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Using Simulation For Law Enforcement De-escalation Training

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USING SIMULATION FOR LAW ENFORCEMENT DE-ESCALATION TRAINING

by

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ABSTRACT

Law enforcement needs simulation practice tailored to de-escalation skills. Law enforcement officers spend most of their training time practicing how to use force appropriately and very little time practicing how to avoid using force. There is little research into the best ways for law enforcement to reduce their use of force and the best ways to provide training to individuals to coach them to avoid using force. There are many training programs promoting de-escalation techniques, but there is little research into the effectiveness of these programs beyond the ability of individuals to perform the skills that are trained. There is little to show that using these skills reduces crime, reduces the need for incarceration, reduces the level of violence, or improves the communities where they are used. The scope of this project addresses a small part of this gap by examining different ways simulators can be used to provide practice in the skills that are taught. This dissertation contributes to the field of simulation by demonstrating how virtual reality can address deficits in law enforcement training. It does so by studying which techniques are most appropriate in some scenarios and how to better train officers to use them. This project looks at different ways of allowing police officers to practice de-escalation skills to see if these have any bearing on an officer's approach to de-escalation and if the officer responds positively to the practice. This research does not attempt to take the next step of measuring the use of these skills outside the training environment. The results indicate active-duty officers have a positive response to any attempt to practice or promote de-escalation and are especially positive about the potential for training in realistic, situationally appropriate virtual environments.

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CHAPTER ONE: INTRODUCTION

1.1 Need for Study

In the wake of police involved shootings, there has been a call to provide de-escalation training to the law enforcement community (Cava, 2021; Gillers, 2020; Lee, 2018). However, there is a paucity of research regarding such training. The contents of the training, measurement of its effectiveness, and the expected outcomes of the training have received scant attention in the academic literature. This chapter attempts to highlight what has been done and to illustrate why more work is needed. Without a better understanding of de-escalation training, we cannot know if it will help reduce the problem of police officers escalating situations involved citizens, most of whom do not pose a threat to others, including the officers. This is especially worrisome in the cases of citizens who may express themselves in non-standard ways, e.g., with seemingly inappropriate verbal utterances or unexpected nonverbal gestures.

Better understanding of this training can show its potential to reduce police shootings of suspects and move sentencing (penalties) from the streets into the courtroom.

In the past decade there has been an outcry of citizen voices expecting law enforcement to use less force and to be increasingly capable of defusing situations without resorting to violence. In response to police shootings, many have called for the use of de-escalation training to better prepare law enforcement to handle situations where force may not be appropriate. Despite this outcry, there is limited research into how to perform these de-escalation activities and how to train officers on these skills. The literature in chapter 2 starts with an overview of the practice of law enforcement de-escalation and the research into this practice.

If we want police to minimize violence, then we need to understand how violence is avoided and provide training in those behaviors. We need to investigate behaviors that prevent

situations from escalating and investigate training methods to instill those behaviors in the individuals that make up the police force. Training obtained at the start of a law enforcement career needs to be supplemented and refreshed (Charles, 2000; Martin, 2020). It needs to be supplemented because the practice of policing and the knowledge of one's community can give an individual insight and understanding to better integrate peacekeeping skills from a training program. It needs to be refreshed because social scientists continue to study human relations and learn more about how to peacefully resolve conflict and about how to build relationships (Bernardet et al., 2011; Greene & Burleson, 2003; Kane, 2002; Pruitt & Carnevale, 1993; Wolfe, Rojek, McLean, & Alpert, 2020). It needs to be refreshed because laws, policies, and the perception of the community towards law enforcement all change with time. It needs to be refreshed because the community where policing happens changes during an officer's career. In addition, changing technology may give officers new capabilities that can reduce hazards, promote officer safety, and reduce the risk of violence in the community.

1.2 Statement of Problem

Simulation is an example of technology whose use can has recently increased in efforts to improve police training. The use of simulation for law enforcement de-escalation training is less prevalent than the use of simulation for other law enforcement skills. In part, the minimal use of simulation for these skills occurs because de-escalation and force avoidance are not large parts of the training curriculum for police agencies. As a result, there is less of a market for developing training scenarios in law enforcement de-escalation. Research into de-escalation and social skills best practices will help agencies understand what works. Adding social skills training to accreditation programs and to training curricula will help develop the market for this type of scenario and this type of trainer.

1.3 Research Questions

If society wants the police to minimize violence, then that society needs to give them training in the best ways to avoid such violence. As the voice of authority and representatives of the community, the police need to be responsible for taking actions to preserve life and well-being for all. In entrusting them with this responsibility, the community needs to give them tools to avoid provoking others to violence, to calm those who are in crisis, and to promote peaceful resolution of disagreements. Training is an essential means of preparing police officers to undertake this work. This study seeks to look at how de-escalation training affects police officer behavior. Primarily it looks at how the use of simulation (or virtual reality) can improve law enforcement ability to de-escalate crisis situations. In seeking to improve abilities, a means to measure the ability level or the change in ability level must be established, so a secondary challenge is to examine ways to propose and examine ways to assess de-escalation skills in the simulated environment. Chapter 3 develops hypotheses relevant to these questions and presents the methods used to address this research topic.

1.4 Contributions of this Study

This study highlights the need for consistent measurement tools regarding de-escalation success. The ability to provide training and practice with an expectation of decreasing the use of force implies we regularly measure the level of force used at some level of granularity where that decrease can be measured. This study also highlights ways that existing technology may be applied to the challenge of de-escalation practice. While scenarios were crafted to allow for de-escalation practice, they were also crafted to take advantage of large investments in technology which are already in use.

1.5 Dissertation Organization

This dissertation begins with a literature review focused on de-escalation training in the law enforcement environment. It then briefly reviews adult learning with the use of simulation in other areas focusing back to the use of simulation within law enforcement for training other than de-escalation. Making use of existing simulation technology, the methods section describes two studies examining ways that de-escalation can be practiced within local law enforcement training. This includes comparing training in a simulator to training delivered via other means. A comparison between police responses for de-escalation and those of members of the local community is discussed as part of the ways of measuring de-escalation practices. The results of different approaches to de-escalation training are presented in Chapters 5 and 6. Chapter 5 focuses on survey responses regarding tactics for de-escalation. Chapter 6 presents the analysis of video recordings for one police department before and after their training sessions. Chapter 7 is a discussion of the findings and directions for further research. The final chapter covers some overall conclusions.

1.6 Definition of Terms

De-escalation The International Association of Chiefs of Police (IACP, 2020) defines de-escalation as "Taking action or communicating verbally or non-verbally during a potential force encounter in an attempt to stabilize the situation and reduce the immediacy of the threat so that more time, options, and resources can be called upon to resolve the situation without the use of force or with a reduction in the force necessary."

Training A set of activities undertaken to improve performance in some skill or activity. Training may involve physical activity, knowledge of material, or sharing of experiences. Training differs from other types of learning by the emphasis of transfer to a situation where the training will be applied (Clark, 2008, p. 234).

Simulation The term is used for many different purposes with definitions that vary by use. The description of a flight simulator as "a means of performance enhancement through the more rapid accumulation of experience (Prothero, 1991)," is applicable to how simulation may be used for law enforcement training. The simulation allows a person to safely experience something that could be dangerous or impractical in the real setting.

CHAPTER TWO: LITERATURE REVIEW

This chapter covers relevant literature from several different domains. After a brief overview of current police training in the U.S., it delves into the limited body of research regarding law enforcement de-escalation practice and training. In part this is to address a number of comments received during this research regarding how obvious or well-known de-escalation practices are considered by those outside the law enforcement community. The third section discusses how simulation is integrated as part of adult learning. Finally, the chapter concludes with areas where simulation is being employed in police training.

2.1 Brief Overview of Police Training

Police training is addressed in two ways. There is initial cadet training, usually in some type of police academy, which takes place prior to the start of a law enforcement career. There are also various types of refresher training activities which occur during their time in a police force. The specific requirements for each vary across states and localities. In Florida, law enforcement academies are required to provide 770 hours of training to basic recruits (Florida Department of Law Enforcment, 2021). Once officers are part of a police department in Florida they can access online refresher training to complete 40 hours of retraining every 4 years (Florida Department of Law Enforcment, 2022).

Reaves (2016) analyzed Bureau of Justice Statistics surveys to find basic training programs spent an average of 23 hours of training on domestic violence and mental illness as opposed to 168 hours of training on use of force. Tactics for de-escalation may have been included in the hours for use of force but the survey did not have sufficient detail to determine hours related to de-escalation. Further results focused on training academies showed an average of more than 40 hours of instruction on community policing. Furthermore, more than half of the

academies used a training model which is stress oriented. This model of training may predispose individuals to avoid de-escalation tactics, which take longer and may keep the student under stress for a longer period. Updates to this data in 2018 (the most recent year for which data is available) indicate that over 90% of trainees were receiving some type of de-escalation training with approximately 18 hours applied to de-escalation topics compared to 73 hours for firearms skills (Buehler, 2021).

De-escalation is a relatively new tactic for law enforcement, which may account for its limited mention in the academy curriculum. Many of the topics covered may support de-escalation without explicitly using that term. A survey in 2016 indicated cadets receive approximately ten hours of training related to de-escalation (Dayley, 2016). This is a step forward from a time when de-escalation may have been seen as just a buzzword (McFarlin, 2017).

2.2 Literature on Law Enforcement De-escalation Practice

2.2.1 Literature Review on Mental Health, Crisis Intervention (pre 2016)

At the beginning of the 21st century studies were undertaken to improve the ability of law enforcement to respond to individuals with mental health issues (Shinder, 2001). Over time a variety of curriculum were developed centered around crisis intervention. The recommendations came from a variety of approaches and were not consistent across curriculum (Oliva, Morgan, & Compton, 2010). Some were specific to the type of crisis such as hostage taking (Van Hasselt, Romano, & Vecchi, 2008) or schizophrenia (Compton et al., 2011). There is a body of work modeled after the Memphis Crisis Intervention Training (CIT) which emphasizes de-escalation and a closer connection to local mental health resources (Oliva et al., 2010). These officers

receive specialized training in rapid evaluation of crisis situations, de-escalation techniques, and procedures to facilitate referral to mental health resources rather than arrest.

Initially much of the training regarding de-escalation related to mental illness and crisis intervention training (Hansson & Markström, 2014; Krameddine, 2014). The Police Executive Research Forum report on de-escalation emphasized the importance of policy and training to minimize use of force. This included a discussion on CIT and on the desirability of taking time to assess situations before moving into using force (PERF, 2012). In addition, work with the military identifies tactics that can be used to defuse tense situations when one is an armed authority figure (Hubal et al., 2015).

A general distrust between the police and academics combined with limited resources made it difficult to conduct research into the quality and effectiveness of these training programs. Yet there is a critical need to evaluate the effectiveness of these curricula (Bradley & Connors, 2007). Initial evaluations of CIT trained officers indicated that they felt less inclined to use force to resolve scenarios than similar officers without CIT training (Compton et al., 2011). Evaluation of CIT training compared to other training showed that CIT training improved de-escalation skills as measured by the evaluators (Helfgott, Strah, Atherley, & Neidhart, 2020; Pelfrey & Young, 2020). However, there remains little understanding of the effects of these training programs on officer and citizen interactions (Dayley, 2016; Rockwell, Bishopp, & Orrick, 2021).

In this same period there is discussion on the importance of "procedural justice". Procedural justice is intended to increase the legitimacy of police authority and cause people to be more compliant with police officers (Colin Bolger & Walters, 2019; Gau & Brunson, 2010). The principles of procedural justice include treating community members in a respectful manner, providing citizen participation prior to police decisions, and maintaining fairness when making

decisions (Rosenbaum & Lawrence, 2017). This set of principles has some overlap with the development of tactics for de-escalation.

2.2.2 Literature on Procedural Justice (PERF, IACP) – 2016-2019

In 2016 the Police Executive Research Forum published Guiding Principles on Use of Force (PERF, 2016). The fourth principle provided is "Adopt de-escalation as formal agency policy." In addition to the policy change this document goes on to recommend de-escalation training and a focus on tactics for de-escalation in more general circumstances than crisis intervention. Unfortunately, this document provides limited insight into what this training would entail or what these tactics might be. The fifth principle is the application of a decision making model which may help to locate courses of action that would reduce the need to use force (PERF, 2016).

Dayley (2016) discussed the need for alternatives to use-of-force training to promote judgement and decision making to avoid escalating situations. After surveying police agencies regarding their training, Dayley presents a solid explanation of CIT and notes the lack of research regarding its effectiveness (Dayley, 2016).

Rather than explicitly training on de-escalation, there is a growing discussion of improving social skills and interpersonal communication for law enforcement (McLean, Wolfe, Rojek, Alpert, & Smith, 2020; Rosenbaum & Lawrence, 2017; Wolfe et al., 2020). This approach included formal training courses and informal sharing of expertise by officers. Goolsby (2017) describes how he came to create such a course and the communication tactics he recommends.

Existing de-escalation training is associated with mental health crises rather than social interaction. One such program is DEFUSE (Hacker, 2017). Hacker (2017) presents an

evaluation that shows officers completing the training have a better understanding of mental health and increased skills in recognizing behaviors to facilitate interactions with individuals who are mentally ill. It is not clear from this research that the behaviors would necessarily translate to improved interactions with individuals who are not mentally ill. Furthermore, the analysis does not include a follow-up showing that officers successfully employed these techniques outside of the training environment.

Rosenbaum and Lawrence (2017) discuss the transition from CIT to a wider range of interpersonal skills training along with the philosophy of "procedural justice" in the introduction to a paper on Quality Interaction Program (QIP). This study included a randomized control treatment of cadets in Chicago's Education and Training academy where one set of cadets received approximately 20 hours of additional instruction of training related to skills associated with procedural justice. The five measures evaluated in this study are (1) respectful attitudes when interacting with the community; (2) supportive behavior during community encounters; (3) procedural justice intentions; (4) communication skills and emotional intelligence; and (5) attitudes toward the use of force. The group experiencing the QIP training expressed less intention to use force and were seen as displaying more respectful behavior. QIP training does not focus on de-escalation, but the skills discussed in this training include many that are associated with de-escalation.

Todak (2017) suggests five verbal de-escalation tactics Verbal De-Escalation Tactics: Humanity, Listen, Compromise, Honesty, and Empower. These coincide with some of the principles of procedural justice and with some of the skills for crisis intervention. Humanity, as a tactic, includes the idea of the dignity of all individuals and treating people as equals worthy of respect. The Listen tactic allows the officer to gain information while also showing respect for

the viewpoints of others. It is important to use active listening and give the other full attention. The Compromise tactic involves looking at decisions that are within the officer's control and consulting with affected individuals for a result that will achieve justice while minimizing the harm to all involved. This may involve minor decisions such as where a discussion will take place or more involved choices such as the charge used for an arrest. Honesty seems straightforward, but the police officer has a far greater understanding of the criminal justice system than most people. Often, they need to honestly explain the process to victims and suspects to gain compliance. Finally, Empower is similar to the procedural justice idea of giving citizens a voice in decision-making. In de-escalation this tactic provides the individual with ways to gain more control over their own crisis. Empowerment can involve helping a person to calm down, giving the person options, and showing them how cooperation will lead to a better outcome. All these tactics can work together to improve relations between individuals and the police.

Better de-escalation skills may be associated with more empathy for the community population encountered by the police. An improvement in de-escalation knowledge was associated with holding more positive attitudes regarding youth during training focused on policing teens (Aalsma, Schwartz, & Tu, 2018; Schwartz, Pate, Tu, & Aalsma, 2016)

The practice of de-escalation spans professions outside of law enforcement. De-escalation techniques are often associated with mental health professionals and studies evaluating the effectiveness of de-escalation are often centered around a patient. However, law enforcement is one of the professions outside of mental health that makes up the participants in a study evaluating the expected effectiveness of a set of 92 different de-escalation techniques (Spielfogel & McMillen, 2017). Using group concept mapping two cluster analysis maps

showed different patterns between mental health professionals and those outside of mental health, but it did not further breakdown the professions.

Todak (2017) observes that officers are already employing de-escalation tactics even without formal training. These tactics include emphasizing humanity, listening to other perspectives, compromise on charges, maintain honesty, and empower citizens in the process. Given that these tactics are in use, they should be evaluated for effectiveness and used as the basis for future training curriculum. This study describes the use of de-escalation techniques as a way of preventing a situation from escalating. In this understanding, the same tactics can be used with individuals who are not in emotional distress and may prevent a situation from escalating into a crisis. In contrast to some of the research on training de-escalation, this study found older more experience officers were more likely to employ de-escalation tactics successfully. Building on this set of five tactics, Todak and James (2018) present eight de-escalation tactics with the labels: Respect, Honesty, Calm, Shoes, Compromise, Listen, Human, Empower. Respect is called out separately to emphasize the importance of treating others as humans worthy of respect. Honesty may seem self-explanatory, but often officers are hesitant to be honest about the constraints on them. Being honest regarding their obligations may induce more cooperation from others. Calm involves the officer's regulation of their own emotions which can be a challenge when an escalating individual is insulting or belittling. Shoes relates to the saying "put yourself in their shoes" involving the demonstration of empathy. Compromise, Listen, and Empower are described above. The Human category focuses more on reducing the power imbalance between the officer and the citizen.

The growing list of tactics associated with de-escalation indicates the need for more research in this area. While the definition of de-escalation for law enforcement may be

solidifying around that presented by IACP definition, “Taking action of communicating verbally or non-verbally during a potential force encounter in an attempt to stabilize the situation and reduce the immediacy of the threat so that more time, options, and resources can be called upon to resolve the situation without the use of force or with a reduction in the force necessary (IACP, 2020),” but the ways of achieving this goal are still under investigation. There are many tactics that are currently associated with de-escalation and officer safety but are not included in the list of tactics above. To improve de-escalation training, the gap between what is known and what is currently being performed needs to be clarified.

2.2.3 Recent Developments in De-escalation (2020 – 2022)

Bennell et al. (2020) conducted a narrative literature review to identify practices for training relating to de-escalation and a reduction in use of force. This review identifies nine principles relating to the development of training for law enforcement including 1. Adult learning principles; 2. Development of relevant competencies; 3. The use of stressful, dynamic scenarios 4. Diverse training scenarios; 5. Massed versus spaced practices; 6. Aligning training format with learning objectives; 7. Appropriately ordering training; 8. Sufficient training time and 9. Well-designed teaching materials.

At the same time Engel, McManus, and Isaza (2020) are looking for more evidence to support training approaches in use by the police. Although there is some consensus regarding the definition of de-escalation there is little empirical evidence regarding the effectiveness of de-escalation tactics and how they may affect officer safety. The article examined research on body worn cameras but could not conclude that outfitting officers with them would significantly reduce the use of force by the officers. In examining de-escalation training Engel et al. (2020) found they had not been subjected to rigorous testing and there was little evidence regarding

their impact. Implicit bias training was reported as having minimal impact on changes in behavior in other disciplines and no experimental evaluations of this training for police officers.

