for dealing with a force incident.
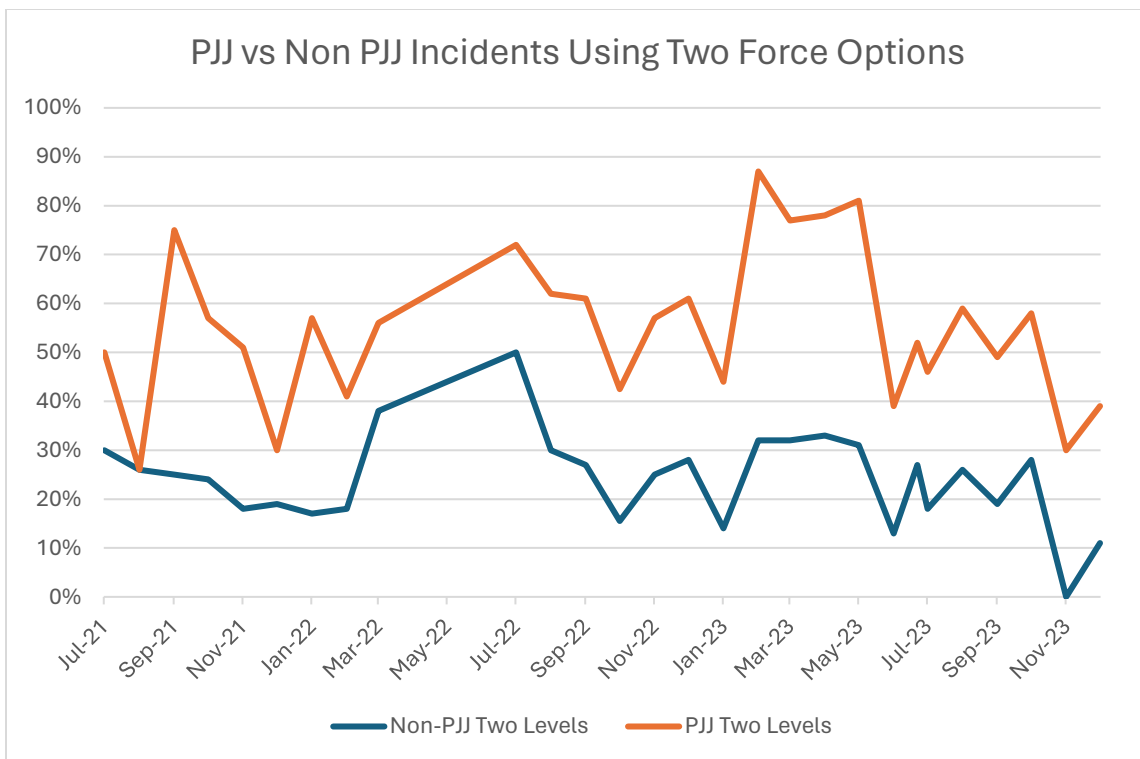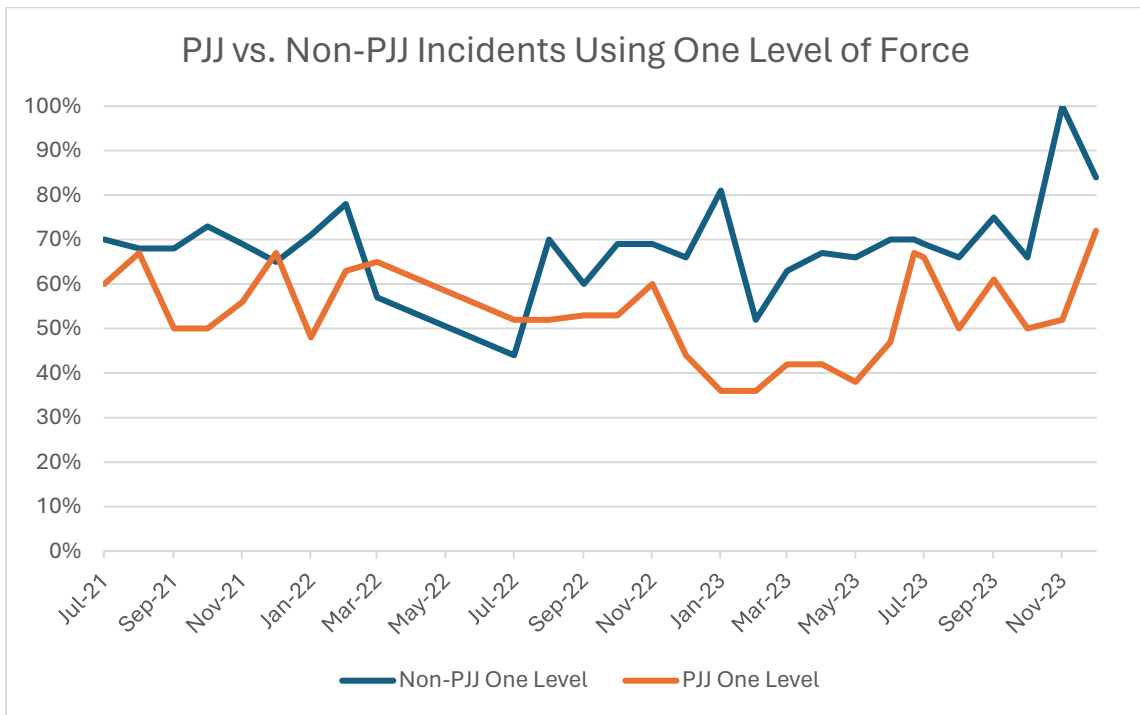
The difference in the training is, like a football team, different position players are trained for different roles. The wide receiver's job on a football team is to run a route during

a given play and then catch a pass from the quarterback at the end of the prescribed route. The wide receiver is silo trained. He is to run a specific route on a specific play and is not to vary too much from the route because the quarterback is going to be looking for him at a specific location on the field to deliver the pass. His External Broad focus is limited to running the route and his External Narrow focus is limited to catching the ball. He may make fast Intuitive Decisions to create distance from a defender or move to a more open spot on the field, but that will result in only very minor deviations from his prescribed route and when the quarterback looks for him, he is going to be in the general vicinity of where he was supposed to be. The non-PJJ officer is silo trained. They are given multiple force modalities and trained and prepared for when to use them. They are evaluated on the use of the modality to ensure proficiency in the use of the modality in a given circumstance and pass the scenario when they use it successfully. They are not trained to go into the scenario and veer off to a different force modality than the one being trained in that moment. When the non-PJJ officer uses force their External Broad focus of attention is on selecting and then executing a force modality. Then they become External Narrow focus of attention on delivering the force modality. Like the wide receiver, they will not veer too far from their prescribed route. They may have time to make an Intuitive Decision to apply another modality (limited strike or strike) in furtherance of the application of the initial force modality (control holds). If this is not working, the officers will panic as they go to an Internal Broad focus of attention trying to think of another modality to use. If they select another modality, then they will completely disengage and cease the original plan. Whether in the historical or research period, this is how these officers are trained and this is what they do.

A PJJ officer is trained more like the quarterback of a football team. The quarterback is responsible for knowing and calling the plays, but once the play starts then the quarterback is empowered to make decisions in the course of the play which can vary greatly from the plan. The quarterback can target any number of wide receivers for the pass, hand off the ball to a running back, run the ball himself, and deviate from the script of the play in any number of ways. Jiu-jitsu and the enhanced decision-making scenarios simulate this same dynamic. Officers are taught to use force modalities to create submission and custody. The technique is important, but what is more important is sensing and countering the momentum and actions of the suspect. Scenario training is not to see if the officer can decide and execute a specific modality, but rather to determine if the officer can decide between many modalities and then strategically transition to other modalities in the overall goal of subduing the suspect. Just like the quarterback, for this type of dynamic to work the PJJ officer must remain in an External Broad focus of attention so that changes in the environment and stimuli can be perceived and acted upon. Jiu-jitsu trained officers prior to the start of the PJJ program were already versed and trained in the grappling art prior and had learned the necessity of the External Broad focus of attention and being ready and able to assess for error and change paths. The force modalities to a jiu-jitsu trained officer are an integrated system of tools to be applied interchangeably as necessitated by the actions of the suspect and the environment.

We can see when looking at the use of force numbers throughout the research period that PJJ officers consistently had a lower percentage of incidents with one modality used and a higher percentage with two modalities used over the period. It should be noted that in many use of force incidents regardless of the training of the officers, only one force

modality is necessary to resolve the situation. The first option works, basically, a good percentage of the time.

PJJ vs. Non-PJJ Incidents Using One Level of Force

**PJJ vs Non PJJ Incidents Using Two Force Options**

A decent percentage of incidents also requires a second modality, such as a limited strike. There is a singular anomaly in November of 2023 which saw non-PJJ officers use only one level of force on each and every incident. While this is possible, it is unlikely that all 100% of the force incidents went smoothly and quickly. It is much more likely that the officers failed to transition to another method on a couple of instances until enough officers were there to contain the suspect. If the force modality is not working, then without a transition to another modality the only resolutions are escape of the suspect or the arrival of so many back-up officers that the suspect can be overpowered.

The differences in training and the statistics related to force modalities are straight forward and understandable in cognitive decision-making and attention theories. Therefore, the substantial change in the historical to research period data concerning non-PJJ serious injury numbers is perplexing until a deeper look into the numbers is done. The PJJ officers' serious injury numbers for the historical period are almost identical for officer injuries. They are also not significantly higher for serious citizen injuries, which is likely due to the substantial increase in PJJ use of force incidents as the number of trained officers grew.

The non-PJJ officers, though, saw significant reductions in citizen and officer major injuries from the historical to the research period data. Non-PJJ officers, as stated above, employed the same average number of modalities as before with better results. The change is due to the four hours of familiarization training on the technique PJJ officers were taught for handcuffing resisting and violent prone suspects. This technique is more about working together with everyone assigned a role in the prone handcuffing. Emphasis is on dealing with only one arm at a time and not struggling with each arm individually. Because this