Updated information from PERF (2020) indicates a similar emphasis on the need to train on communication and critical thinking skills. Officers are encouraged to ask questions in keeping with the first critical decision-making step of collecting information. The report includes the recommendation of asking "how" and "what" questions to elicit more information. In addition, there is a recommendation to speak in a manner that is calm and peaceful in order to reduce the tension in a crisis. The report noted the need for ongoing training especially for small to midsized agencies that have limited access to training resources.

Good communication is widely considered to be essential to de-escalation. Many officers may believe they are skilled at communication (Wolfe et al., 2020). This belief may come from often interacting with others who know what types of behaviors are expected. These officers may not have practice in defusing the situations that can occur when others behave unexpectedly. Bias awareness may fit with social skill improvement as improving an officer's ability to de-escalate a situation (Worden et al., 2020). Skills in social interaction are developed through the type of deliberate repetitive practice that is needed to build other skills (Wolfe et al., 2020). It may be easier to see how improvements are made in physical skills such as using a weapon and more difficult to measure the improvement in social skills.

Ehrman (2021) looked at the results of California legislation imposing de-escalation training requirements on law enforcement agencies. A qualitative analysis with key leaders in affected law enforcement agencies found the agencies were already conducting this training. The legislation did little to advance the quality of the training or to connect the provided training

to any measure of resulting behavior change. There is little to show the current methods of de-escalation training are effective in reducing the use of force by the population being trained.

Comparison of outcomes from a department with de-escalation training to other departments without that training is a way of judging the success of the training (Goh, 2021). Before and after training comparison of individual officers did not show statistically significant results. However, comparing Camden, New Jersey police department to other large departments in New Jersey showed decreases in the use of force following the training. Discussion in this study includes the unique nature of police localities and how studies may have different results based on where they are conducted.

In 2022 a literature review and subject matter expert interviews identified knowledge, skills, and abilities (KSAs) associated with successful police management of potentially volatile interactions. The identification of these KSAs may serve as a way to focus training curriculum development and measures of effectiveness of the training. In addition to procedural justice and communication skills previously discussed, the KSAs include emotion and behavior regulation, decision-making, and perceptual skills (Bennell et al., 2022). Like many of the preceding articles, this study calls for more empirical information regarding the effectiveness of de-escalation training.

Engel, Corsaro, Isaza, and McManus (2022) present an empirical study looking at use of force incidents and the changes in use of force in practice that result from de-escalation training. PERF is implementing Integrating Communications, Assessment, and Tactics (ICAT) training. This training includes critical thinking skills, communication skills, operational tactics, crisis recognition and intervention techniques. Empirical evidence that de-escalation practices work is provided by analyzing use of force counts during the before and after the ICAT training. A

decrease in the number of people experiencing force used against them by the police was found across all the levels of force used except officer-involved shootings. Given the limited number of officer-involved shootings compared to the other types of force and the general attention paid to officer-involved shootings, this examination of change across the use of force spectrum offers great insight into the effects of de-escalation training. It may be improving procedural justice and moving toward less overall violence. Work examining the changes across the use of force spectrum is a start to filling the gap in the understanding of de-escalation practices.

2.3 Use of Simulation for Training

Simulation comes in many forms from board games to mathematical calculations to immersive virtual reality. All of these forms may be useful for training purposes. The nature of the simulation employed in training is dependent upon the training curriculum. As can be seen from the last section, the curriculum for de-escalation is in flux and subject to change as more knowledge of this area is developed. This curriculum should also be informed by principles of adult learning and professional development. Some background on adult learning is described as a means of introducing the many ways simulation is being utilized in the training field.

2.3.1 Adult Learning

Training is a form of adult learning. It is often associated with professional development or organizational change. There are numerous theories surrounding the best ways to train adults and have new knowledge and skills transfer to the desired organizational setting.

Andragogy, a term originally used by Knowles in 1973 is presented as describing a process for learning focused on adults as opposed to children (Knowles, Holton, & Swanson, 2015). The six principles for this model are:

1. Adults need to know the reason for learning

2. Adults have a self-concept that includes their sense of responsibility
3. Adults bring their own prior experience to the learning environment.
4. Adults need to be at a point in life where the learning material is relevant.
5. Adults need to understand how the material relates to their interests.
6. Adults have a variety of internal and external motivations for learning.

In the decades since Kowles, science has developed a better understanding of the human brain and the science of learning. Experiential learning was described by Kolb initially in 1984 includes four learning modes: assimilator, converger, accommodator, and diverger. These were further refined into nine learning styles (Kolb, 2015). While people may have preferences in their learning styles, they can be encouraged to use different approaches based on the learning situation. Learning through experience involves reflecting on the experience and how it can be incorporated into a person's knowledge. Boud emphasizes the need to reflect during preparation for a learning event as well as after the event (K. Taylor & Marienau, 2016, pp. 258-260). Ambrose and Ambrose (2010), present seven Principles for Learning:

1. The prior knowledge of an individual can help or hinder learning.
2. The way an individual organizes information affects their ability to learn and apply knowledge.
3. The motivation of an individual arbitrates their learning.
4. Mastery is developed when an individual acquires skills, integrates them, and is able to apply them appropriately.
5. Learning is facilitated through Goal - directed practice combined with targeted feedback regarding skill acquisition.

6. The progress of each person combines to alter the learning environment.

7. Adults become self - directed learners when they regulate their path to new abilities.

When creating training for professional development there are key themes that occur across professions. Individuals should have the opportunity to learn new physical skills or techniques, potentially replacing previous habits. People should be able to have new experiences to gain fresh insight and perspective. Professionals need to be able to have directed practice to gain mastery and maximize their opportunity for perfection. The learning environment should increase the motivation to perform well. Finally, professional development can help to build judgement providing self-direction for future learning and increasing competence at applying learned skills. Simulation has been used to support all these needs.

2.3.2 Learn new physical skills

Possibly one of the mostly commonly thought of simulators is the flight simulator to practice flying. These started with Link trainers in the 1930s (ASME, 2022) and have evolved into some of the most sophisticated training devices available. Improvement comes from increasing technology, but also from repeated questioning of the value provided by the training device. The military has been key in encouraging research into what factors the simulator needs to replicate in order to provide the best training. As early as 1973, engineers were looking at the accuracy of visual cues in flight simulators to provide pilots the best training for landing on an aircraft carrier (Aronson, 1979). In addition to flying, many professional sports players make use of simulation to train specific techniques and improve their performance. Professional and recreational skiers may train on a simulator to be able to tackle more advanced slopes. This type of device can be tested or compared with others to determine which is best for training specific

muscle groups or specific techniques (Fausto, Giuseppe, & Nicola, 2013). Simulators have also been used for performance improvement in tennis (StĂNescu, 2014) and in windsurfing (Ouadahi, Chadli, Ababou, & Ababou, 2016).

2.3.3 Directed Practice

While practice is beneficial, not all practice is equal. When individuals are first learning a skill trial and error may be sufficient for them to learn what to do. As the level of proficiency increases, it is important that practice focuses on areas that need improvement, on muscles that need to be strengthened, and on places where technique needs to be refined. In the case of jockeys, comparisons have been done between muscle movements on a simulator and on a live racehorse (Walker et al., 2016) to ensure muscles were strengthened in a manner that would promote the best racing capabilities.

In addition to ensure the accuracy of the simulator, the rate or repetition of practice may be important. One study of a robotic virtual reality simulator for surgery compared performance for groups with different training schedules finding that one hour daily practice was the most effective training schedule for this particular procedure (Kang et al., 2015). In other cases, simulators may be used as a warmup prior to surgery improving the performance of the surgeon in the same way that an athlete may warm up prior to a game (Shiomi da Cruz et al., 2016).

Turpin, Welles, and Price (2007) worked with the Utah Department of Public Safety to structure simulator driving training for law enforcement personnel. The simulator was used to provide trainees a progressively more challenging set of circumstances as driving practice progressed. The implemented methodology resulted in a measurable reduction in critical driver errors. Repeated practice in a driving simulator with interruptions from dispatch operators

reduced the negative effects from the concurrent activities of communication and driving (Hembroff, Arbuthnott, & Krätzig, 2018).

2.3.4 Engage in Novel Experiences

Simulators can be a safe means to engage in experiments that would be dangerous in reality such as mechanical failure of an aircraft (Boyer, 2021). Nighttime landings on an aircraft carrier are challenging maneuvers which are practiced in a simulator. Over time many advances to these simulators have been made to accommodate changing aircraft, carriers, and technology (Aronson, 1979; Endsley, 1989). Similarly, intersection clearing for emergency vehicles involves many costly dynamic vehicles with human occupants. Practicing this activity in a simulator is relatively low cost and significantly less risk to people and equipment (Urban & Gudzbeler, 2014). Leicester Fire & Rescue uses an immersive simulator to allow drivers to experience a car crash without physical risk emphasizing the importance of defensive driving (Delta Kinetic Ltd, 2022).

Besides limiting physical harm, simulators can also be a safe means to try skills involving others who could be harmed by poor performance. Using simulators to train medical professionals in resuscitation techniques improves patient survival rates (Perkins, 2007). The need for safe practice situations is not limited to physical reactions and can include all types of human interactions. For example, social workers need to gain experience in entering people's homes and noticing points where intervention is needed. Initial practice in a simulator can build skills in interacting with people can improve performance in demonstrating caring behaviors and appropriate assistance (V. Ferguson & Driver, 2019; Linsk & Tunney, 1997). Similarly, teacher training in a simulator can improve classroom management and teaching skills. Using a

simulator rather than live students protects vulnerable populations while allowing the teacher to practice new techniques (Dieker et al., 2019).

One can learn about other cultures by interacting with a simulated environment without the risk of offending others (Fishwick, Coffey, Kamhawi, & Henderson, 2010; Lew, Gul, & Pecore, 2021). Simulations have been developed focusing on interacting with individuals in other cultures (Finn & Goff, 2020). Some of these simulations focus on the context of interactions with a high likelihood of escalating to violence (Brown et al., 2018; W. Ferguson et al., 2015).

2.3.5 Build confidence

Nursing students need to gain confidence in assisting elderly patients with intimate experiences such as showering. Using a simulator to introduce students to preferred practices and behaviors can increase confidence prior to interactions with live patients (Mainey, Dwyer, Reid-Searl, & Bassett, 2018). Physical simulators can mimic patient conditions better than a human acting as a standardized patient because they can change temperature, skin tone, and visualizations can create different types of wounds or burns. These can assist in training medical students to better diagnose patient conditions (Daher et al., 2020). Another key area where practice with a simulator can facilitate better human interactions is in end-of-life care. Communication between team members, the family, and the terminally ill patient improves when health care providers have experience in assisting through this transition. Using a simulator can provide practice without compromising care to live patients (Lippe, Stanley, Ricamato, Halli-Tierney, & McKinney, 2020).

The driving training from the Utah Department of Public Safety found that the simulators motivated trainees toward improved skills as the trainees worked through a progression of more difficult driving situations (Turpin et al., 2007).

Investigations into the use of virtual simulation for developing counseling skills show the virtual simulator as effective as student-to-student role play when working with crisis intervention training (Uwamahoro, 2015).

2.3.6 Build Judgement

As far back as the late 1980's there was a need for simulation to allow pilots to practice situational awareness, making judgement calls about appropriate responses to changing circumstances (Endsley, 1989). As simulator technology improves the ability to link training experiences leads more realistic encounters and expands the ability to train for situational awareness (Seibert, 2012). This need to train for situational awareness and to make judgement calls appears in many types of training and is a driving force behind many of the use-of-force simulators for law enforcement.

As a practical way for social work students to learn behaviors associated with promoting client success, simulation exercises started with standardized clients played by human actors similar to a standardized patient in medicine (Linsk & Tunney, 1997). Technology now allows similar social work training to occur in virtual settings. Students can use these to assess a client's needs and make judgements about proper referrals (V. Ferguson & Driver, 2019). In the same way simulator have been developed for law enforcement to assess a situation and determine an appropriate response. These are often referred to as shoot/don't shoot simulations or use-of-force simulators (Ellis, 1999).

2.4 Use of Simulation for Law Enforcement Training

In 1995, Hormann envisioned simulation as the future of law enforcement training (Hormann, 1995). Although training curricula varies across municipalities, there is a growing use of simulation. Often these simulators are technology originally designed for the military, remarketed to address law enforcement. There are many shared skills between the military and law enforcement including driving, piloting, and use of weapons. It is reasonable that the tremendous investment in simulation technology made by the US military should result in advances for other purposes. Although law enforcement training does not have the resources available to the U.S. military, there are some areas where the police community has been able to make use of simulation or virtual reality for training. In making use of these simulators, it is important to recognize the context and tactics used by law enforcement differ from those employed by the armed forces.

2.4.1 Driving Trainers

Driving trainers were developed as a cost and safety approach for training operators of large vehicles such as tractor trailers and fire departments. As these became more common, police departments became interested in the technology for training their officers. Devices were marketed specifically for police agencies in the early 2000s (Siuru, 2000; Tim, 2004; Trevino, 2000). Different levels of immersion and sophistication are available for these trainers, but they generally consist of a driver's seat with dashboard, driving controls, and one or more screens showing the virtual driving terrain. Using these devices, instructors could allow students to practice the mechanics of driving, inclement weather effects on driving, situational awareness, and emergency maneuvering. As the simulators became more widely used, investigations in to the best way to incorporate them into law enforcement curriculum began. Turpin et al. (2007)

found directed practice in the simulator with gradually increasing levels of difficulty improved cadet driving skills faster than unstructured practice. Other studies focused on how these trainers could be used for a variety of driving conditions encountered by law enforcement such as intersection clearing or deliberate collision attempts (Krätzig & Hudy, 2012; Urban & Gudzbeler, 2014). In addition to driving, law enforcement officers need to communicate with their dispatchers and driving simulators may be used to safely practice this type of attention splitting (Hembroff et al., 2018). Although there is increasing use of driving simulators and the uses to which they may be employed (Paquette & Bélanger, 2015; Scott, 2020), they are not universally available. Neither of the police organizations participating in this research have incorporated driving simulators into their training curriculum on a reoccurring basis.

In addition to their use for training, these simulators have been used for investigation into research topics associated with police driving. One study showed trained drivers exhibiting a safter driving style in hazardous driving simulations compared to less trained drivers (Dorn & Barker, 2005), supporting the rigor of UK police driving training. Another study indicated that distracted driving affects police officers in addition to the general public (S. M. James, 2015). Further investigation into the challenges of technology in police vehicles has used driving simulators to look at methods of communication and arrangement of computer terminals (Hembroff et al., 2018; Shupsky, Lyman, He, & Zahabi, 2020). In addition to using simulators to safely investigate how to improve technology for police activity, there is research into improving the simulators themselves. This includes improving the visualization characteristics (Gudzbeler, Urban, & Lojek, 2012), investigating simulation sickness (Paquette & Bélanger, 2015), and improvements in the realism of machine generated driving scenarios (Matowicki,

Pribyl, & Bouchner, 2016). The driving simulator is both a useful tool and an ongoing area of technology advancement.

2.4.2 Use-of-Force Simulators

Firearms simulators evolved from shooting range scenarios and use of simulated ammunition (Jennifer, 2001). The simulators used by law enforcement were often based on technology used by the U.S. Army. Using the same devices, but with different scenarios, law enforcement can use virtual reality to practice a number of different shooting encounters. With branching video and soft projectiles, the simulators can have criminals shoot at the officers or comply with officer requests based on the actions of the officers as judged by the simulator operator (McCormick, 1999; Siuru, 1999). Several manufacturers began product lines focused on law enforcement each with their own set of scenarios and capabilities. The simulators included various weapon types including less lethal approaches such as O.C. spray and Tasers (Ashley, 2006; David, 2009). Originally designed on a single screen similar to marksmanship trainers, these simulators became more flexible as multiple screens were added and with the ability to reconfigure them for different locations or viewpoints (Basich, 2016; David, 2018).

Although the technology is available, it is expensive, and departments may not be in a position to make use of the simulators in the manner in which they were intended. Simulation time is time that officers are not performing their duties. Despite the availability of the equipment to repeat scenarios and learn from mistakes, there is a cost to this type of practice. Departments need to choose the right type of simulator with an appropriate set of scenarios (Bolton, 2018). They also need to consider when and how to integrate the simulators into their training curriculum (Craig, Natalie, & Shevaun, 2007; Fournier, Lapointe, Kondratova, Emond, & Munteanu, 2012). Krätzig (2014) found that law enforcement officers who trained with a

handgun simulator prior to range training had improved marksmanship scores on follow up and recertification tests. Likewise, in a study with Orange County Florida Sheriff Department, Kent (2020) found cadets who trained with a simulator prior to range training were more likely to pass their initial qualification test than comparable cadets who did not experience the simulator practice.

The modern use-of-force simulators are intended for more than simply shoot or don't shoot scenarios. They are designed to give the officers a wide range of options when approaching the simulated situation. In addition to weapons, the officers may use voice commands, flashlights, radios, and have obstacles or places to take cover (Basich, 2016).

The simulators may have areas to display policy or procedures specific to the local jurisdiction. They may incorporate scenery from the local area and video or avatars with features that resemble to population of the community. They are intended as practice in making judgement calls which makes them appropriate for de-escalation practice. Having the opportunity to practice de-escalation in a virtual environment has been reported as leading to officers feeling more comfortable in employing it (Chester, 2021). The benefits of this training may depend upon characteristics of the officers and how ready they are to make use of the simulators (Comiskey, Lockwood, Cunningham, & Arminio, 2021). In addition, skill improvements may relate to when and how the simulators are incorporated into the training experience.

Use of force simulators have been used in various types of research projects regarding law enforcement and the training of law enforcement. Early studies looked at factors, including training, that may affect short or don't shoot decision making. One study found that increasing temperatures lead to increasing tension and more aggressive behavior on the part of law

enforcement (Vrij, Van Der Steen, & Koppelaar, 1994). Another study found officers had increased emotional arousal and less complete memories when witnessing a shooting event as opposed to a dispute where no weapon was present (Hulse & Memon, 2006). Simulators have been used to explore the relationship between race and decisions to shoot, including evidence that indicates officers may be more hesitant to shoot black suspects than white suspects (L. James, 2012). Simulators allow for a more control over the experimental conditions and can be used to evaluate items not easily explored outside of the simulator such as the effects of dispatch messages on law enforcement (Mitchell & Flin, 2007).