technique is about working together, it requires officers to use it in a more External Broad focus of attention. Officers must pay attention to the instructions and communication of the other officers and not just deal with their specific individual in External Narrow focus of attention as taught in the non-PJJ prone handcuffing techniques. From that communication and External Broad awareness, they make no more force modality choices than before, but they make better choices without as much panic. Use of strikes, known to be an outsized cause of serious officer injuries reduced. Use of chemical agents, which causes pain in the moment but no injury, increased.
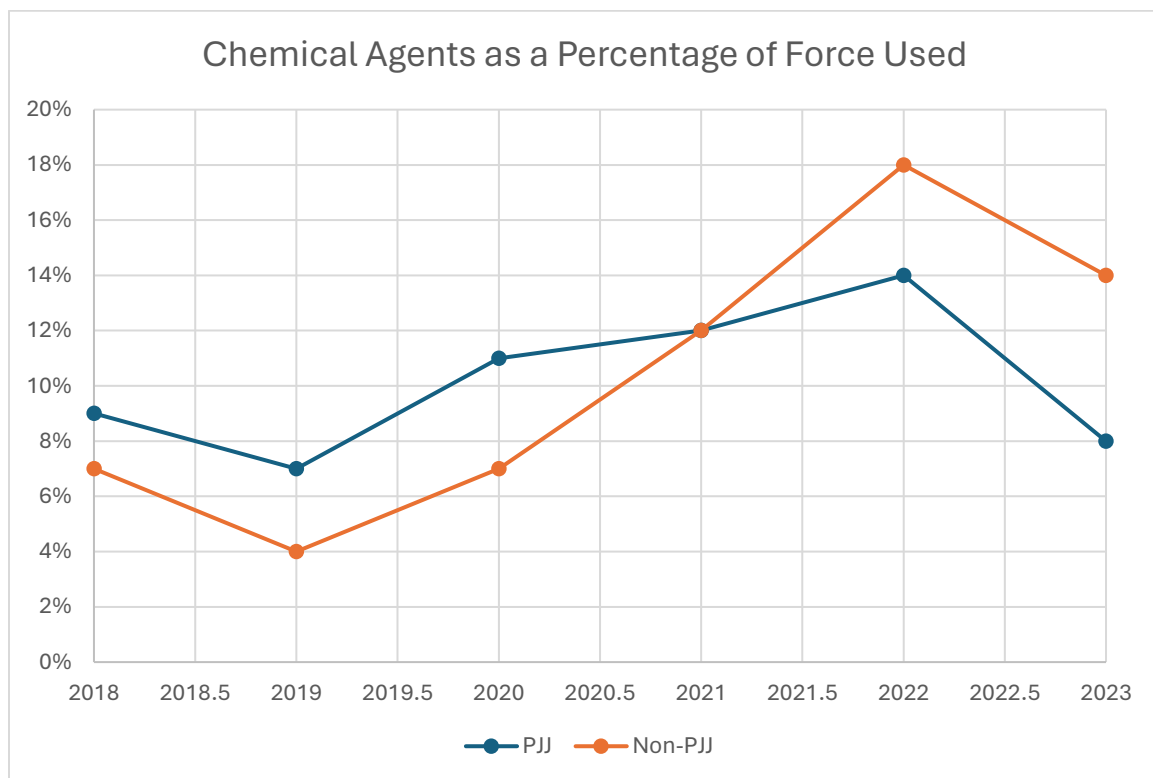

What this means essentially is non-PJJ officers use a control hold and then if that does not work move directly to a strike, which causes injury. Research into the mechanics of PJJ in a police agency show that one of the aspects of the training is that there is an emphasis on gaining compliance through using leverage against the suspect as opposed to

pain compliance techniques, of which strikes are the most common (Huff, Zauhar & Agniel, 2024). They move to a strike because it is the only task switching option that they can cognate in the time compressed fight. As Hicks found, the more options one has, the longer it takes to decide what option to employ. Factor in task switching is a change in that action and the time required between cessation of one action and start of another, the psychological refractory period, makes an intuitive response more likely. A PJJ officer, due to training which employs elements of task switching and decision-making throughout this process, can make a quicker assessment of more options than a silo trained officer.

Strikes, primarily, are a method used for pain compliance and distraction. They are most often selected as an option after using a control hold that fails because it is the quickest and most expedient hands only use of force available. Strikes, limited strikes, and control holds are the only methods typically taught closely together while all other options are all siloed.

Non-PJJ officers had a steadily declining rate of strikes, and the anecdotal theory would say that the vast majority of these strikes are delivered by non-PJJ officers in the final stages of the confrontation when the suspect is prone on the ground and officers are struggling to control and handcuff the hands. The primary training nugget to remember with this theory is that ALL officers were trained in the segmenting technique for prone use of force handcuffing of combative suspects. Prone handcuffing is something that occurs in almost all use of force incidents and it is therefore noteworthy that non-PJJ officers were trained in this specific aspect, where strikes are most likely to be delivered.

Strikes as a Percentage of Force Used

PJJ — Non-PJJ


Broken Bones/Sprains
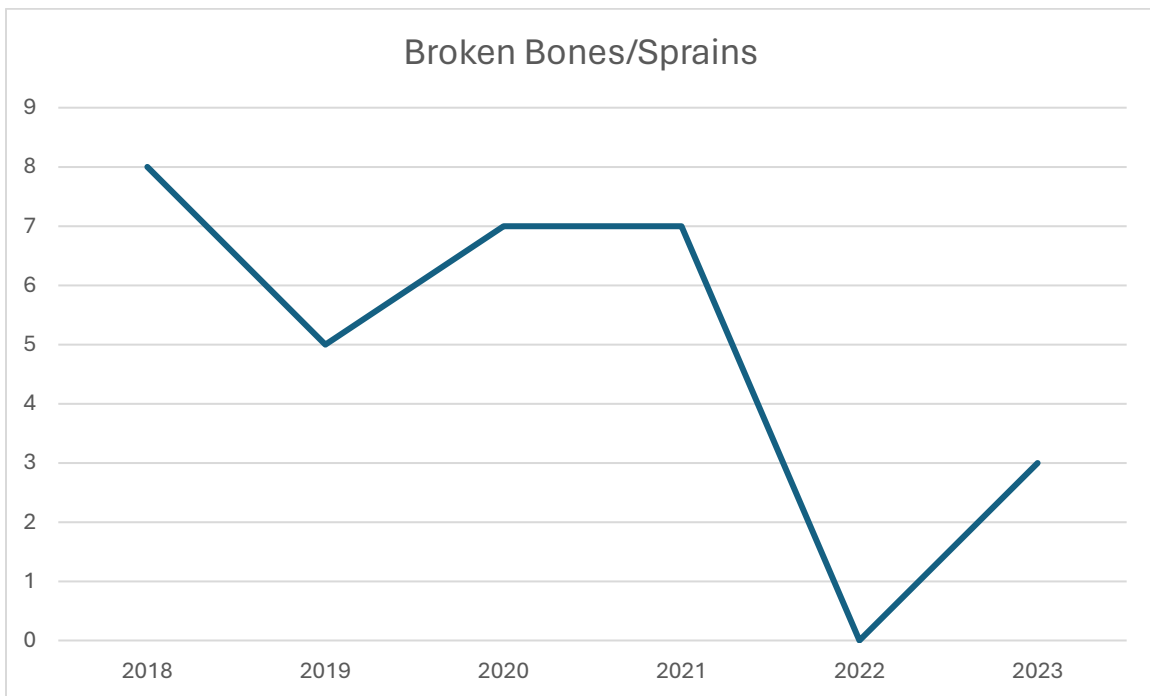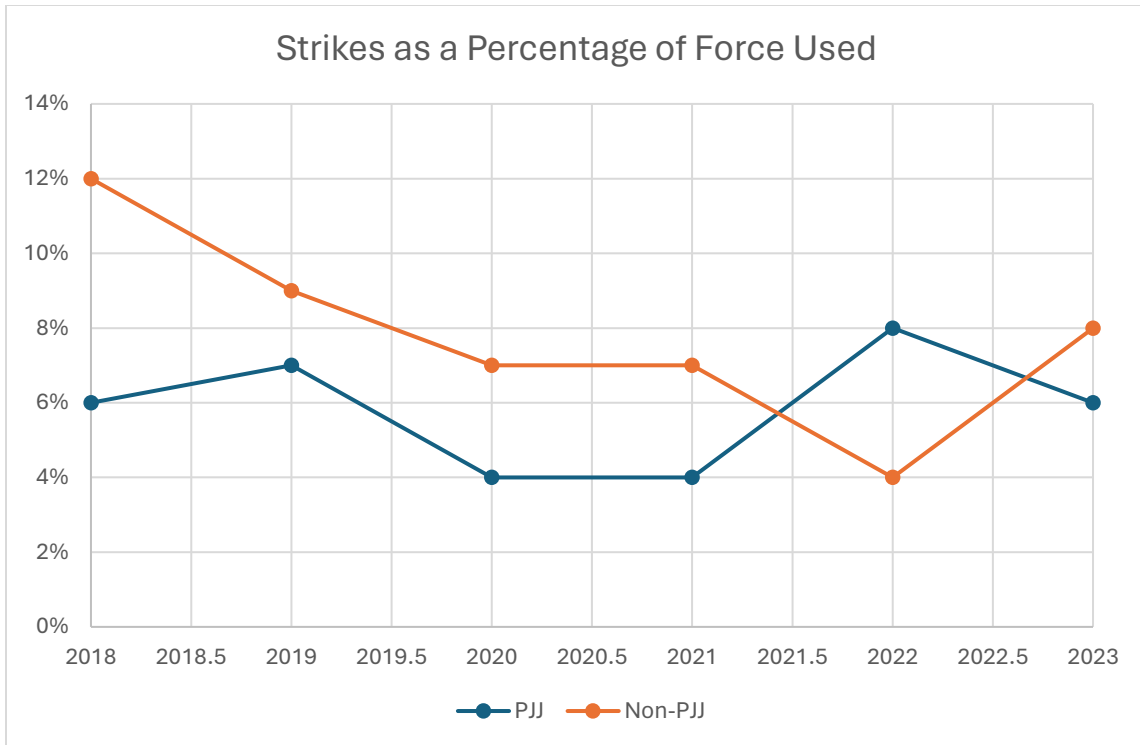
The evidence supporting that strikes delivered from the prone handcuffing position are responsible for is actually very compelling. In looking at the strike reductions of non-

PJJ officers on the first graph and comparing it to the number of Broken Bone/Sprain injuries (most often associated with Strikes) suffered by police in the second graph, we can see that the trend lines are almost identical in appearance.

Interestingly, PJJ officers consistently used strikes in 4-8% of incidents and in 2022 used strikes in twice as many incidents (8% to 4%) than non-PJJ officers. Logically, if strikes are the primary cause of serious injury to officers in use of force and PJJ officers deliver strikes in 4-8% of incidents then one would expect to see injuries. The answer is that because PJJ officers are operating in a more External Broad focus of attention, they are more aware and more likely to be using Analytical Decision-Making rather than Intuitive Decision-Making. The slower decision-making process allows them to target their strikes to areas where they will disrupt the struggle of the suspect and not injure themselves. In 2022, PJJ officers used more strikes than non-PJJ officers, and were in the middle of a string of nineteen straight months without a serious officer injury. This reduction in strikes by non-PJJ officers indicates that the time in External Broad focus of attention while doing prone handcuffing was resulting in less emphasis on strikes to suspects in unproductive areas. It also led to non-PJJ officers surpassing PJJ officers in chemical agent use. Non-PJJ serious officer injuries plummeted from 1.05 per month to 0.38 per month (more than twelve per year to less than 5 per year). This is seven officers per year who will not miss time from work, require medical interventions, or possibly medically retire from a use of force injury. Ironically, patrol squad size is typically 8-12 in Mesa, so this equates to almost a full squad of officers not on light duty with serious injuries.