While initially results were measured based on the shoot or don't shoot decision, there is increasing attention paid to the biometrics of the trainee during the simulation experience. Increased realism in the shooting simulator is linked to higher heart rate during the training exercise (Thomasson, Gorman, Lirgg, & Adams, 2014). Physiological changes can indicate a more intense training experience and could be used as a basis to increase or decrease the challenge in the simulation (Munoz, Quintero, Stephens, & Pope, 2020). Looking at biometric feedback may be another factor in designing scenarios to meet specific training needs. Officer training should maximize the attention to safety including the safety of bystanders and victims. Simulator scenarios can be designed to put officers in positions where they need to resist shooting due to the presence of others (Biggs, 2021). Alternatively, the controlled scenarios in the simulator can allow researchers to study the effects of muzzle position on shoot or don't shoot errors and recommend teaching a lower muzzle position for ambiguously armed individuals (P. L. Taylor, 2021). Bringing simulation to bear as a means of examining law enforcement response in a controlled setting allows for data driven decisions regarding the manner of response that promotes overall safety.

2.4.3 Social Interaction Simulators

Training can be delivered in many different formats. Perhaps one of the most common is classroom training using PowerPoint slides. The frequency of this method of training may have more to do with the ease of putting it into practice than with the effectiveness of the format. There have been many articles describing how to make better PowerPoint presentations for training purposes (Felder & Brent, 2005; Winn, 2003). However, even the best and most engaging presentation does not provide experience in performing social interactions. Often the presentations are used as starting points for interactive class activities including roleplaying.

Roleplaying is often used in training for social interactions, including many types of police activities. Role playing enables the trainees to get more engaged in the interaction as opposed to simply watching an interaction (Ahmady, Shahbazi, & Khajeali, 2021). Students who have the opportunity to practice the behaviors are more likely to perform the behaviors expected (Yamauchi et al., 2021). With interpersonal interactions, role-play assists in building appropriate responses and intervening in a constructive manner (Rao, 2011).

Practice builds skill and confidence. The quality of that practice is instrumental in improving performance. Guidelines for quality roleplay include introducing it as a type of simulation helping participants to take responsibility for their learning experience (Nestel & Tierney, 2007). However, in roleplay the quality of the practice is dependent on the skill of the other participants. Officers who practice with fellow officers may get used to interacting with neurotypical individuals and may get used to a more limited set of emotional responses than they will encounter in public interactions. In the medical field this is addressed in part with the use of standardized patients who have training to perform with certain characteristics. The creation of

this type of standards for different suspects and by-standers in law enforcement scenarios has not been accomplished.

VerPlanck (2020) focused on examining creativity by police officers engaged in simulation training. VerPlanck found participating in a many previous scenarios reduced the likelihood of responding creatively. This may relate to increased cognitive load from the previous training sessions. This article examines ways to train officers to de-escalate and to move beyond procedural activities. Supports the idea that police training relies on behaviorist approaches and could benefit from additional research related to adult learning principles (VerPlanck, 2020).

Dayley presents a dissertation based on a 12-question survey sent to police agencies regarding their training. This is supplemented with background literature regarding police training practices in the US and abroad emphasizing work done on de-escalation. The dissertation contains a nice explanation of Crisis Intervention Training (CIT) and the lack of research regarding its effectiveness (Dayley, 2016). Bennell et al. (2020) describe practices for improving de-escalation including the use of dynamic scenarios to build competencies. Recent work in training for de-escalation was done using Verbal Judo. De-escalation behaviors for law enforcement were identified by (Giacomantonio, Goodwin, & Carmichael, 2020). These are discrete behaviors which can be captured during the space of a short role-play or simulation session. This may serve as a starting point for examining the effectiveness of training in this area.

2.5 Summary

This chapter has introduced some of the major concepts associated with using simulation for law enforcement training. The need to place the simulators in the context of instructional

design and a planned curriculum has been developed. The use of simulation to provide training experiences that cannot be safely pursued by other means has been shown through the literature. The evolution of simulation including technology advances to provide more realistic scenarios has been demonstrated. The next chapter describes the methods used to take these simulators and start to address some of the knowledge gaps concerning de-escalation training.

CHAPTER THREE: REPURPOSING SIMULATORS

"Reduce, Reuse, Recycle" – Gary Anderson

3.1 Overview of Studies Conducted

This research consists of two studies involving law enforcement refresher training for active-duty officers and one community survey. These studies were conducted with resources available to the police forces without external grants or other significant funding. These studies were developed after COVID prevented in person studies that were originally planned. The two participating law enforcement agencies participating are both in Central Florida. The names of the studies are based on the agencies: the Orange County Sheriff's Office (Orange County) and the Mout Dora Police Department (Mt. Dora). These two studies investigate the following two hypotheses:

H1: Changes in an officer's attitudes and behaviors regarding de-escalation can be measured and observed.

H2: Practice in a simulator will improve an officer's ability to de-escalate a crisis situation.

After the first study with Orange County, comments from external reviewers in the Central Florida area implies that de-escalation techniques were so commonly in use, there was little need to investigate what would be useful to law enforcement. These comments caused the addition of the survey from the local population and a third hypothesis was added:

H3: De-escalation of a crisis in a public law enforcement venue requires different approaches than in other venues.

The second study with Mt. Dora included the use of video tape to capture de-escalation scenarios in the simulator. Using video allows further examination of what occurs during these sessions. Three additional hypotheses were introduced specific to this study.

H4: After training, officers would slow down and spend more time in a scenario as they work through de-escalation techniques.

H5: After training, officers would exhibit more of the de-escalation behaviors listed in Table 11 - De-escalation Behaviors from Verbal Judo.

H6: After training, officers would use more open-ended questions.

3.1.1 Orange County Study

Orange County Sheriff's Office has approximately 1,600 sworn deputies. All deputies participated in de-escalation training in 2020. The specifics of this curriculum were not known to the researcher at the time this study was devised. The training was delivered by an outside organization and was tailored for law enforcement. The training was part of the annual continuing education requirements for the department.

In 2021 half of the deputies were assigned to have simulator practice in de-escalation. The other half were assigned to have driving practice using a controlled access vehicle track. This study was designed to compare the two groups of officers to see if the simulation practice had an impact on intent to use behaviors that could be considered de-escalation tactics. The researcher created a de-escalation survey based on best practices available across disciplines. This survey was sent to all participants in both groups. The group that had the simulator practice had an additional section to their survey which included the instrument used to measure engagement and presence in various virtual reality and multimedia activities. The survey was sent by an Orange County Deputy who works as a training coordinator.

The survey was developed based on commonly recommended de-escalation practices. Currently, there does not appear to be a widely recognized set of de-escalation skills or measures to demonstrate de-escalation capability.

3.1.2 Local Community Survey

When preliminary results from Orange County Sheriff Deputies showed little difference between the De-escalation Group and the Driving group, there arose a question regarding the training the officers had already received masking any change arising from practice. To investigate any potential differences between the deputies and the larger population of the area, the same questions were used to survey part of the UCF academic community. Given the age of the deputies responding an effort was made to gain UCF participants who were older than the typical undergraduate population. To that end the survey was distributed to graduate students, faculty, and staff. The survey was distributed in a snowball fashion where initial recruits were asked to distribute it to others they know.

3.1.3 Mt. Dora Study

Mount Dora is a city in central Florida approximately 35 miles northwest of Orlando. The total size of the sworn police force in Mount Dora varied from 33 to 36 members during the time of the study. All but one of the officers was able to participate in some form of the training. For the Mount Dora Study we were asked to provide a means to reenforce de-escalation practices when working with an individual with autism.

We created a 10-minute video emphasizing some key points when working with an individual with autism:

- Allow extra physical distance when possible
- Avoid physical contact

- Do not force eye contact

These individuals may also have certain traits that differ from society norms. The individual may have unusual gestures or body motions. The individual may be sensitive to light or loud noises. The individual may feel anxiety from the close proximity of others.

This study was set up as a pre/post survey to see if the form of training made a difference in de-escalation approach. The same survey was used for de-escalation principles as was used for Orange County.

3.2 Surveys Used Across Multiple Studies

Two of the survey instruments were used across multiple studies, the Independent Telecommunication Corporation - Sense of Presence Inventory (ITC-SOPI) and the De-escalation Questions Survey. The ITC-SOPI is a validated instrument that has been used for over twenty years. Its applicability is discussed in Section 3.2.1. The De-escalation Questions were crafted for this research as described in Section 3.2.2. It is used with all three data collection groups.

3.2.1 Independent Telecommunication Corporation - Sense of Presence Inventory

Unlike de-escalation practices, there has been attention paid to the idea of immersion or presence in virtual environments. The Independent Telecommunication Corporation - Sense of Presence Inventory (ITC-SOPI) has been in use for over twenty years as a means to examine factors related to an individual's experience of transportation to a reality outside of their physical surroundings (Lessiter, Freeman, Keogh, & Davidoff, 2001). This survey has two parts and 53 questions which are combined into four factors: Spatial Presence, Engagement, Naturalness, and Negative Effects. This survey was used to see if changes in de-escalation were related to how engaged the individual became with the simulation.

3.2.2 Creation of the De-escalation Questionnaire

The Orange County Sheriff's Office training division was happy to share the scenarios planned for the de-escalation practice in the simulators. They did not have curriculum or tests for the de-escalation training which had been delivered by a third party.

As the conversations around de-escalation indicated that there was a general understanding of what was expected, several online searches were conducted to locate sources of de-escalation tactics that were publicly available. One key starting point was the Police Executive Research Forum which intersperses recommendations for de-escalation when discussing use of force (PERF, 2016). Articles referencing policing curriculum on de-escalation were reviewed for techniques including those published by training officers (CPI, 2020; Goolsby, 2017; McFarlin, 2017). In addition, de-escalation tactics from outside the realm of law enforcement were reviewed for inclusion in the questionnaire (Duan, 2018; Harris, 2016; HSI, 2021; Mavandadi, Bieling, & Madsen, 2016).

These sources were reviewed to find commonalities across the sources. Starting with tactics that were common, a questionnaire was created with a 5-point Likert scale asking for agreement with each of the practices. Because the survey was developed to be self-administered during the COVID pandemic, these questions examine intentions or expectations rather than observations. The twenty questions developed in this manner are listed in Table 4 below.

Table 1 - De-escalation Survey Questions

Table 1 - De-escalation survey questions[†]

1.	Finding points of agreement can reduce a conflict even when a person is in crisis.	A
2.	It is important to intervene quickly when someone behaves erratically.	D
3.	Law enforcement should always act on information at their disposal.	D
4.	De-escalation is stressful work and can result in negative effects for the officers involved.	A

5.	When attempting to de-escalate a tense situation, it is important to give individuals choices.	A
6.	When attempting to de-escalate a tense situation, it is useful to ask what and how questions.	A
7.	When responding to bizarre statements, it is important to focus on the illogic of the statement.	D
8.	When listening to someone who is in crisis, it is important to give them undivided attention.	A
9.	In order to resolve an incident quickly, it is important to keep the conversation going.	D
10.	When someone has a sudden change in tone, it may be a sign the situation is escalating.	A
11.	When an individual is in crisis, it is important to raise your voice to ensure they can hear you.	D
12.	Focusing on moving forward into the future will not help with the immediate problem.	D
13.	When approaching an individual, it is important to look authoritative.	D
14.	When talking about a situation, it is important to stick to the facts.	D
15.	When approaching an individual, it is important to listen to what they are saying.	A
16.	In approaching a person in crisis, observing personal space is not an issue.	D
17.	When trying to de-escalate a tense situation, your nonverbal communication should remain typical.	D
18.	When talking to someone who is upset, it is important to judge their situation correctly.	A
19.	After you ask a question, silence from someone is a sign of disrespect or hostility.	D
20.	When others ask challenging questions, you may choose to ignore the questions.	A

[†]Recommendation is to Agree with items marked A and Disagree with items marked D

3.3 Orange County Methods

In 2020, the Sheriff of Orange County, Florida had all deputies attend de-escalation class as part of their annual in-service training curriculum. In order to provide more practical experience in using the classroom techniques, the department chose to have the officers use their use-of-force simulator to de-escalate two simulation scenarios. As time and budget constraints limit the number of people who can access the simulator over the course of the year, half the department had this for their annual training in 2021 with the other half expected in 2022. The deputies who did not access the simulator in 2021 were given training on a driving range to

practice specialized driving skills. This group serves as a natural control group for comparison to those who had the simulation practice.

3.3.1 Virtual Reality Equipment

Orange County Sheriff's Office purchased a VirTra 300 use-of-force system in 2015. This system has 5 screens with rear projectors covering a 300-degree arc where the trainee can engage in the scenario. The system supports several types of weapons including pistols, shotguns, OC spray, and tasers. Lasers are used for shot tracking and a recoil is produced using a CO_2 cartridge. The system is run by an operator who chooses a pre-recorded video scenario. Each scenario has multiple branches that can be used to change the outcome depending on the actions of the trainee.

Multiple scenarios allow trainees to build a more robust mental model of the activities they need to perform. This increases the ability to transfer from the training environment to the work environment (Clark, 2008). Having multiple branches for each scenario give flexibility to respond to trainee actions, but also allows for the scenarios to give a unique experience even if the trainee has experienced the scenario previously.

Figure 1 - Orange County VirTra Simulator

3.3.2 Scenarios Used in Training

The simulator session starts with a warmup scenario called “Plates of Steel” where the trainee shoots virtual steel plates from left to right. The scenario starts with “FIRE” command on the screen and ends after all the plates have been hit. The instructor reviews round placement, total time, and hits versus misses with the trainee.

The second scenario is called “Baby on Bridge” and involves a distraught father threatening harm to his infant. The father threatens to throw the baby off the bridge and the trainee is expected to talk to the father to calm him down. The operator has the option to escalate or de-escalate the scenario depending on the actions of the trainee. After several responses the

operator of the scenario causes a backup officer to arrive. The backup officer arrives with a handgun drawn and the father's behavior escalates again. The trainee needs to convince the backup officer to back away and needs to regain rapport with the father. If the trainee is successful in convincing the other officer to back away and in regaining rapport the scenario ends with the father complying with the trainee's directions. If the trainee is not successful, the scenario devolves into the father committing suicide.

The third scenario is called "Cruiser Kick" and starts with the trainee seated, imitating the seating in a patrol vehicle. At the start of the scenario a group of young women walk by and one of them kicks the patrol vehicle. The trainee is expected to request ID from the woman who kicked the vehicle and attempt to converse with her. However, the other women will interfere with the conversation. The trainee must instruct them to leave, and the operator will select a branch where the crowd departs. The operator will then select conversation branches based on the dialog from the trainee. Eventually the operator will select a branch where the woman reaches into her purse. The trainee is expected to reach for their handgun at a minimum. The operator selects the branch where the woman turns the knife on herself threatening to harm herself. The trainee should seek cover and continue to attempt verbal dialog with the woman. If the trainee is able to de-escalate the situation the woman may surrender. Otherwise, the scenario ends with the woman still threatening self-harm.

The three scenarios are followed by a short debrief session. The surveys were not distributed at this time in order to minimize the impact on the instructor time. The surveys were sent to each trainee via email after their training session. The emails were sent from an Orange County Sheriff's Office email account and contained an anonymous link to the survey, so no identifying information was collected by the researcher.

3.3.3 Survey Distribution

Demographic data is shown in Table 1 including age, time with the force, gender and education. The ITC-SOPI inventory was used to measure the engagement of officers in the simulator. Demographic questions were based on those accompanying that instrument and augmented with years of experience in law enforcement and specifically with Orange County. The respondents generally had more than a decade of law enforcement experience most of it with the Orange County Sheriff's Office. As the survey instrument is used for a variety of simulated experiences, data on computer experience and television viewing were collected showing most officers rate themselves as intermediate computer users. Most of the officers reported watching less than 8 hours of television per week. Computer experiences and television viewing may affect the engagement in some types of simulation.

Table 2 - Descriptive Statistics for Orange County

	DE-ESCALATION	DRIVING
	n=48	n=31
ORANGE COUNTY EXPERIENCE†	13 (6 - 20)	16 (8 - 23)
LAW ENFORCEMENT EXPERIENCE†	16 (9 - 22)	18 (10 - 26)
AGE†	43 (36 - 48)	46 (34 - 52)
COMPUTER EXPERIENCE		
BASIC	7 (15%)	7 (23%)
INTERMEDIATE	35 (73%)	22 (71%)
EXPERT	5 (10%)	1 (3%)
MISSING	1 (2%)	1 (3%)
TV VIEWING		
0-8 HOURS	24 (50%)	16 (52%)
9-16 HOURS	11 (23%)	8 (26%)
17-24 HOURS	10 (21%)	4 (13%)
25-32 HOURS	2 (4%)	2 (6%)
MISSING	1 (2%)	1 (3%)
EDUCATION		
HIGH SCHOOL DIPLOMA	5 (10%)	2 (6%)
CERTIFICATION	1 (2%)	1 (3%)
ASSOCIATE DEGREE	10 (21%)	8 (26%)
BACHELOR'S DEGREE	23 (48%)	12 (39%)
GRADUATE DEGREE	8 (17%)	7 (23%)
MISSING	1 (2%)	1 (3%)
GENDER		
FEMALE	8 (17%)	4 (13%)
MALE	38 (79%)	23 (74%)
NON-BINARY	0 (0%)	1 (3%)
PREFER NOT TO SAY	1 (2%)	2 (6%)
MISSING	1 (2%)	1 (3%)
†IN YEARS		

3.4 Local Community Methods

In order to capture the knowledge of de-escalation from individuals outside of the police departments, the same survey was used online with a group from UCF. To avoid an abundance of young adults this survey was administered to UCF graduate students, staff, and faculty. The

descriptive statistics for this community are shown in Table 3 - Descriptive Statistics for Local Community Responses.

Table 3 - Descriptive Statistics for Local Community Responses

TABLE 3 - DESCRIPTIVE STATISTICS FOR LOCAL COMMUNITY RESPONSES

	n= 48
UCF EXPERIENCE†	8 (5 - 16)
LAW ENFORCEMENT EXPERIENCE†	0 (0 - 0)
AGE†	44 (35 - 56)
COMPUTER EXPERIENCE	
BASIC	3 (6%)
EXPERT	17 (35%)
INTERMEDIATE	27 (56%)
MISSING	1 (2%)
TV VIEWING	
0-8 HOURS	21 (44%)
9-16 HOURS	16 (33%)
17-24 HOURS	5 (10%)
25-32 HOURS	3 (6%)
33-40 HOURS	1 (2%)
40 HOURS OR MORE	1 (2%)
MISSING	1 (2%)
EDUCATION	
HIGH SCHOOL DIPLOMA	2 (4%)
BACHELOR'S DEGREE	10 (21%)
GRADUATE DEGREE	35 (73%)
MISSING	1 (2%)
GENDER	
FEMALE	25 (52%)
MALE	22 (46%)
MISSING	1 (2%)

†IN YEARS

3.5 Mount Dora Methods

This study was conducted working with the Mount Dora Police Department in Mount Dora Florida. The department was looking for a means to provide follow up training in non-escalation/de-escalation practices especially suited for interactions with individuals on the autism spectrum. The chief believed the officers had a good grasp of de-escalation practices when

engaging with neurotypical individuals but needed additional opportunities to consider how to approach those who may present atypically. The methods described below and the preliminary results for the Mount Dora study are published as part of the Research Topic Professional Training in Extended Reality: Challenges and Solutions Volume II (J. Kent & C. Hughes, 2022).