Non-PJJ serious citizen injuries also plummeted from the historical period through the research period from 1.5 to 0.38 per month. It stands to reason that if you are slowing

down and selecting less strikes and/or better targeted strikes to suspects then you are not breaking your hand and you are also not breaking the suspect's nose or cheek. Non-PJJ serious injury to citizens is now even slightly lower than PJJ officers' rate (0.47 to 0.38). Ironically prior to the last four months of 2023 being tabulated, PJJ and Non-PJJ citizen major injuries were equal at 0.38. The difference was four major injuries reported by PJJ officers in the last 4 months, which was one more than the previous 10 months combined. The number of serious citizen injuries per year averages around nine total from non-lethal use of force incidents where it had averaged around twenty-two in the historical period. This represents thirteen citizens per year that the taxpayer will not be paying medical bills for or a lawsuit for a serious physical injury. The officer and citizen major injury reductions do not appear to be an anomaly as the numbers have been consistent throughout the research period. In addition, research of the St. Paul, MN police department shows similar results of fewer major injuries providing a cost savings to the agency through the implementation of PJJ in their agency (Huff, Zauhar & Agniel, 2024).
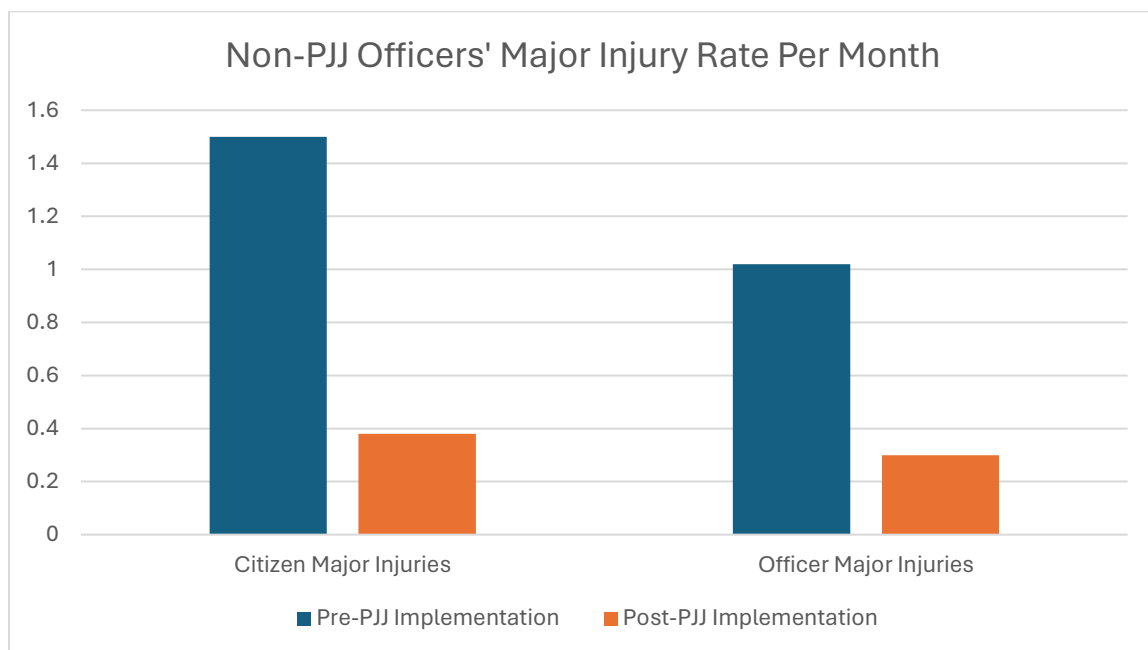
When a comparison of major injury rates to citizens and officers by non-PJJ trained police in the pre- and post-implementation period there is a clear and convincing difference. This represents a stunning and unexpected payoff that is coming solely off of a familiarization training given to non-PJJ officers on the segmenting technique. For the Mesa Police Department, a four- hour investment in familiarization training for officer safety reasons has paid massive dividends in reducing major injuries. These injury numbers for officers are still twice that of PJJ officers to give it further context.

What Police Jiu-Jitsu and enhanced decision-making scenario training has done for the Mesa Police Department is to instill in officers the calm, the confidence, and the efficient delivery of force that research shows come from martial arts training (Torres, 2018; Renden et al, 2015). It keeps the officer in an External Broad focus of attention which speeds perception and adjustment to error. This in turn allows officers to make more trained and experienced analytical decisions in times closer to decisions made intuitively. These analytical decisions are in essence the ability to effectively task switch in a short amount of time. Task switching is an executive function and often thought of as an indicator of intelligence. Intelligence has sometimes been defined as control over reflexive actions or 'mental self-management' (Thurstone, 1924; Sternberg, 1988). In this definition, task switching could be determined to be a measure of intelligence. Friedman found little relationship research between inhibiting, task shifting and intelligence (Friedman et al., 2006).

Looking at these results through the view of executive function there is a somewhat confirmatory, albeit not often researched, support for what it appears is cognitively occurring with PJJ and non-PJJ officers in use of force incidents. The silo trained non-PJJ

officer uses force as a one option application because they were not trained in a comprehensive decision-making manner. Control Holds and Strikes are taught in a similar training environment while modalities such as pepper spray, Taser, and impact weapons are taught completely separate. When a non-PJJ officer uses a control hold and it does not work, the task switching executive function goes to the only other similarly trained option which is a strike. If the officer has trained and applied this well enough over their career it may even appear as an intuitive decision delivered with speed. This is a 'natural' progression in the sense that these two methods may be taught similarly and in conjunction with each other, but with no other options. If these two methods do not work, the non-PJJ officer has to go back to the drawing board, or more precisely back to Internal Broad focus of attention where the time compressed and stressful situation with cognitively appear as if it is getting out of control. No other option will likely occur to the non-PJJ officer as they have not been trained to use, or planned to use, multiple force modalities in the event of failure. The PJJ officer who has been trained to make multiple decisions under stress, when a control hold does not work, will by executive function inhibit the impulse to use a strike as it may not be feasible and efficient. They will analyze and apply a different force modality without a sense that the situation is getting out of hand and with the cognitive ability to task switch between multiple applicable options. The time is saved, and the force is delivered more efficiently because the PJJ officer was taught to analyze and apply numerous options to numerous situations and therefore as planned for this eventuality. Because they have planned for it there is no need to go to an Internal Broad focus of attention which is tantamount to panic in the moment.

While we can measure through all of this is the police department's application of force. We can see what modalities are used and what injuries are caused, and we can see results from different types of training. What cannot be measured is how this increased efficiency and confidence may have stopped resistance or prevented aggression before it started. This is a factor that cannot be measured or known, but the odds are it is there. In theory, the decision-making prior to a non-PJJ officer use of force is not on a similar tract as the decision-making in use of force. By having PJJ officers make decisions in scenario-based training that set up, lead to, or lead away from a use of force the odds are great that the PJJ officer has planned in Internal Broad focus of attention possible eventualities for preventing or leading into use of force as necessary. The cost of silo training is that the lead up to the use of force is siloed also. The PJJ officer is better equipped to think through a use of force prior to its application also in order to prevent or select the most optimal resolution of the conflict.

CHAPTER 7

LIMITATIONS

The limitations on the application of this research are that the policies, procedures, training, and laws applicable for any use of force incident can vary from agency to agency, state to state, police academy to police academy. Agencies which may have different tools and different experiences with police use of force may have standards that prohibit or hinder using some of these methods.

There is also very little understanding within the field of law enforcement to what degree we can re-train officers taught with silo methods to now respond to critical incidents outside of the intuitive decision-making processes that they have used for years. There are certainly indications from the plummeting injury rates of non-PJJ officers that a simple introductory training into base PJJ application can pay dividends. However, without further research it is hard to determine the extent of this effect.

CHAPTER 8

CONCLUSION

This brings the issue full circle back to Marshal Wyatt Earp and his foreshadowing comments about time all the way back in 1910. Time really is the important issue here. The difference between an Intuitive and an Analytical Decision is time. The difference in the Quadrants of Attention is time. Internal Narrow focus is so imperceptible as to not even be noticed. Completing critical use of force tasks in sustained External Narrow shuts off time for perception and Analytical Decision-Making and we are stuck in the Intuitive Decision we made at first. Any time not spent in Internal Broad focus of attention before the fight, or any time spent in it during the fight can be deadly and can cause serious injuries unnecessarily. Marshal Earp was right. It is deliberate action faster than thought combined with the slow and analytical process of taking your time mentally. The time is only the split fraction of a second. Teaching officers to cycle through their force modalities and analyze their effectiveness quickly, adjusting to error and applying other methods as a result, led to more optimal application of force by the Mesa Police Department. What the officers have been given is decision-making processes throughout the incident and not just at the beginning. They have been given split fractions of seconds of time to decide. The tangible result from this imperceptible amount of time is less serious injuries to citizens and officers, which is very perceptible. While not all use of force is efficient or effective, training force as a series of decisions versus single modalities to be deployed in set circumstances results in much more optimal use of force decisions and results.

For the non-PJJ officers, the decision-making process just in the prone handcuffing technique they were taught has brought them split fractions of seconds forward in that

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aspect of their decision-making alone. They are not as efficient as PJJ officers are, but in the aspect that they were trained in, they are making less panicked and more analytical decisions. It is rewarding them with fewer major injuries.

Analytical decision-making takes time. Task switching also takes time. The necessity to train officers in methods which could employ multiple options of force requires an understanding that more robust decision-making leads to faster analysis of many options in order to employ the best options. Only when trained to make these decisions in the moment can we see PJJ officers mentally slow and muscularly faster than thought, just as Marshal Earp described.

REFERENCES

Alpert G., Dunham, R. (2004). *Understanding Police Use of Force: Officers, Suspects, and Reciprocity.* New York, NY. Cambridge University Press.

Alpert, G., Smith, M., Kaminski, R., Fridell, L., MacDonald, J., Kubu, B. (2011). Police use of force, tasers and other less-lethal weapons. *National Institute of Justice: Office of Justice Programs.* Washington, D.C.

Arnetz, B. B., Arble, E., Backman, L., Lynch, A., & Lublin, A. (2013). Assessment of a prevention program for work-related stress among urban police officers. *International Archives of Occupational and Environmental Health*, *86*, 79-88. doi:10.1007/s00420-012-0748-6.

Arnetz, B. B., Nevedal, D. C., Lumley, M. A., Backman, L., & Lublin, A. (2009). Trauma resilience training for police: Psychophysiological and performance effects. *Journal of Police and Criminal Psychology*, *24*, 1-9. doi:10.1007/s11896-008-9030-y

Ash, E., Xu, Y., Jenkins, A., Kumanyika, C. (2019). Framing use of force: An analysis of news organizations' social media posts about police shootings. *Electronic News.* 13(2). 93-107. doi: 10.1177/19312431198505239.

Bacon, S. J. (1974). Arousal and the range of cue utilization. *Journal of Experimental Psychology*, *102*, 81-87.

Barker, R.G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behavior.* Stanford University Press, Stanford, CA.

Bayes, T., Price, R. (1763). An essay towards solving a problem in the doctrine of chance. *Philosophical Transactions of the Royal Society of London*. 53: 370-418. doi:10.1098/rstl.1763.0053

Bellini-Leite, S. (2022). Dual process theory: Embodied and predictive; symbolic and classical. *Frontiers in Psychology: Hypothesis and Theory.* 13(805386). doi: 10.3389/fpsyg.2022.805386.

Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behavioral Brain Science.* 36, 233-253. doi:10.1017/S0140525X12000477.

Crawford, C., Burns, R. (2008). Police use of force: Assessing the impact of time and space. *Policing and Society.* 18(3). 322-335.

Dhabhar, F. (2018). The short-term stress response- Mother nature's mechanism for enhancing protection and performance under conditions of threat, challenge, and opportunity. *Frontiers in Neuroendocrinology.* 49(2018). 175-192.

Donovan, K., Klahm, C. (2015). The role of entertainment media in perceptions of police use of force. *Criminal Justice and Behavior.* 42(12). 1261-1281. Doi: 10.1177/0093854815604180.