3.5.1 Overall Design

In designing this study, two different approaches to training were created for the Mount Dora Police Department. One option is a high-quality video, and the alternative is a virtual reality experience. This study compares de-escalation training addressing individuals on the autism spectrum using these two approaches. Active-duty officers who participated were divided into three training groups. The first group participated in the virtual reality training session. The second group watched the video and engaged in the virtual reality session. The third group only watched the video. Table 6 - Descriptive Statistics for Mount Dora below shows demographic statistics for the participants. It should be noted that the third group, video only, has participants who were somewhat younger and have less policing experience. This arose despite a random assignment to the three conditions.

Each participant attended two sessions. As a result of the ongoing COVID pandemic all sessions were conducted over Zoom. Using Zoom provided an interactive environment which allowed us to easily record simulation sessions (J. A. Kent & C. E. Hughes, 2022). Activities during the first session included familiarization with the virtual reality environment, a set of surveys, and the training exercise. The second session included a culminating virtual reality session and follow up surveys. Pre and post surveys compared responses concerning de-escalation approaches. The NASA TLX (Task Load Index) survey (Hart & Staveland, 1988) was used to examine workload during the virtual reality sessions.

3.5.2 NASA Task Load Index

Workload associated with a task is a complex phenomenon which may be experienced differently by each individual. The survey instrument asks for responses on six different scales: Mental demand, Physical demand, Temporal Demand, Performance pressure, Effort expended, and Frustration. These are evaluated with sliders from 0 to 21. An overall score is calculated for each participant by taking the mean across all the unique scales. This instrument has been used to measure workload in instructional design (Nikulin, Lopez, Piñonez, Gonzalez, & Zapata, 2019).

3.5.3 First Session

The first session had two goals main goals, familiarization with the technology in use and the training activity. The sessions were conducted over Zoom and many of the participants had not used the application before. They were also unfamiliar with controls for muting the microphone and silencing speakers when needed. Within the Zoom session the officers were placed in breakout rooms for the VR experience. At the start of their first session, participants took a survey regarding their opinions on some points in de-escalation. To familiarize the participants with the VR, the officers used the Stacy scenario described below.

Following the Stacey scenario each individual officer completed a NASA TLX survey to measure the workload experienced during the simulation. The officers then provided their individual demographic information. Following those two surveys, the officers participated in their training activity. Paired officers received the same training activity. The officers were placed in training activities based on their order of arrival at the session. Again, the individuals who were working with the virtual reality environment participated in pairs because of the

limited resources with the simulator. For the video only, participation was in pairs to maintain consistency.

At the conclusion of their training, each officer completed ITC-SOPI regarding their experience in the training activity. This survey instrument has four factors that measure engagement, spatial presence, naturalness, and negative effects. The participants respond to survey questions regarding their experience with the training activity. These responses are then grouped to create a score for each factor (Lessiter et al., 2001).

3.5.4 Virtual Reality Experience and Stacy Scenario

TeachLivE is a virtual learning environment originally designed for providing professional training to secondary school teachers (Dieker et al., 2019). Realtime interaction with virtual avatars is provided through software enabling digital puppeteering by trained human actors called interactors. In the original environment the avatars were in a classroom environment. For this study the virtual reality experience was tailored for Mount Dora by placing the avatars in a public setting in Mount Dora where officers might be expected to respond to a call for assistance. This setting was well known to the officers participating and they recognized it when entering the virtual reality. While the original virtual learning environment was delivered via projection to a life-sized screen, for the purposes of this study the virtual environment was delivered over Zoom on the screen the officers had available. Both the virtual reality setting and the method of delivery encouraged participant engagement and a sense of relevance to their work.

The introductory session is referred to as the Stacey scenario. The Stacey scenario involves interacting with a woman who is standing in a public arena complaining about students not being required to wear masks in school. It is called in as an instance of possibly disturbing

the peace and the officers are expected to de-escalate the situation while maintaining their own safety and that of others in the area. Due to resource constraints, the officers were paired for the scenario. This scenario provided an opportunity for officers to familiarize themselves with the simulator and the technology they were using. Figure 2 provides a view of the character in the Stacey scenario.

Figure 2 - Stacy at level 2 calm and ready to communicate

Stacy can move through a variety of emotional states on a scale of 1 through 5. Officers are expected to interact with her and help to reach a state of 1 or 2 where she is in control of her emotions. Table 4 - Levels of Behavior for Stacy During the Initial Scenario provides levels of behavior exhibited by Stacy in response to officer interactions. Stacy starts at level 3, agitated.

Table 4 - Levels of Behavior for Stacy During the Initial Scenario

1 Problem Solving	• Behavior: Smiling and talking about how she can engage others • Communication: Problem solving about who can help keep the individuals near her child wearing masks • Attention: Respectfully, responds to requests and asks coherent questions
2 Calm	• Behavior: Asking for assistance or ideas. Stands in neutral position • Communication: Talks about ways to keep child safe. Talks about her current situation. • Attention: Notices she has attracted attention. Responds to requests.
3 Aggravated	• Behavior: Closed posture, crossed arms, pacing or foot tapping • Communication: moderate tone of frustration, repeated complaints about unmasked people near her child • Attention: Notices others and officers. Asks for help to make sure the class wears masks
4 Angry	• Behavior: Stomping feet, tearing at hair, hands on hips • Communication: loud and angry, making verbal threats to call others or raise a riot • Attention: Notices who is listening, responds to officer actions or words
5 Furious	• Behavior: Makes threatening or obscene gesture • Communication: Verbally abusive, foul language, sputtering • Attention: Not attending to surroundings, too angry to care about others

3.5.5 Training Content

The goal of the training is to support officers in interactions with individuals who have autism. In that effort the video gave explicit instructions to avoid close physical proximity, direct eye contact, physical contact, and overly stimulating environments. The avatar in the virtual setting will escalate if the officers attempt to make direct eye contact or reduce the physical distance. The avatar deescalates, moves lower on the levels of behavior, when the officer does the following:

- Encourages them to explain what has happened
- Maintains physical distancing
- Provides assistance with problem solving
- Offers binary choices rather than a list of options

- Encourages them to do an action rather than stop doing an action

These are behaviors that are regarded as useful in working with individuals on the autism spectrum and may not be appropriate in all law enforcement encounters.

3.5.6 Video Training Experience

A ten-minute training video was created for this study. The video is set in Mount Dora and includes some members of the Mount Dora Police Department in the footage. Officers who viewed the video could recognize the settings. Several participants expressed the thought that the training must be applicable to their work because it was filmed in their town. The video explicitly states the training content described in Section 2.3. Scenes contain actors familiar with behaviors characteristic of autism who go through problems often encountered in public. These problems include ways the police can help resolve the issues without using force to coerce the individual.

3.5.7 Second Session

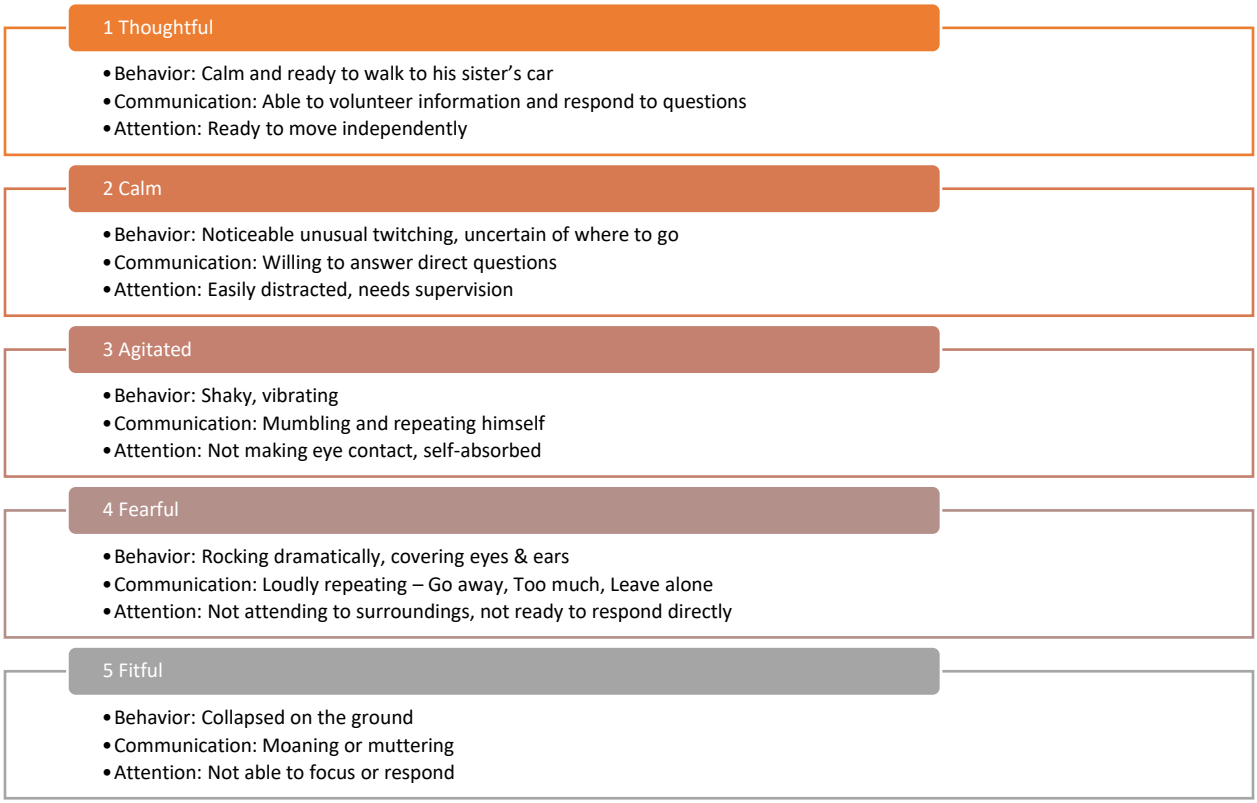
There was a two-week gap between the first session and the second session. At the second session, the officers in pairs did the Martin scenario in the virtual reality environment. The Martin scenario involves a similar report of an individual behaving oddly and upsetting others in the same physical setting as the Stacey scenario. Although they are not made aware of it at the call, the officers are being asked to respond to an individual on the autism spectrum. They need to find out why this person is acting in an unusual manner, not necessarily protesting anything, but help the person to resolve their quandary. In the scenario design, Martin has become separated from his sister and, if he can be calmed down, he actually can remember where his sister has parked the car that they're going home in and he has his sister's phone number, but he needs to be calm enough to be able to access and make use of that information.

Escalating and de-escalating behaviors for Martin were designed through discussions with autism experts in the UCF Center for Autism and Related Disabilities (CARD). Figure 3 - Martin holding a water bottle in Mount Dora provides a view of the character in the Martin scenario.

Figure 3 - Martin holding a water bottle in Mount Dora

Similar to Stacy, Martin can move through five levels of emotion. As Martin is on the autism spectrum his behaviors differ from those of Stacy. Both Stacy and Martin have a level lower than simply calm. This level provides an emotional state where the individual in the encounter is ready to work with the officer to resolve the situation. Not all the scenarios ended with the individual at level 1. In some cases, the officers decided there was no need to go beyond level 2. Table 5 - Levels of Behavior for Martin During the Final Scenario provides levels of behavior for Martin. The scenario starts with Martin at level 3, agitated.

Table 5 - Levels of Behavior for Martin During the Final Scenario



After the scenario, the officers again completed the NASA TLX survey and then they repeated the de-escalation survey. The responses regarding de-escalation were designed for pairwise comparison with the answers given prior to the training. These questions are provided in Table 4. Finally, participants responded to open-ended questions regarding their feelings and responses on the training.

Table 6 - Descriptive Statistics for Mount Dora

TABLE 4 – DESCRIPTIVE STATISTICS FOR MOUNT DORA

	Virtual Reality n=9	Virtual Reality & Video n=10	Video n=8
Mt. Dora Experience†	10	5	2
Law enforcement Experience†	19	8	4
Age†	42	36	32
Computer Experience			
Basic	22	40	50
Intermediate	56	60	50
Expert	22	0	0
TV Viewing			
0-8 hours	22%	60%	75%
9-16 hours	44%	10%	25%
17-24 hours	0%	10%	0%
25-32 hours	22%	0%	0%
33-40 hours	0%	10%	0%
40 hours or more	11%	10%	0%
Education			
High School Diploma	22%	20%	50%
A-level/Associate Degree	0%	50%	38%
Apprenticeship / Certification	0%	10%	0%
Bachelor Degree	67%	20%	12%
Graduate Degree	11%	0%	0%
Gender			
Female	22%	20%	25%
Male	67%	80%	75%
Prefer not to say	11%	0%	0%

†In years

Video and audio were recorded as individual Zoom breakout sessions. In the sessions with multiple participants, the participants were situated such that the camera could pick up both participants. In some cases, participants (especially in the later sessions) were not collocated. It should be noted that despite the efforts of the primary researcher to set the focus on the officers and to pin their video, zoom recorded the Virtual Reality setting as the primary video with the officer pictures shown in smaller frames with the main picture. Facial features and motions could still be distinguished within those pictures.

The video tagging tool DebriefScape was used to add tags to the recorded videos. DebriefScape is a tool developed by the Center for Research in Education Simulation Technology at UCF and previously used with TeachLiVE. It has templates for evaluating various expected behaviors of a teacher working with a classroom of students. DebriefScape is a web-based interface for reviewing video and creating spreadsheets with time stamps indicating when specific behaviors occur. The video can be paused to add tags which may be pulled from a template or added manually. The tags are saved in a spreadsheet with their corresponding timestamp. Tags were added indicating questions starting with "What" or "How" along with other questions. Tags were added for Smile and Frown and for times when the officer moved their head in a manner that reflected a change in attention. Times when the officers used their hands in an expressive manner were tagged.

The videos were evaluated to determine total scenario time. Participants used the phrase "start simulation" to begin the scenario and had approximately 10 minutes to resolve the situation presented. The end time was based on either the stated end by the participants or by the operator ending the scenarios by zooming out from the interaction. The times for the sessions are presented in the next section as part of the results.

3.6 Data Analysis Approach

ITC-SOPI and NASA-TLX are survey instruments which have been validated in previous studies. The scores for these instruments are calculated based on the methods used in defining the survey. The scores are used for comparison between groups. Although there is only one simulation group for Orange County, the ITC-SOPI results from Orange County can be compared to Mt. Dora scores on the same instrument.

The de-escalation questions are not a validated survey instrument. The responses to these questions for the simulator and driving groups from Orange County are compared to look for statistically significant differences that may arise from having the additional simulation practice. In the case of Mt. Dora, the responses between the three types of training will be compared to see if there is any statistically significant differences arising from the type of training. Additionally, for Mt. Dora a comparison between the responses prior to training and the responses after training is possible. Finally, the law enforcement responses are compared to the responses from the local community to see if the trained law enforcement officers have a different set of responses than the community where they are working. It should be noted that Mt. Dora is about an hour away from Orange County and it may be a stretch to consider the respondents local to Mt. Dora. Following that an exploratory factor analysis is conducted on the responses to see if there are underlying factors that may explain the differences between groups. Finally, the results are scored by grouping them into questions where agreement is expected to increase with more de-escalation skill and questions where disagreement is expected to increase with more de-escalation skill. These are based on the recommendations found in the documentation supporting each question. Using those scores, the groups are once again compared looking for statistically significant differences.

The video sessions from Mt. Dora are used to compare officer behavior before and after training. This is not done as a pairwise comparison as the officers are matched with different partners for the second session. The overall time spent in the scenario is compared. The number of de-escalation behaviors as identified in (Giacomantonio et al., 2020) are examined. In addition to the total score for these behaviors, the individual behaviors are scrutinized. The video was then tagged based on some observed attributes and the occurrences of those tags are compared

between the groups before and after training. Using tags or codes to identify data that belong in a common category is a common practice in qualitative analysis (Lindlof & Taylor, 2011). The rate at which these tagged behaviors occur is compared for the before and after groups.

3.7 Summary

This chapter presents the simulators and methods used to examine de-escalation training practices. The lack of consensus regarding de-escalation best practices and lack of a defined measurement tool make investigation of the training response difficult at best. The next chapter summarizes the results of the free text responses from the officers participating in these activities. The chapter then provides the results of the two validated survey instruments described in this chapter. The use of validated survey instruments for sense of presence in the virtual environment and for task load allow us to make some assertations regarding the current de-escalation practice sessions. The next chapter focuses on the experience of the participants in the simulator with the following chapters focused on training results.

CHAPTER FOUR: TRAINING EXPERIENCE FROM REPURPOSING SIMULATION TO PRACTICE DE-ESCALATION SCENARIOS

4.1 Free Text Responses

Although it is not a stated hypothesis, there was an expectation by the researcher and by the department training lead that officers would find the simulation experience worthwhile and relatively pleasant. The results of the free text responses are largely in line with those expectations. The majority of the survey respondents left the free text fields blank. The nonblank responses are supplied in Appendix A. Many of the comments called for more practice and more challenging scenarios. The call for more challenge came from both departments, but it was more pronounced from Mt. Dora. There had been an intention to have a more complex scenario with multiple individuals for the second Mount Dora session, but it was scrubbed due to technical difficulties.

Other themes emerging in the free text responses include:

1. Desire for more Crisis Intervention Training (CIT)
2. Concerns about occasions when de-escalation does not work as expected
3. More knowledge of de-escalation tactics and techniques
4. Increased opportunities for practice, especially reoccurring practice

The participants in the Mount Dora study had opportunities to ask questions and make comments directly to the researcher. These comments were overwhelmingly positive with many officers thankful to get the training. Some of the comment indicated that the scenarios could be more difficult or more intense. Many participants mentioned appreciation for having a scenario at a location which was recognizably their community. In many instances their actions during the scenario indicated how well they know the community where they are working.

4.2 Present ITC-SOPI results

Immersion in an experience can be affected by many things. Individuals bring their own background and lived reality to each encounter. This includes their physical attributes as well as thoughts and feelings. Simulation can offer the advantage of addressing more of a person's senses compared to other practice methods. The ITC-SOPI survey is designed to look at four different aspects of immersion and has been applied to many types of simulation.

Increased immersion may increase the transfer of skills from the training experience to the practical situations (Farra, Smith, & Ulrich, 2018). The ITC-SOPI instrument was used for both Orange County and Mt. Dora. This section presents the results of each followed by a comparison of the two.

4.2.1 ITC-SOPI Results for Orange County

The Orange County deputies were responding to the survey based on their perceptions of the walk in 300-degree simulator originally intended for use-of-force training. A graphical display of the results for is shown in Figure 4 - ITC-SOPI Results for Orange County. The four factors are shown on the x-axis with the scores shown on the y-axis. The mean for each factor is given in the boxplot. The first three factors on the inventory score near the middle of the range. This indicates the officers were not overly wowed by the simulation experience. They were able to engage, but they did not reach a level of engagement to feel they had stepped outside of the training environment. The lower negative effects score indicates they were not significantly impacted by simulator sickness or other issues associated with using simulation technology.

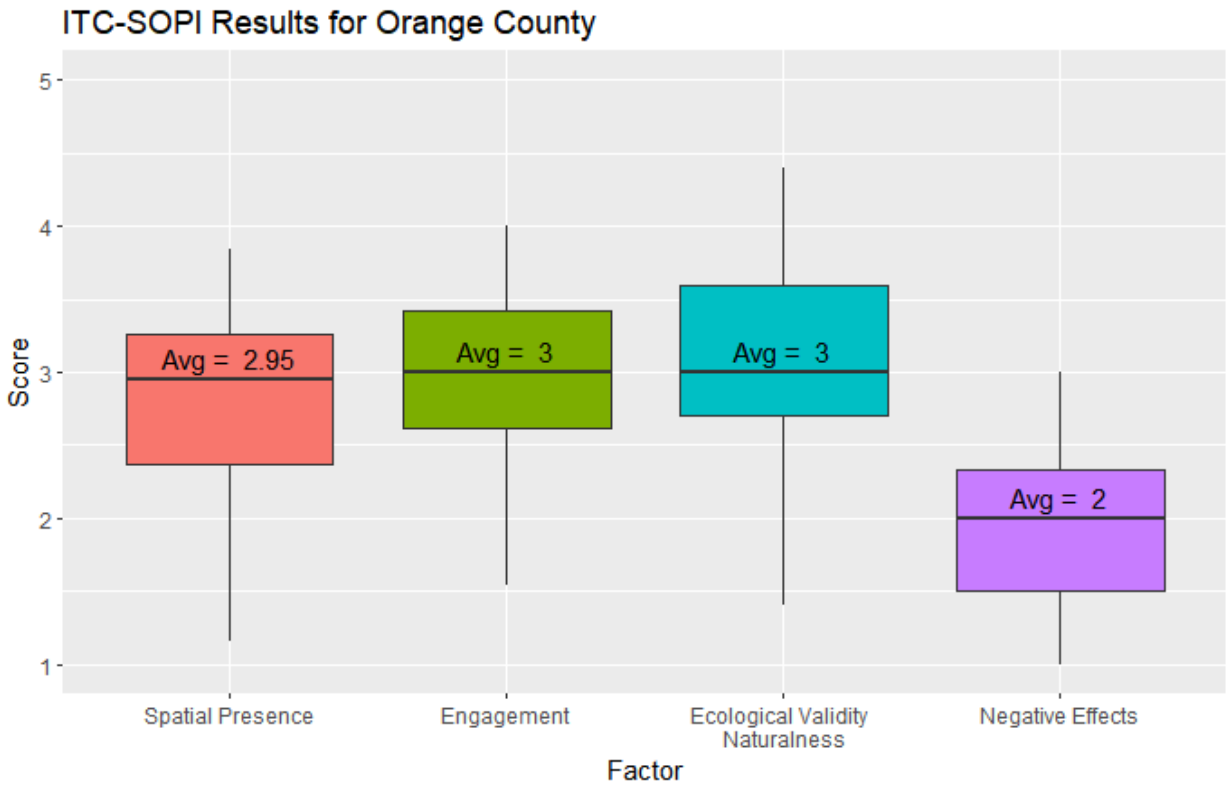


Figure 4 - ITC-SOPI Results for Orange County

4.2.2 Present ITC-SOPI results for Mt. Dora

The Mt. Dora officers are responding to the survey based on their training experience. Three different training experiences were rated: Zoom session with TeachLivE, Video session, and the combination of Zoom session with TeachLivE and Video referred to as Hybrid. These results, grouped by training experience, are shown in Figure 5 - ITC-SOPI Results for Mt. Dora. While the first three factors again hover about the midpoint, it should be noted that the TeachLivE session has a higher score for naturalness. It is also worth noting that this group had a lower negative effects score than the other groups. There is some indication that the nature of the TeachLivE experience may make this form of training more appealing to participants.

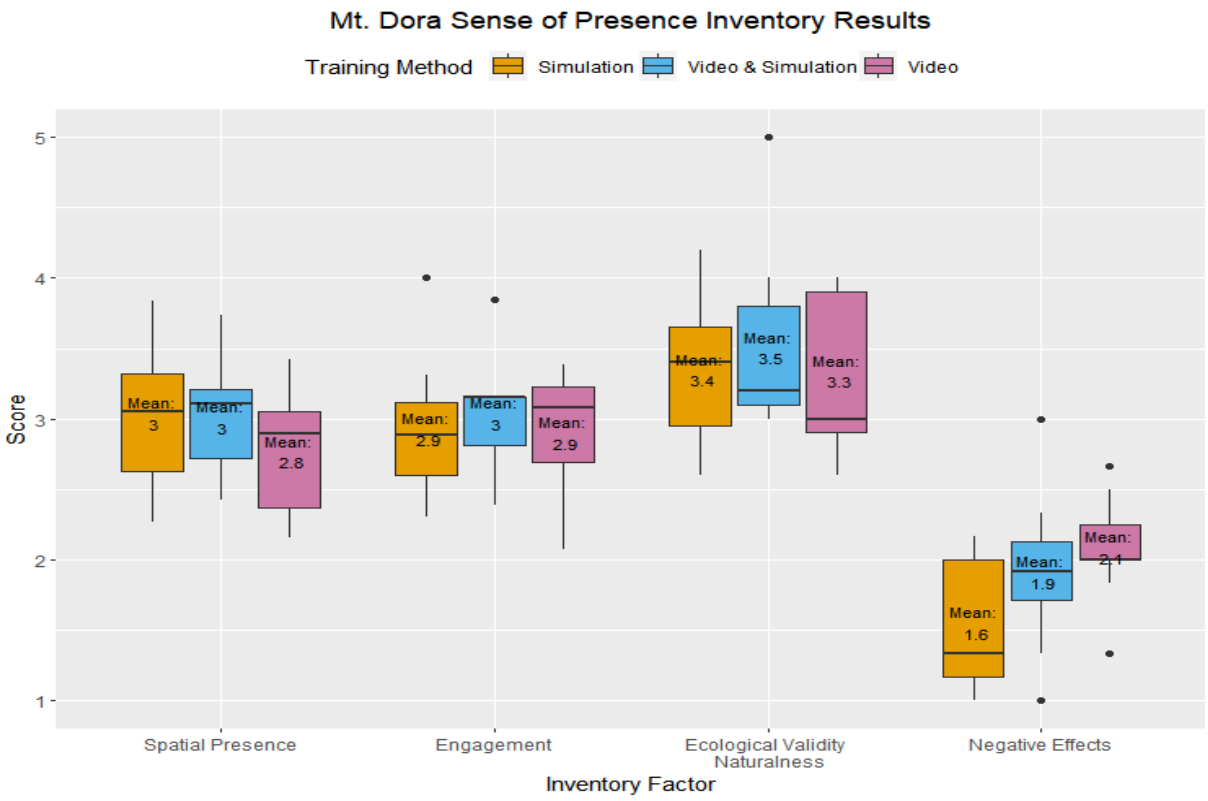


Figure 5 - ITC-SOPI Results for Mt. Dora

Looking at the graphic it appears there may be a significant difference in the Negative Effects scores. A post-hoc one-way analysis of variance (ANOVA) was conducted to examine these scores which indicated a statistically significant difference between the groups. A Tukey pairwise comparison was performed indicating the difference between the TeachLivE group and the video group was likely significant with a p-value of 0.02. This fits with a preference for the simulator compared to the video. For completeness a one-way ANOVA was conducted for the Ecological Validity factor, but it did not indicate a statistically significant difference. The original intent was to look at differences in skills based on the training and see if the level of engagement was affecting the differences. Given the relatively consistent level of engagement across all participants it is unlikely to mediate the effects of the training.

4.3 Compare ITC-SOPI

For the purpose of comparison, the simulation only group from Mt. Dora is compared to the simulation group from Orange County. The two simulators run on different technology and provide different user experiences.

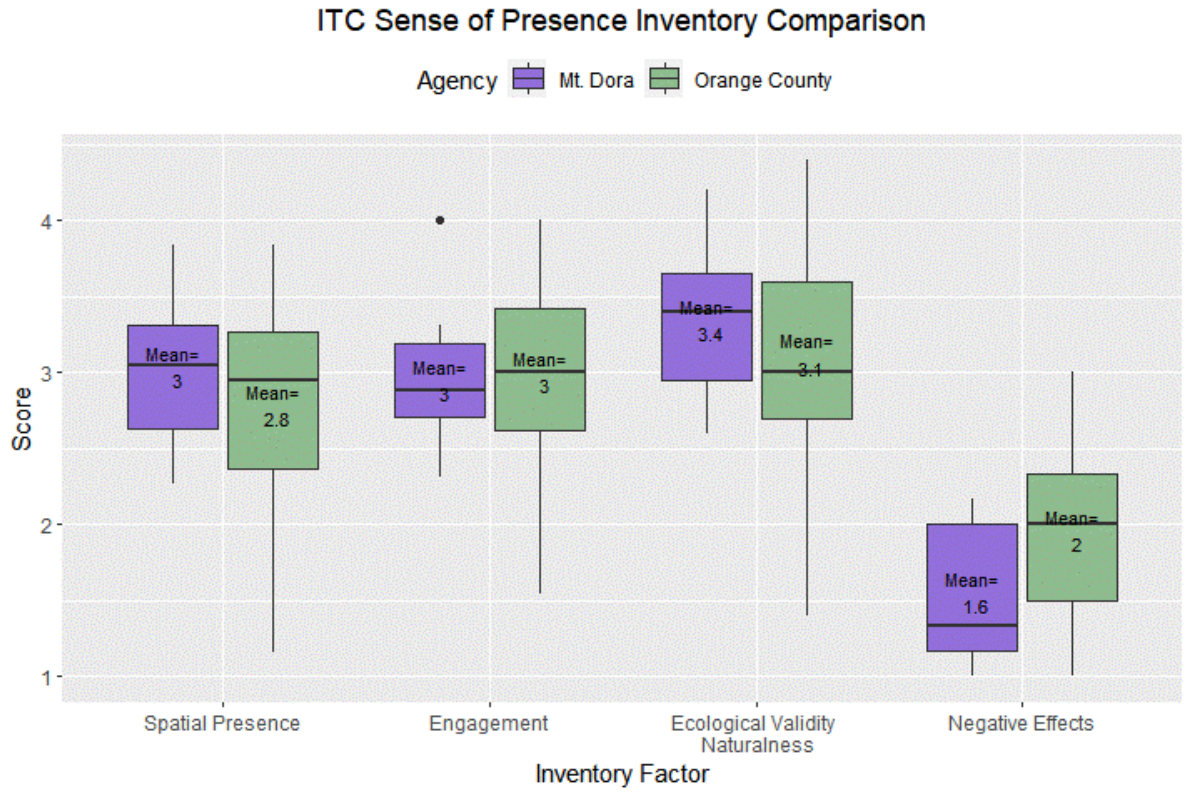


Figure 6 - ITC-SOPI Comparison between Mt. Dora and Orange County

This inventory allows us to compare experiences across simulators, but it does not help with measuring what may have been learned via the simulator. A t-test was conducted on the Negative Effects scores. It showed a statistically significant difference in the responses for the negative effects questions between the two simulators. Mt. Dora officers scored fewer negative effects, had a more positive experience, than the Orange County Officers.

4.4 Present NASA-TLX results from Mt. Dora

The NASA-TLX instrument was used to examine the workload of the Mt. Dora officers in the scenarios before and after training. The survey was not used for the training experience itself. The charts in Figure 7 - NASA TLX Results for Mt. Dora show there was no significant difference in workload before and after training. The workload is measured with six factors and combined score shown on the x-axis. The y-axis gives the numeric score with a boxplot shown for each factor. Some may argue that focus on de-escalation techniques may distract officers from safety concerns or other aspects of their job, but the evidence from the workload survey does not support that argument.

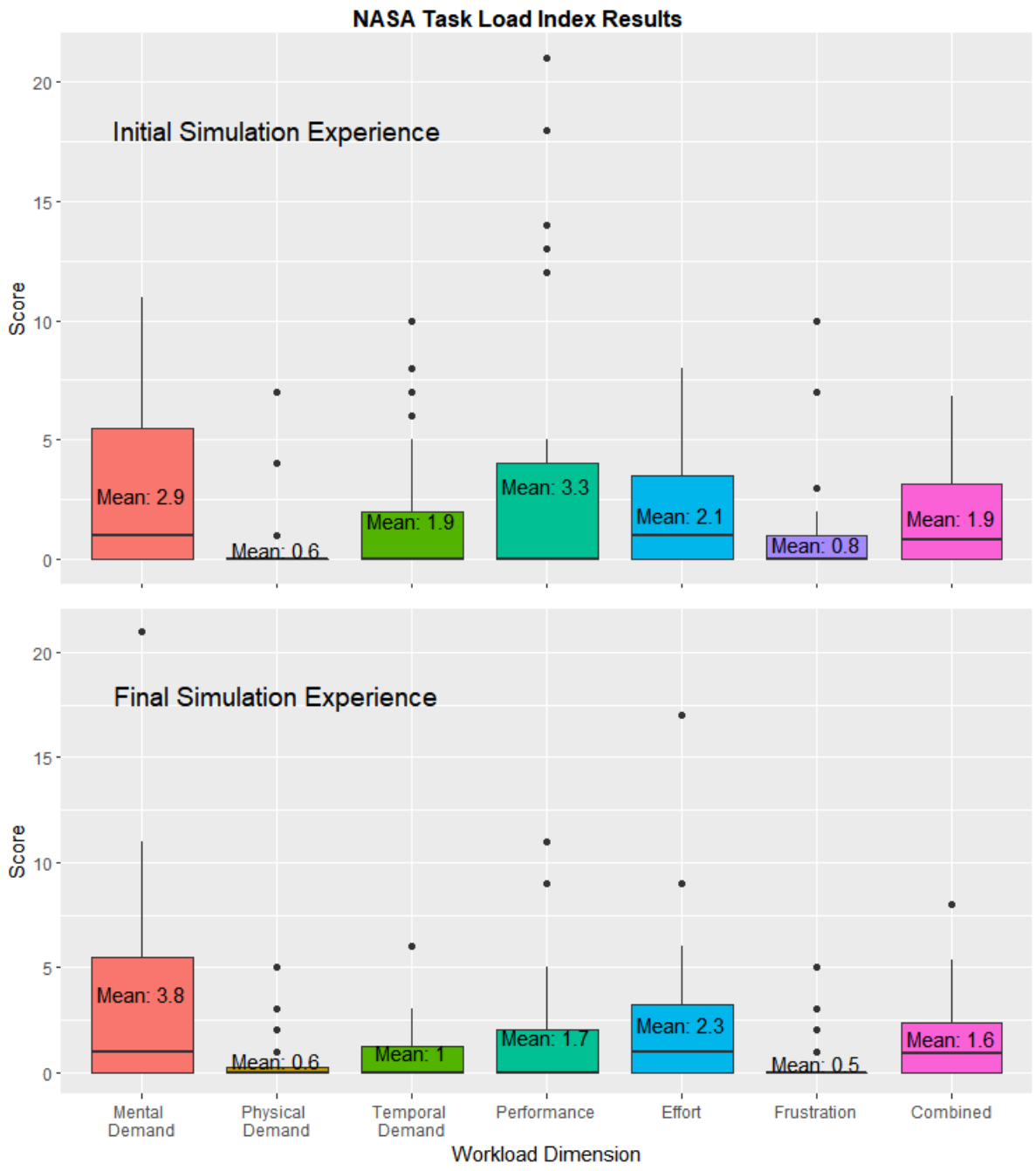


Figure 7 - NASA TLX Results for Mt. Dora

4.5 Discussion of NASA TLX

The combined value for the workload in the pre training scenario is 1.9. The combined value in the post training scenario is 1.6. The change in value is not statistically significant and

may be due to the small sample size, general fluctuation in workload, or increasing familiarity with the virtual reality environment.

4.6 Summary of Results from Validated Survey Instruments

This chapter focused on the results from test instruments that have been validated across many years in studies from a wide variety of industries. The results indicate that the use of simulation for training appears to have no ill effects on the officers involved and may be more enjoyable than more traditional training experiences. The simulation did not appear to impose a significant workload and the use of simulation is unlikely to detract from the learning experience. The free text responses indicated that participants felt the training was beneficial and would like more opportunities to practice de-escalation.

The next chapter focuses on measures appropriate for assessment of de-escalation practice in simulated environments. The responses to the questionnaire developed for this study are analyzed. These responses from law enforcement participating in simulation training are compared to the responses for those who have not had simulation training. There is also a comparison with responses from the local community.

CHAPTER FIVE: DE-ESCALATION MEASURES FROM SIMULATION PRACTICE

5.1 Questionnaire Scoring

The de-escalation questionnaire was used as a way to evaluate H1: Changes in an officer's attitudes and behaviors regarding de-escalation can be measured and observed. It was expected that officers with additional training would be more likely to respond in a manner recommended in de-escalation literature. Three different approaches were used to evaluate the scores on this questionnaire. First, the results were examined by looking for statistically different results at the level of individual questions. Matrices of boxplot results from the individual questions are shown in the next section, 5.2. The initial comparisons did not yield any statistically significant differences between groups. Second, an exploratory factor analysis was performed to isolate particular factors that may combine to indicate a difference in response. These results are given in the following section, 5.3. Third, a de-escalation score was created based on desired responses as garnered from the original material used to create the de-escalation questions. Comparisons of this score for each treatment group are shown in the next to the last section, 5.4. A comparison with the academic community was also included to see if prior police training had an effect on the responses to the de-escalation questions. The chapter ends with a summary of the regarding the responses to this questionnaire.

5.2 De-escalation Question Responses

Figure 8 - De-escalation Questionnaire Responses Consolidated Across All Groups shows the consolidated set of responses to the De-escalation questions. Each bar chart represents the responses to an individual question. The x-axis has the response categories. The height of the bars is based on the number of participants who selected that response.