Dror, I. (2020). Cognitive and human factors in expert decision-making: Six fallacies and the eight sources of bias. *Analytical Chemistry.* 2020(92). 7998-8004.

Engel, R.S., McManus, H.D., Herold, T.D. (2020). Does de-escalation training work? A systematic review and call for evidence in police use-of-force reform. *Criminology and Public Policy* 19, 721-759. doi: 10.1111/1745-9133.12467.

Evans, J. St. B. T. (2003). In two minds: Dual-process accounts of reasoning. *Trends in Cognitive Sciences*, 7, 454 – 459.

Fawcett, J., Peace, K., Greve, A. (2016). Looking down the barrel of a gun: What do we know about weapon focus effect. *Journal of Applied Research in Memory and Cognition.* 5(2016). 257-263.

Frankenhuis, W., de Weerth, C. (2002). Does early-life exposure to stress shape or impair cognition. *Current Directions in Psychological Science.* 22(5). 401-412. doi: 10.1177/0963721413484324.

Friedman, N., Miyake, A., Corley, R., Young, S., DeFries, J., Hewitt, J. (2006). Not all executive functions are related to intelligence. *Psychological Science.* 17(2). 172-179.

Gaub, J.E., Todak, N., White, M.D. (2021). The distribution of police use of force across patrol and specialty units: A distribution of police use of force across patrol and specialty units: A case study in BWC impact. *Journal of Experimental Criminology.* (2021)17. 545-561.

Gibson, J. (1966). *The senses considered as perceptual systems.* Houghton Mifflin, Boston, MA.

Gibson, J., Gibson, E. (1955). Perceptual learning: Differentiation or enrichment? *Psychological Review.* 62(1). 32-41.

Gifford, R. (2014). Environmental psychology matters. *Annual Review of Psychology.* 2014(65). 541-579. doi: 10.1146/annurev-psych-010213-150488.

Graham v. Connor, 490 U.S. 386 (1989), United States Supreme Court. Library of Congress, Washington, D.C.

Heft, H. (2001). *Ecological psychology in context: James Gibson, roger barker, and the legacy of william james's radical empiricism.* Erlbaum Associates, London.

Hickman, M.J. (2005) *State and Local Law Enforcement Training Academies.* Washington, D.C.: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.

Hicks, W.E. (1952). On the rate of gain of information. *Quarterly Journal of Experimental Psychology.* 4: 11-26.

Hines, K., Porter, L.E., Westera, N. J., Alpert, G.P., Allen, A. (2018). Exploring police use of force decision-making processes and impairments using a naturalistic decision-making approach. *Criminal Justice and Behavior.* 45(11) 1782-1801. doi:10.1177/0093854818789726.

Hockey, G. R. J. (1970). Effect of loud noise on attentional selectivity. *Quarterly Journal of Experimental Psychology*, *22*, 28-36.

Honig, A., Lewinski, W. (2008). A survey of the research on human factors related to lethal force encounters: Implications for law enforcement training, tactics, and testimony. *Law Enforcement Executive Forum.* 8(4). 129-154.

Hope, L., Lewinski, W., Dixon, J., Blocksidge, D., Gabbert, F. (2012). Witnesses in action: The effects of physical exertion on recall and recognition. *Psychological Science.* 23(4). 386-390. doi: 10.1177/0956797611431463.

Hsieh, S. (2002). Task shifting in dual-task settings. *Perceptual and Motor Skills*, 94(2), 407.

Huff, J., Zauhar, S., Agniel, D. (2024). From pain compliance to leverage-based control: Evidence of reduced use of force severity and injuries following police training. *Policing: A Journal of Policy and Practice.* 2024(18). 1-11.

Hyman, R. (1953). Stimulus information as a determinant of reaction time. *Journal of Experimental Psychology.* 45: 188-196.

Johnson, R. (2018). Exploring the validity of behavioral cues predictive of physically resisting arrest. *Journal of Police and Criminal Psychology.* (2019)34, 134-144.

Johnson, R., Aaron, J. (2013). Adults' beliefs regarding nonverbal cues predictive of violence. *Criminal Justice Behavior.* 40: 811-894.

Justification; use of physical force in law enforcement. *Arizona Revised Statute Title 13, Section 409* (2022). https://www.azleg.gov/ars/13/00411.htm.

Kahneman, D. (2011). *Thinking fast and slow.* New York: Farrar, Straus, and Giroux.

Kahneman, D. (2003). A perspective on judgment and choice. *American Psychologist.* 58(9). 697-720. doi: 10.1037/0003-066x.58.9.697.

Kahneman, D. (2002). Maps of bounded rationality: A perspective on intuitive judgment and choice. *Nobel Prize Lecture.* 8, 449-489.

Kahneman, D., Tversky, A. (1974). Judgment under uncertainty: heuristics and biases. *Science.* Vol. 185(4157) 1124-1131. doi: 10.1126/science.185.4157.1124

Klein, G. (2015). A naturalistic decision-making perspective on studying intuitive decision making. *Journal of Applied Research in Memory and Cognition.* 4(2015). 164-168.

Lake, S. (1930). Guns and gunfighters. *The Saturday Evening Post.* November 1, 1930.

Lewinski, W., Hudson, W., Dysterheft, J. (2014). Police officer reaction time to start and stop shooting: The influence of decision-making and pattern recognition. *Law Enforcement Executive Forum.* 14(2).

Levy, J., Pashler, H., Boer, E. (2006). Central interference in driving: Is there any stopping the psychological refractory period? *Psychological Science.* 17(3). 228-235.

Lilienfeld, S. & Landfield, K. (2008). Science and pseudoscience in law enforcement: A user-friendly primer. *Criminal Justice and Behavior.* 35(10). 1215-1230.