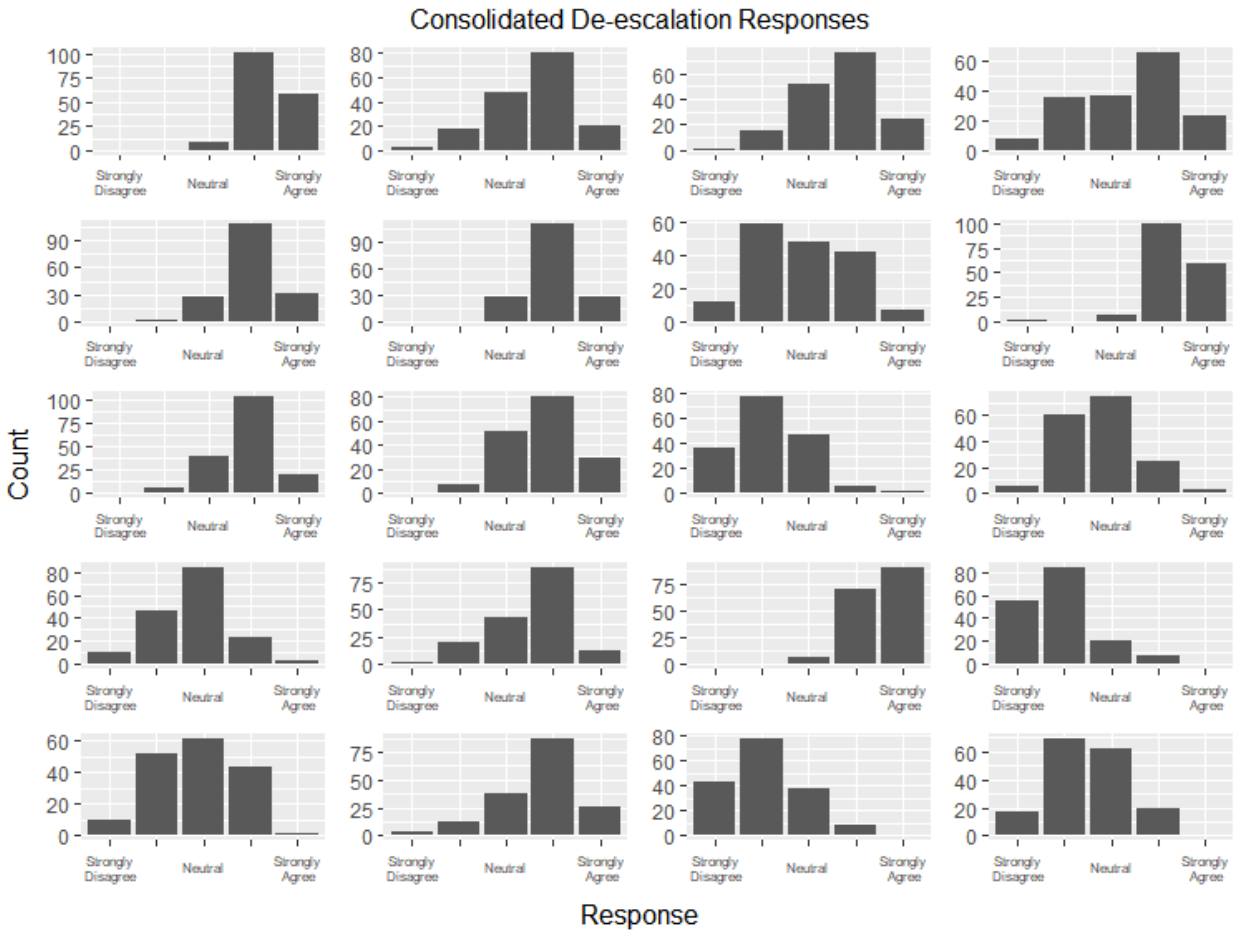


Figure 8 - De-escalation Questionnaire Responses Consolidated Across All Groups

It appears that questions 7, 11, 12, 13, 16, 17, 19 and 20 are negatively skewed as the responses are grouped to the left-hand side of the graph. These do not perfectly correspond to the questions where the experts expected increasing disagreement with increasing training.

5.2.1 Orange County De-escalation Responses

There were two treatment groups from Orange County, those that received de-escalation practice in the simulator and those that received driving training. The responses for each group are shown below. There were no statistically significant differences between the groups for responses to individual questions.

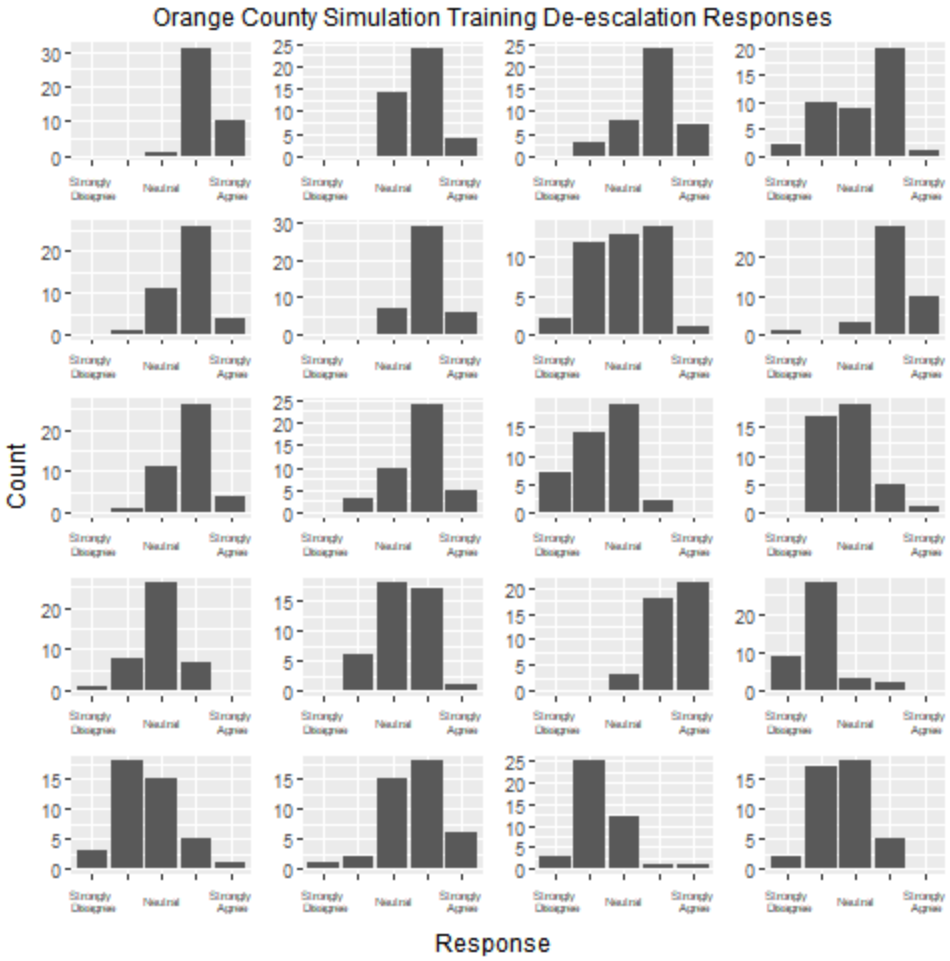


Figure 9 - De-escalation Question Responses for Orange County Deputies in the De-escalation Simulation Training Group

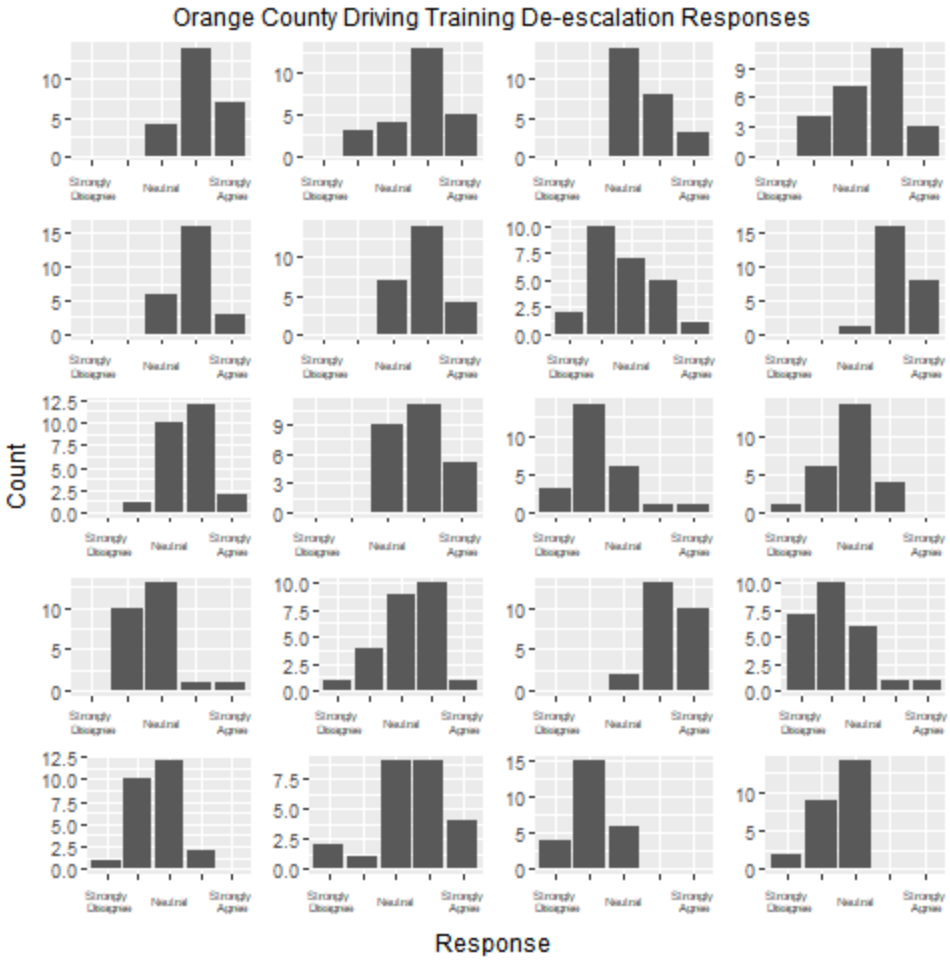


Figure 10 - De-escalation Question Responses for Orange County Deputies in the Driving Training Group

5.2.2 Mt. Dora De-escalation Responses

The Mt. Dora study was conducted with a pre-test/post-test approach. Therefore, the de-escalation question responses are grouped as pre-training and post-training. The particular type of training is not isolated in these graphs. A more comprehensive analysis was run including the individual training methods, but no statistically significant differences were found between the groups for the individual questions.

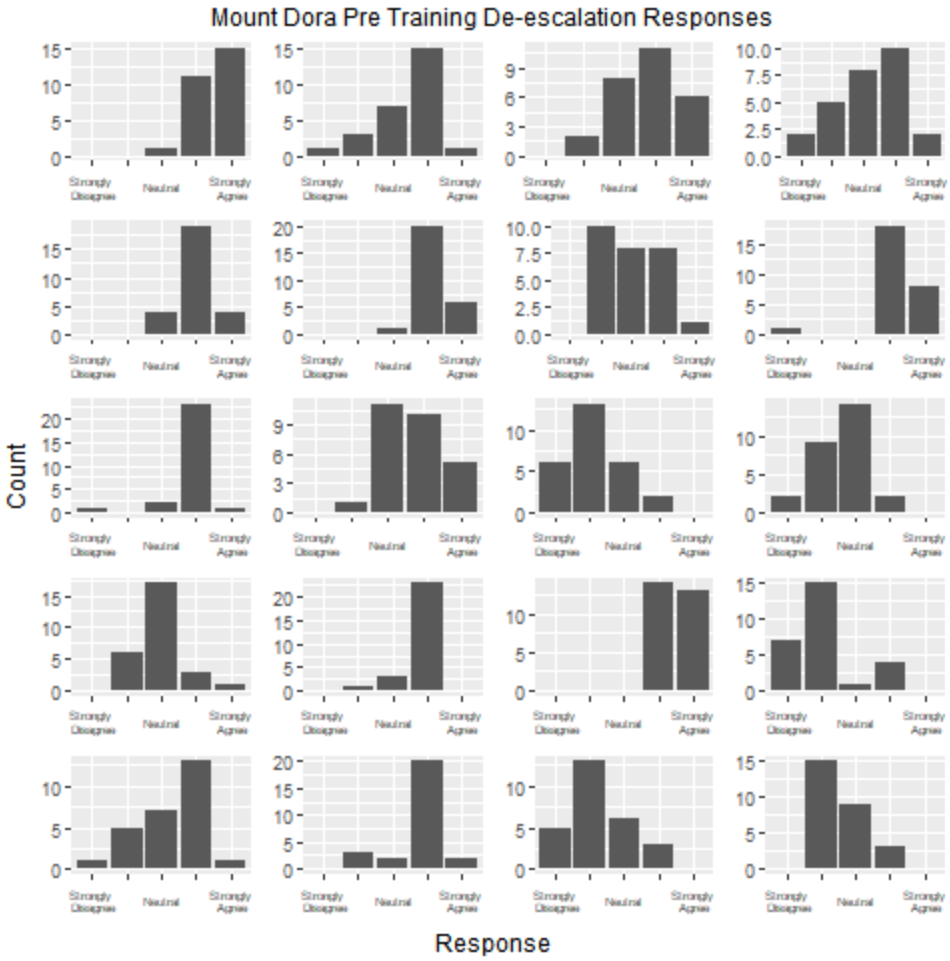


Figure 11 - De-escalation Question Responses for Mt. Dora Prior to Training

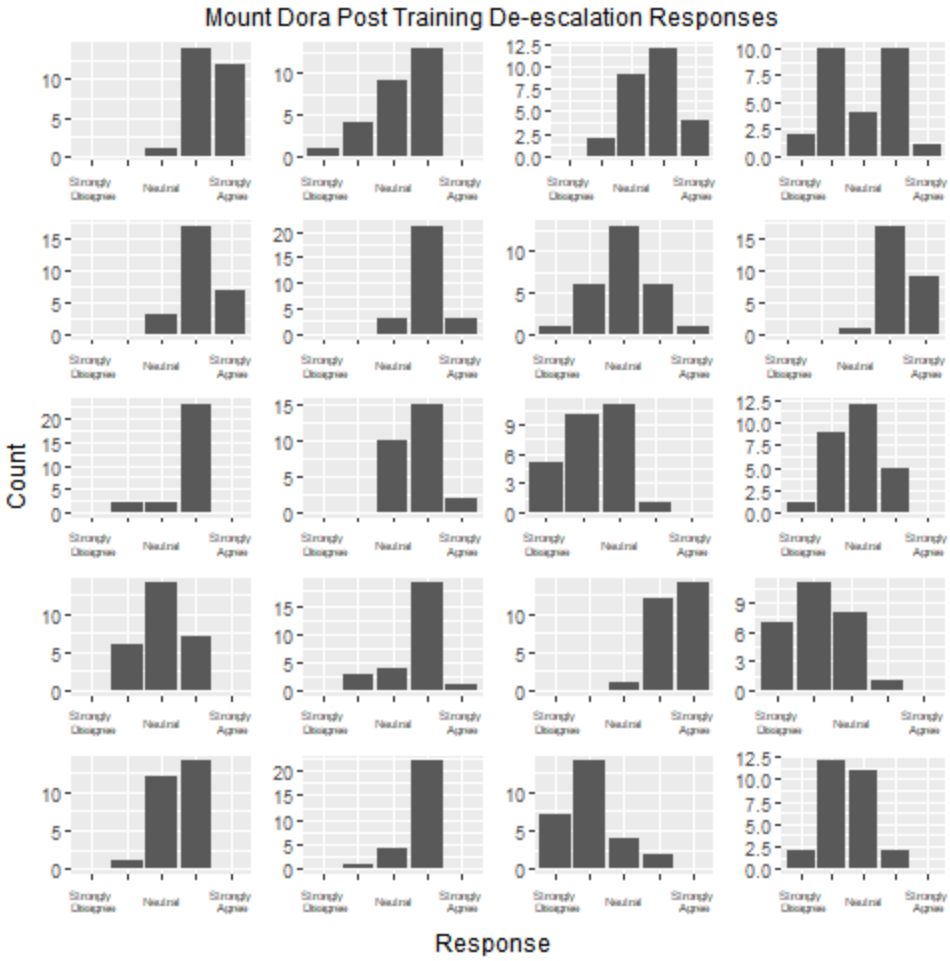


Figure 12 - De-escalation Question Responses for Mt. Dora Post Training

5.2.3 Local Community De-escalation Responses

This group is a sample of convenience from the same geographic area as the officers surveyed. They are used as a comparison to examine if prior police training may be affecting officer response.

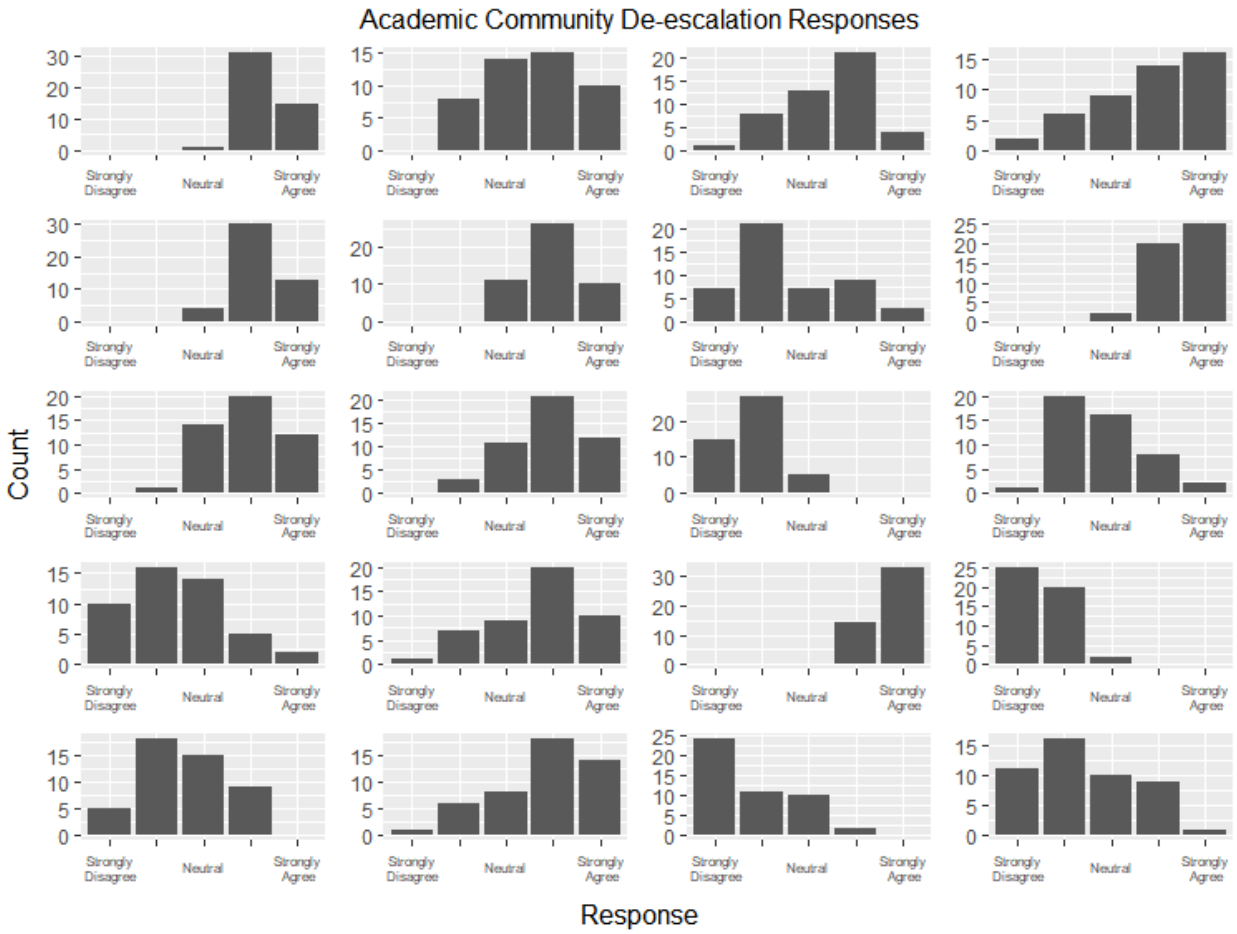


Figure 13 - De-escalation Question Responses from Local Community

5.2.4 Summary of Individual De-escalation Responses

There does not appear to be any significance in the differences between the survey response from these different communities when considered at an individual question level. The variations in responses do not appear to be related to the groups defined for this study. It is possible that there are variations at an individual level and this sampling was too small for it to be apparent. However, it is more likely that there is some grouping or combination of survey responses that are a result of the different levels of training an experience for the groups. In the next section we will examine a factor analysis to group the questions based on the similarities of their variations across groups. In the final section, the responses to the questions will be

averaged based on the recommended responses from the material that was used to create the survey. Alternatively, this survey may not be the best measure of the changes in attitudes and behaviors regarding de-escalation.

5.3 Survey Scoring Based on Factor Analysis

Factor analysis is a form of data reduction where a large number of variables are reduced to a set of underlying factors based on correlations between the variables. The idea is that underlying factors that cannot be measured directly drive the variation in the measured variables. Given no obvious or previously measured factors, an exploratory factor analysis was conducted on the de-escalation responses looking for factors that may be affected by the de-escalation training. Table 7 - Description of Statistical Variation of De-escalation Responses describes the variation in the dataset of the twenty variables.

Table 7 - Description of Statistical Variation of De-escalation Responses

Variable	Min	Max	Mean	Median	Skew	Kurtosis
V1	3	5	4.303571	4	-0.0214687	-0.6333576
V2	1	5	3.583333	4	-0.4638768	-0.0922933
V3	1	5	3.636905	4	-0.3126226	-0.2636791
V4	1	5	3.357143	4	-0.3327999	-0.7954575
V5	2	5	4.005952	4	-0.1573683	0.1430560
V6	3	5	4.000000	4	0.0000000	-0.1378284
V7	1	5	2.839286	3	0.1525617	-0.7979372
V8	1	5	4.279762	4	-1.3705945	5.5838469
V9	1	5	3.803571	4	-0.6805880	1.3538522
V10	2	5	3.785714	4	-0.1519266	-0.4607734
V11	1	5	2.154762	2	0.3619691	-0.0456955
V12	1	5	2.755952	3	0.3224104	-0.0811278
V13	1	5	2.779762	3	0.0255535	0.1344098
V14	1	5	3.535714	4	-0.6265910	-0.0123275
V15	3	5	4.505952	5	-0.6059241	-0.6691350
V16	1	5	1.904762	2	0.9318861	0.9472756
V17	1	5	2.851190	3	-0.0802447	-0.7553618
V18	1	5	3.702381	4	-0.7771989	0.5861350
V19	1	5	2.083333	2	0.5386382	0.0288092
V20	1	5	2.511905	2	0.1682775	-0.3638606

A Kaiser-Meyer-Olkin (KMO) call is run to examine factor adequacy. (Kaiser, 1974) recommends an overall MSA greater than 0.6 for factorability. In this case the overall MSA = 0.72 indicating the factor analysis is likely to be successful. Next the correlations are examined to see if there is sufficient correlation present for a factor analysis to seem useful. Both Pearson Correlation (Figure 14) and Polychoric Correlation (Figure 15) are shown below in matrix form. Positive correlations are shaded in blue and negative correlations are shaded in red with darker shades indicating greater absolute values. Pearson correlation is appropriate when the values are normally distributed. The Polychoric Correlation uses a non-parametric analysis, which is appropriate if normality is not present.

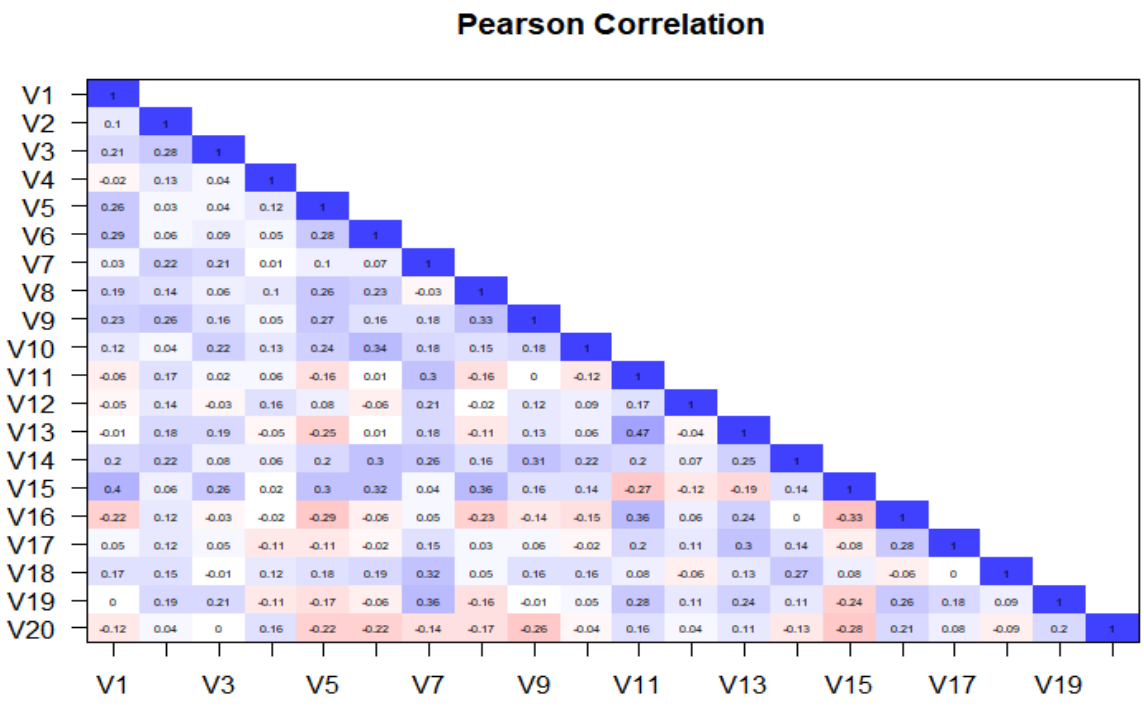


Figure 14 - Pearson Correlation Matrix for the De-escalation Response Variables

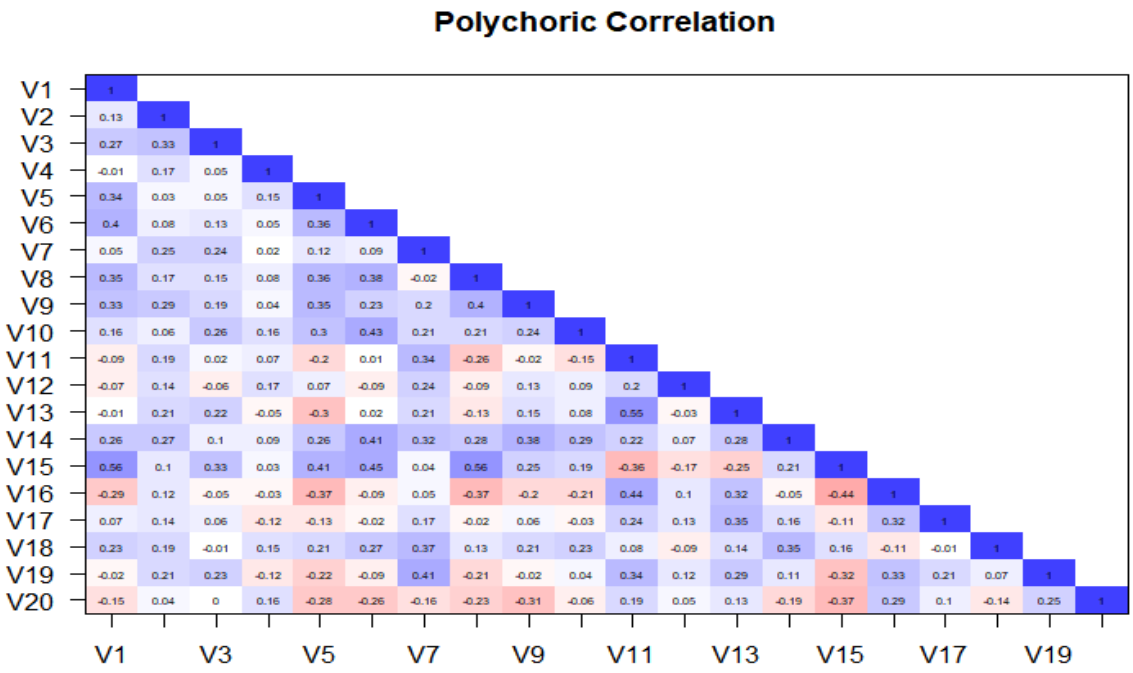


Figure 15 - Polychoric Correlation Matrix for the De-escalation Response Variables

The next step is to determine the number of factors to extract. As a starting point for determining the number of factors, a scree plot is created and shown in Figure 16 - Scree Plot for De-escalation Response Factor Analysis.

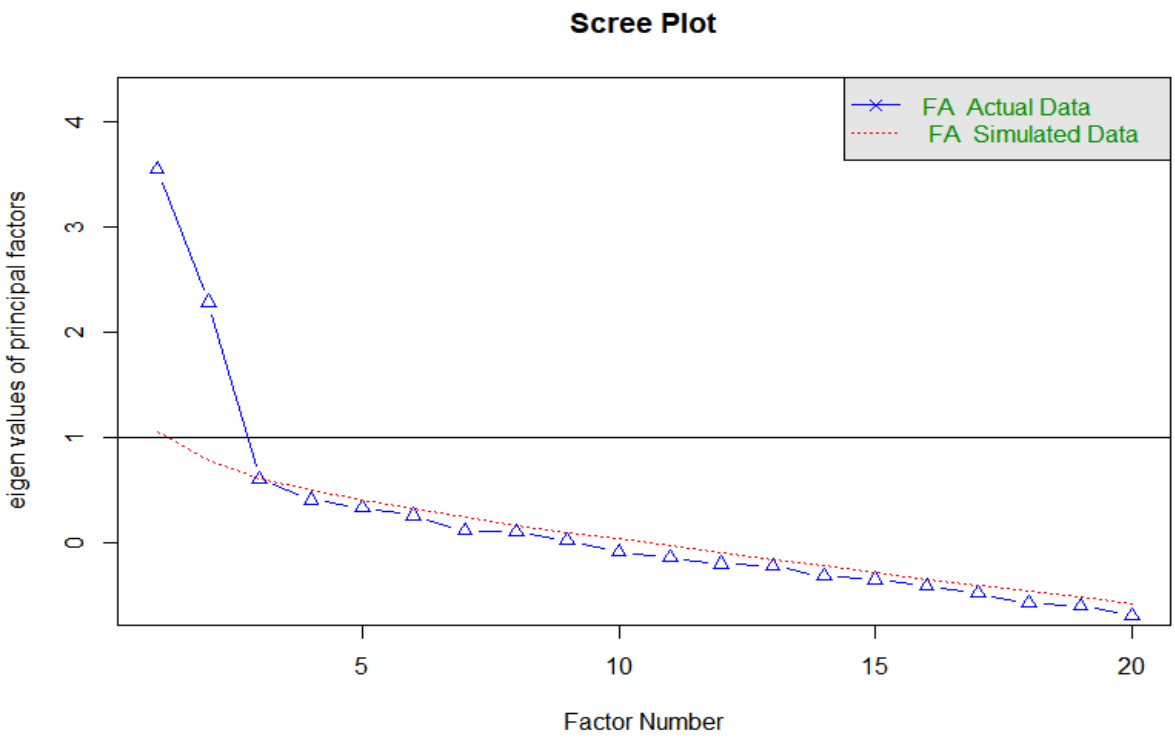


Figure 16 - Scree Plot for De-escalation Response Factor Analysis

Where the scree plot takes a bend to the right, the addition of more factors has less effect on the analysis. In this case it looks like two (2) factors will explain most of the variation. Therefore, we run a cluster analysis looking for two clusters. The resulting clusters are shown in Figure 17 - Cluster Analysis for De-escalation Response Factor Analysis. The loadings for the two factors are given in Table 8 - Cluster Loadings for De-escalation Response Factor Analysis.

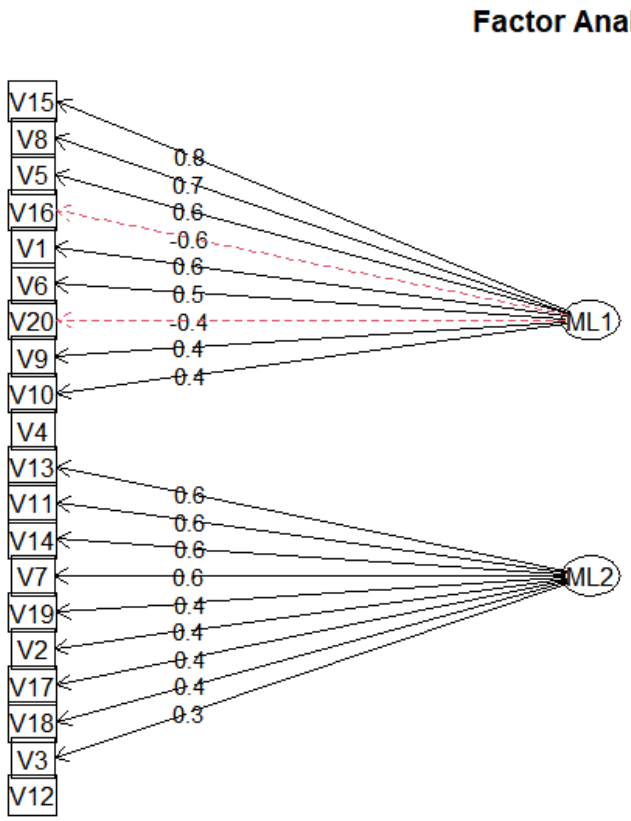


Figure 17 - Cluster Analysis for De-escalation Response Factor Analysis

Table 8 - Cluster Loadings for De-escalation Response Factor Analysis

	ML1	ML2
V1	0.572	0.209
V2	0.101	0.446
V3	0.228	0.306
V4		
V5	0.602	
V6	0.534	0.291
V7		0.556
V8	0.658	
V9	0.440	0.355
V10	0.366	0.245
V11	-0.432	0.590
V12	-0.118	0.183
V13	-0.290	0.609
V14	0.338	0.583
V15	0.796	
V16	-0.582	0.276
V17	-0.175	0.365
V18	0.268	0.362
V19	-0.339	0.448
V20	-0.444	

The chart on the next page shows the questions color coded by their factor association from the cluster analysis shown in Figure 17 - Cluster Analysis for De-escalation Response Factor Analysis. Question 4 is not associated with either factor and so it is left with a white background.

Table 9 - De-escalation Questions Color Coded by Cluster

De-escalation Questions Coded by Cluster
1. Finding points of agreement can reduce a conflict even when a person is in crisis.
2. It is important to intervene quickly when someone behaves erratically.
3. Law enforcement should always act on information at their disposal.
4. De-escalation is stressful work and can result in negative effects for the officers involved.
5. When attempting to de-escalate a tense situation it is important to give individuals choices.
6. When attempting to de-escalate a tense situation it is useful to ask what and how questions.
7. When responding to bizarre statements it is important to focus on the illogic of the statement.
8. When listening to someone who is in crisis, it is important to give them undivided attention.
9. In order to resolve an incident quickly, it is important to keep the conversation going.
10. When someone has a sudden change in tone it may be a sign the situation is escalating.
11. When an individual is in crisis it is important to raise your voice to ensure they can hear you.
12. Focusing on moving forward into the future will not help with the immediate problem.
13. When approaching an individual, it is important to look authoritative.
14. When talking about a situation it is important to stick to the facts.
15. When approaching an individual it is important to listen to what they are saying.
16. In approaching a person in crisis observing personal space is not an issue.
17. When trying to de-escalate a tense situation your nonverbal communication remains typical.
18. When talking to someone who is upset it is important to judge their situation correctly.
19. After you ask a question, silence from someone is a sign of disrespect or hostility.
20. When others ask challenging questions you may choose to ignore the questions.

Having identified the two clusters, the factors associated with them can be constructed. The original data captured can be used to see if there is an underlying difference in factors between the groups. For this analysis the groups are the local population, the officers from Mt. Dora prior to training, the officers from Mt. Dora after training, the Orange County Deputies who attended Simulator training, and the Orange County Deputies who attended Driving Training. Calculating the score for Factor 1 involves adding the individual values for the associated variables that are positively correlated and subtracting the values for the ones that are negatively correlated. Visually comparing the results gives the graph shown in Figure 18 - Comparison of Scores for Factor 1 Across Groups.