MacDonald, J., Kaminski, R., Smith, M. (2009). The effects of less-lethal weapons on injuries in police use of force events. *Research and Practice.* 99(12). 2268-2274.

Maguire, E., Paoline, E. (2023). Non-fatal injuries among police officers during use-of-force encounters. *Occupational Medicine.* Vol. 73(8), 479-483.

Martin, J. (2016). Applied human error theory: A police taser-confusion shooting case study. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting.* doi: 10.1177/1541931213601108.

Miethe, T., Venger, O., Lieberman, J. (2019). Police use of force and its video coverage: An experimental study of the impact of media source and content on public perceptions. *Journal of Criminal Justice.* 60 (2019) 35-46.

National Institute of Justice. (2009). The use-of-force continuum. August 3rd, 2009. https://nij.ojp.gov/topics/articles/use-force-continuum.

Nideffer, R.M. (1976). Test of attentional and interpersonal style. *Journal of Personality and Social Psychology.* 34, 394-404.

Nideffer, R.M. (1990). Use of the test of attentional and interpersonal style in sports. *The Sports Psychologist.* 4(3). 285-300. doi: https://doi.org/10.1123/tsp.4.3.285

Nieuwenhuys, A., Savelsbergh, G., Oudejans, R. (2015). Persistence of threat-induced errors in police officers' shooting decisions. *Applied Ergonomics.* 48(2015). 263-272.

Norman, D.A., Shallice, T. (1980). Attention to action: willed and automatic control of behaviour. *Cognitive Neuroscience: A Reader.*

Obasogie, O., Newman, Z. (2017). Police violence, use of force policies, and public health. *American Journal of Law and Medicine.* 43(2017), 279-295.

Paoline, E., Terrill, W., Ingram, J. (2012). Police use of force and officer injuries: Comparing conducted energy devices to hands and weapons-based tactics. *Police Quarterly.* 15(2). 115-136.

Peirce, C.S. (1883). *A Theory of Probable Inference.* John Hopkins University, Boston MA.

Police Executive Research Forum. (2012). *Critical Issues in Policing Series: An Integrated Approach to De-Escalation and Minimizing Use of Force.* Washington, D.C.

President's Task Force on 21st Century Policing (2015). Final report of the president's task force of 21st century policing. *Office of Community Oriented Policing.* Washington, D.C.

Roberts, A.P.J., Cole, J.C. (2018). Naturalistic decision making: Taking a (cognitive) step back to take two steps forward in understanding experience-based decision. *Journal of Applied Research in Memory and Cognition.* 7(2018). 70-81.

Renden, P., Landman, A., Savelsbergh, G., Oudejans, R. (2015). Police arrest and self-defence skills: Performance under anxiety of officers with and without additional experience in martial arts. *Ergonomics.* 58(9). 1496-1506.

Sandal, W., Martaindale, M.H., Blair, J.P. (2020). A scientific examination of the 21-foot rule. *Police Practice and Research.* 2-16. doi: 10.1080/15614263.2020.1772785.

Schliemann, A. D., & Carraher, D. W. (2002). The evolution of mathematical reasoning: Everyday versus idealized understandings. *Developmental Review*, 22, 242–266.

Sharps, M.J. (2022). *Processing Under Pressure: Stress, Memory, and Decision-Making in law Enforcement (3ʳᵈ Edition).* Flushing, NY. Looseleaf Law.

Shomstein, S., Yantis, S. (2004). Control of attention shifts between vision and audition in human cortex. *Journal of Neuroscience, 24*(47), 10702-10706.

Simons, D., Chabris, C. (1999). Gorillas in our midst: sustained inattentional blindness for dynamic events. *Perception.* 1999(28). 1059-1074.

Sternberg, R.J. (1988). *The triarchic mind: A new theory of human intelligence.* New York: Viking Penguin.

Strayer, D. L., & Johnston, W. A. (2001). Driven to distraction: Dual-task studies of simulated driving and conversing on a cellular phone. *Psychological Science*, *12*, 462-466.

Stromwall, L., Granhag, P. (2003). How to detect deception? Arresting the beliefs of police officers, prosecutors, and judges. *Psychology Crime Law* 9: 19-36.

Taylor, P. (2020). Engineering resilience into split-second shoot/no shoot decisions: The effect of muzzle-position. *Police Quarterly.* 0(0). 1-20.

Taylor, P., Sipe, P., Bartel, L. (2021) Lost in transition: The effects of transitioning between firearms and electronic control devices on perception-response times. *The Police Journal: Theory, Practice and Principle.* 0(0) 1-14.

Terrill, W., Paoline, E.A., Manning, P.K. (2003). Police culture and coercion. *Criminology.* 41(4). 1003-1034.

Thurstone, L.L. (1924). *The nature of intelligence.* London: Kegan Paul, Trench, Trubner & Company.

Torres, J. (2018). Predicting law enforcement confidence in going 'hands-on': The impact of martial arts training, use of force self-efficacy, motivation, and apprehensiveness. *Police Practice and Research.* 21(3). doi:10.1080/15614263.2018.1500285.

Tueller, D. (1983). How close is too close? *S.W.A.T. Magazine.* March 1983.

Tversky, A. and Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185: 1124–31.

Use of Force. Department Policy Manual 2.1.1 (2023). *Mesa Police Department Policy Manual.* Mesa, Arizona Police Department.

Weber, J., Angerer, P., Apolinario-Hagen, J., Boylan, J. (2022). Physiological reactions to acute stressors and subjective stress during daily life: A systematic review on ecological momentary assessment studies. *PloS One*. 17(7).

White, M., Mora, V., Orosco, C. (2019). Exploring variation in police perceptions of de-escalation: Do officer characteristics matter? *Policing*. 15(2). 727-740. doi: 10.1093/police/paz062.