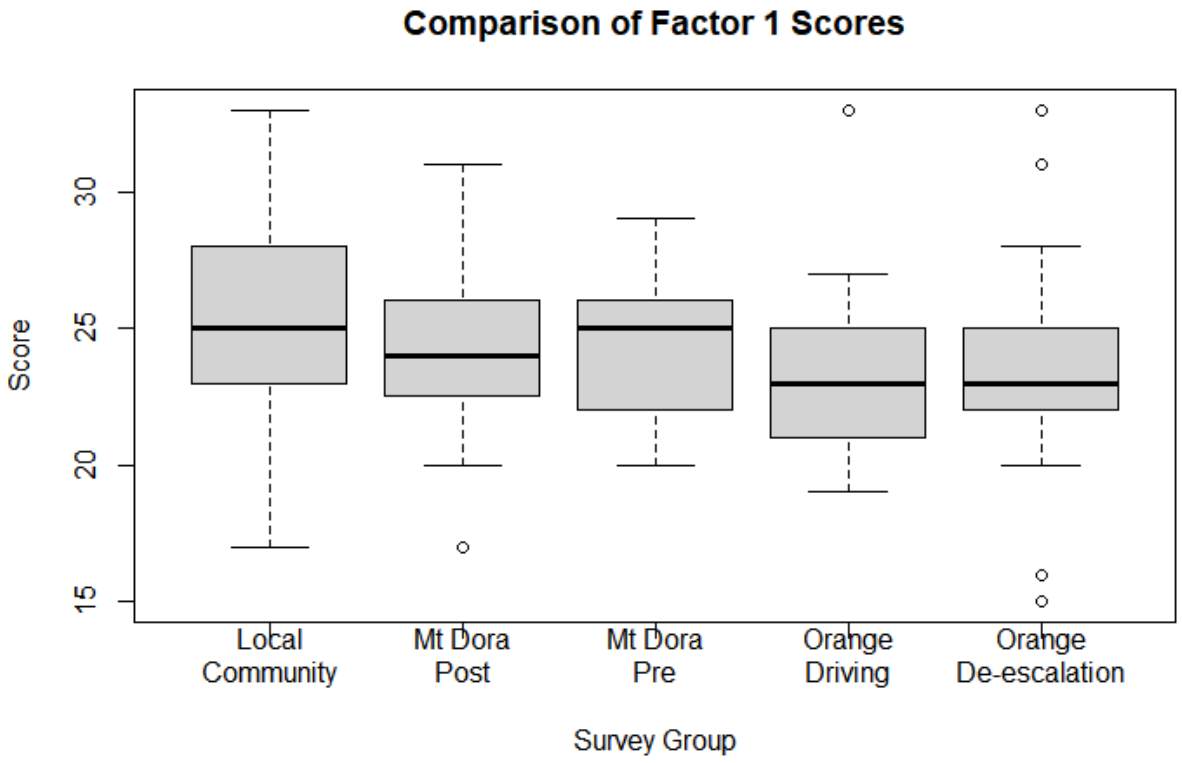


Figure 18 - Comparison of Scores for Factor 1 Across Groups

Running a one-way analysis of variance gives a p-value of 0.02, which indicates one or more of the differences between the groups may be significant. Using a Tukey analysis shows a statistically significant difference between the local population and the Orange County deputies, both those who participated in the simulator training ($p = 0.03$) and those who had other training ($p = 0.05$). Officers from Orange County are responding differently than the local community which could be the result of the training they had the previous year.

Looking at the second factor, none of the variables were negatively correlated so the individual response values were totaled to create the scores. These are shown visually in

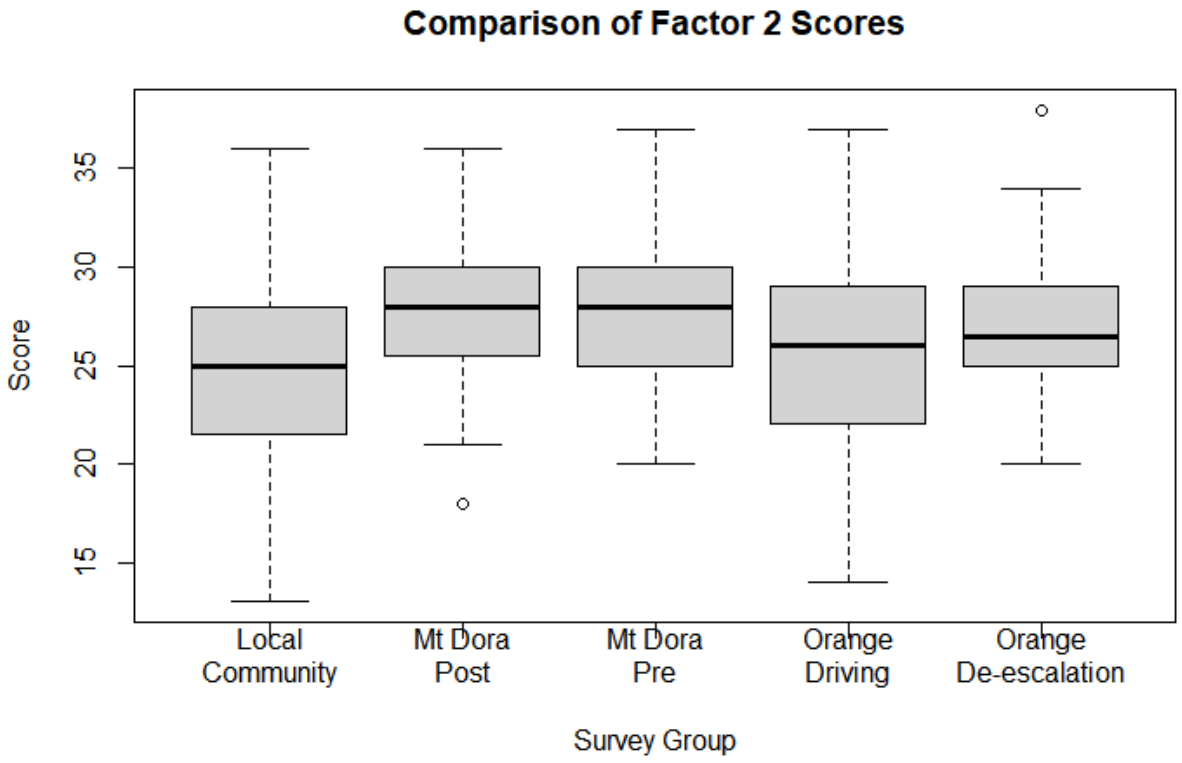


Figure 19 - Comparison of Scores for Factor 2 Across Groups

The one-way analysis of variance shows a p-value of 0.01 indicating a significant difference between some groups. The Tukey analysis comparing the groups shows a statistically significant difference between the local population and the officers in Mt. Dora prior to the Virtual Reality training ($p = 0.03$). It is possible that previous training for this group caused them to differ from the expectations of the community, and the virtual reality training countered that previous training as there does not appear to be a statistically significant difference in responses after the training. Even looking for underlying factors, this instrument does not appear to be a good way to measure the results of de-escalation training. There does not appear to be support for H1.

5.4 Survey Scoring Based on Background Recommendations

The de-escalation questions were created based on literature recommendations regarding how to go about de-escalating tense, critical situations. There were expectations regarding the best approach used to create the questions even if the literature was not always consistent. To create a de-escalation score, the original recommendations supporting each question were examined to determine if acting in agreement with the question was more likely to de-escalate the situation or if acting contrary to the questions was more likely to de-escalate the situation. In total 9 questions were formulated for agreement while 11 questions were formulated for contrary action. The total agreement score was created by adding the values of those responses (coded 1 to 5) and dividing by 9. The total contrary score was created by adding the values of the contrary responses (coded 1 to 5) and dividing by 11. The final score was generated as the agreement score minus the contrary score.

Using the De-escalation score computed above, the average for Orange County after Simulator training, Mount Dora after Simulation and training, Orange County without Simulator training, and Mount Dora prior to Simulation and training were compared with the local community. The results are shown in Figure 20 - De-escalation Scores Across Groups Based on Background Recommendations.

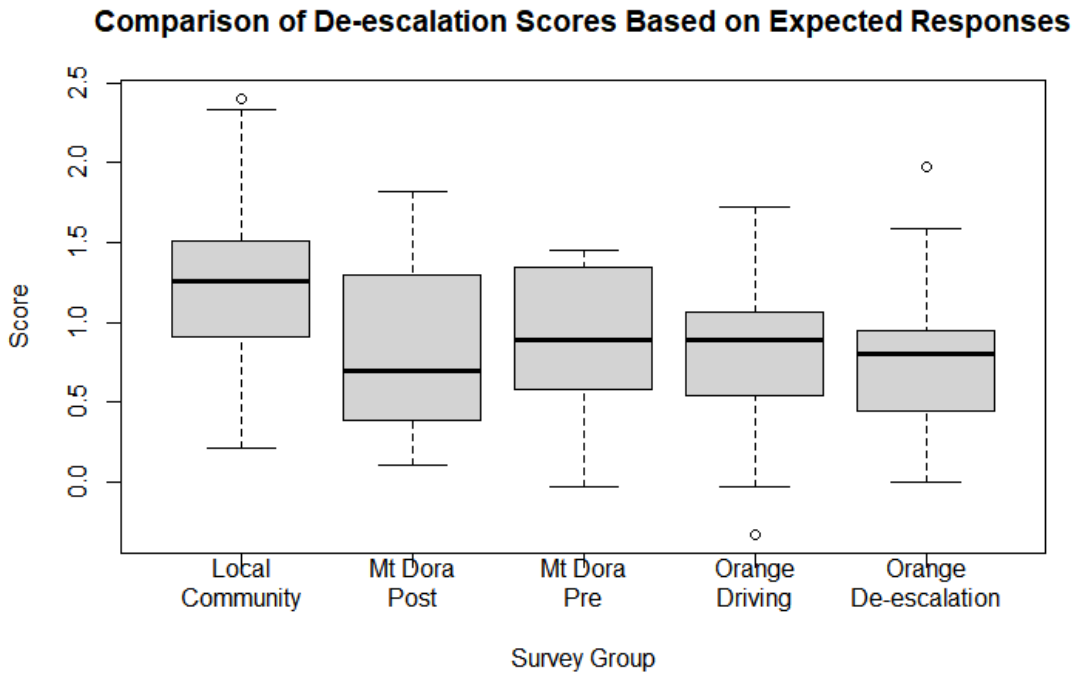


Figure 20 - De-escalation Scores Across Groups Based on Background Recommendations

An analysis of variance was calculated for these groups using R. A p-value of 5.03e-05 indicates a significant difference for at least one of these groups. Following this a Tukey Honest Significant Differences comparison was run to perform multiple pairwise comparisons between the means of the groups. The results showed a statistically significant difference between the local community group and each of the other groups. None of the other comparisons reached the level of statistical significance. These differences support the idea that training and practice for law enforcement does result in a difference from the expectations of the general population.

Table 10 - Tukey Multiple Comparisons of Means

GROUP	DIFF	LOWER	UPPER	P ADJ
MDS-APD	-0.42877952	-0.7409578	-0.11660126	0.0019620
MDU-APD	-0.39772827	-0.7099065	-0.08555001	0.0051063
OCD-APD	-0.34195573	-0.6619667	-0.02194472	0.0297573
OCS-APD	-0.44793937	-0.7224373	-0.17344147	0.0001237
MDU-MDS	0.03105125	-0.3207932	0.38289572	0.9992169
OCD-MDS	0.08682379	-0.2719886	0.44563615	0.9630638
OCS-MDS	-0.01915985	-0.3380460	0.29972627	0.9998292
OCD-MDU	0.05577254	-0.3030398	0.41458490	0.9928956
OCS-MDU	-0.05021111	-0.3690972	0.26867502	0.9925357
OCS-OCD	-0.10598365	-0.4325417	0.22057438	0.8983060

There does not appear to be a statistically significant difference between the officers who participated in de-escalation training and those who participated in other training. It is likely that the overall background and experience of the police officers makes their responses different than those of members of the local community.

5.5 Summary of De-escalation Questionnaire

This chapter starts to illustrate how little is measured regarding de-escalation. The survey instrument was constructed based on publicly available recommendations for de-escalation. Training did not result in a statistically significant change for any individual survey question. A factor analysis produced two potential factors accounting for most of the change between groups. These factors indicate that law enforcement responses show a statistically significant difference compared to the local community. However, these factors did not show a statistically significant difference across law enforcement training groups. Adjusting for positive and negative coefficients based on the original recommendations also indicates a statistically significant difference between law enforcement and the local community. Unfortunately, it showed active-duty law enforcement officers produced lower scores, based on the recommendations, compared to the untrained community group. It is possible the law enforcement training is reenforcing

something which is in conflict with the expert recommendations. Currently there is limited information to validate these recommendations. These findings could be an indication that and the recommendations are missing something for the law enforcement environment. The experience in the simulation may closely resemble the situations officers face that calls for a different approach to de-escalation compared to those used in less public settings. Alternatively, the experts may be correct, and the simulators are producing a negative training effect.

It does not appear that measuring de-escalation skills is as straight forward as measuring improvement in driving skills. This survey offers limited support for H1. Some of the video analysis in the next section may give additional insight into how de-escalation skills can be measured. The interesting comparison here is with the local community. It appears simulation training may increase the difference between the law enforcement de-escalation tactics and the expectations of the local community. This implies there may be demonstrable differences between de-escalation approaches in other settings and those used by law enforcement.

The next chapter looks at an alternative manner of measuring law enforcement de-escalation. This approach labels behaviors as de-escalating or escalating and notes which behaviors the officer performs. Measuring in this manner is only possible with audio visual access to the encounter. For this study that was possible for the officers in Mount Dora but not for those in Orange County. Therefore, the next chapter focuses on difference in Mount Dora before and after the training.

CHAPTER SIX: MOUNT DORA VIDEO ANALYSIS FOR DE-ESCALATION TECHNIQUE IDENTIFICATION

This chapter presents the results of analysis of the pre training and post training videos from Mount Dora. Video was not collected during the training sessions. The pre training scenario is not the same as the post training scenario so it is possible some of the differences are due to the scenario rather than a training effect.

There were 20 pre training videos and 19 post training videos. A total of 33 people appear in the pretraining videos and 27 people appear in the post training videos. Due to technical difficulties one pre training session and one post training session were not recorded. The DebriefScape tags were consolidated into four spreadsheets prior to being read into R.

6.1 Time spent in the Simulation

Officers had a maximum of 10 minutes to spend in the breakout session engaging with the virtual reality environment. This artificial limit was imposed to ensure there was time available for all participants to use the simulator. However, time was not a factor in any of the sessions and officers stayed within the 10-minute window and resolved all the scenarios. Hypothesis 4 expected officers to spend more time in the de-escalation scenario after training. To test this hypothesis the exact length of engagement was recorded for each session based on the video time stamp at the start and end of each simulation session. Sessions with two officers were counted twice in this analysis. Figure 21 - Comparison of Time Spent in Scenario Pre and Post Training below shows the times for the Pre-Training sessions and the Post Training sessions. After training the participants appear to spend longer in the scenario on average. Thus, the results lend support for Hypothesis 4.

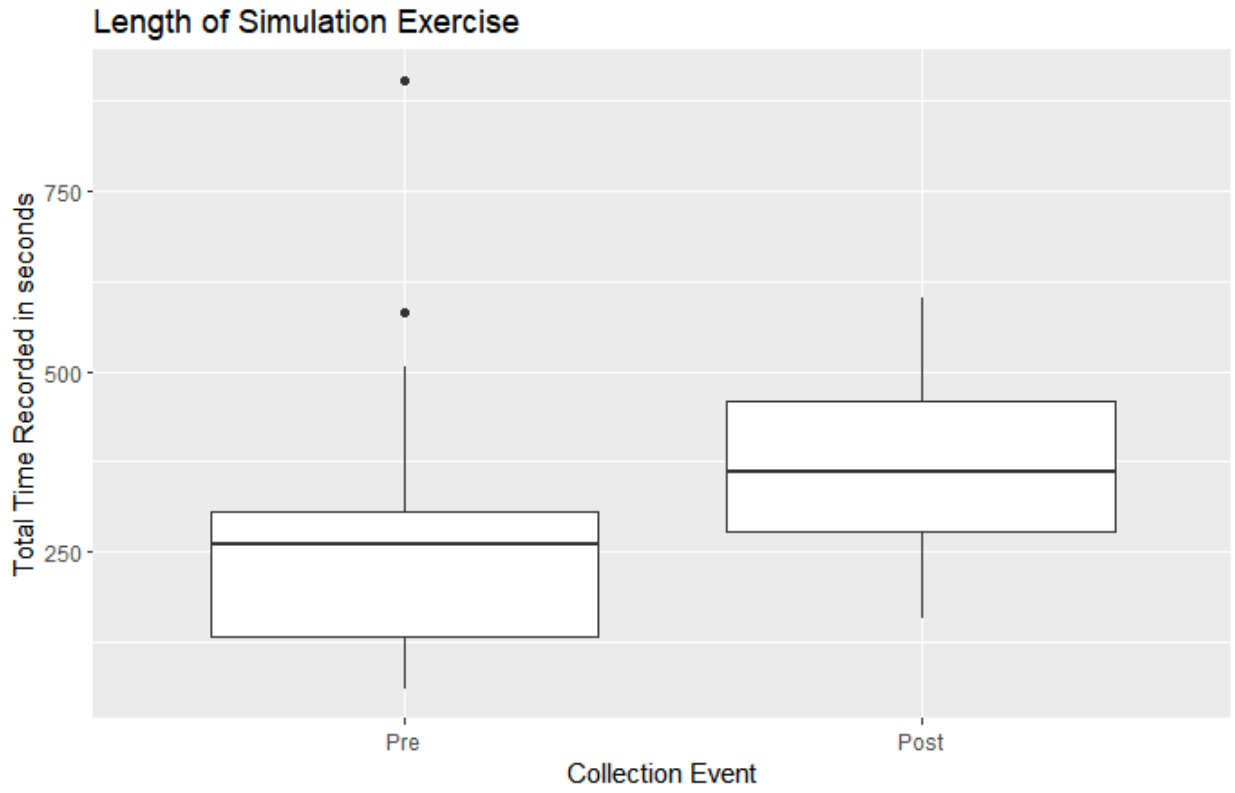


Figure 21 - Comparison of Time Spent in Scenario Pre and Post Training

An F test was run to compare the two variances. The ratio of the variances is not equal to 1 so a T-test was conducted based on an assumption of unequal variances. The T-test resulted in a p-value = 0.007076 secs indicating the difference in time spent in the scenarios is not likely due to chance. This gives tentative support for H4: After training, officers would slow down and spend more time in a scenario as they work through de-escalation techniques. It is possible that the training contributed to the additional time spent in the scenario post training, but there could be differences between the scenarios affecting this measure. While the Stacy scenario and the Martin scenario are similar and designed to be of a similar length, they are not the same and the Martin scenario may take longer to resolve. Therefore, it is possible that the difference in the time spent in the scenarios is inherent in the situation as opposed to resulting from the training.

6.2 De-Escalation Behaviors Observed

For each video a spreadsheet was created noting if the officers performed any of the actions shown in Table 11 - De-escalation Behaviors from Verbal Judo that are a subset of the original list delineated by Giacomantonio et al. (2020). The original list includes several other use of force options that may be present in other simulations but are not available to the officers in this scenario. The subset examined here is listed in Table 11 - De-escalation Behaviors from Verbal Judo with behaviors that are expected to be reduced after training shown in italics.

Table 11 - De-escalation Behaviors from Verbal Judo

	VERBAL JUDO BEHAVIORS
1	Ask for any justification
2	Ask for identification
3	Identify agency during introduction
4	Identify self during introduction
5	Provide a reason for contact at any time during the scenario
6	Provide a reason for contact during the introduction
7	Provide options (ask rather than tell)
8	Use appropriate close
9	Use appropriate greeting
10	Use empathetic statements
11	*Use anti-peace statements*
12	*Use excessive repetition*
13	*Use verbal commands*

Behaviors shown in italics should be reduced after training.

A total de-escalation score for each video was calculated by summing the number of items that were observed during the recording. The last three items, shown in italics, were coded negatively, they reduced the de-escalation score. The resulting scores for each video are shown in Figure 22 - Comparison of De-escalation Score based on Verbal Judo Pre and Post Training. Again, the results show support for Hypothesis 5 with an increase in behavior associated with de-escalation practices.

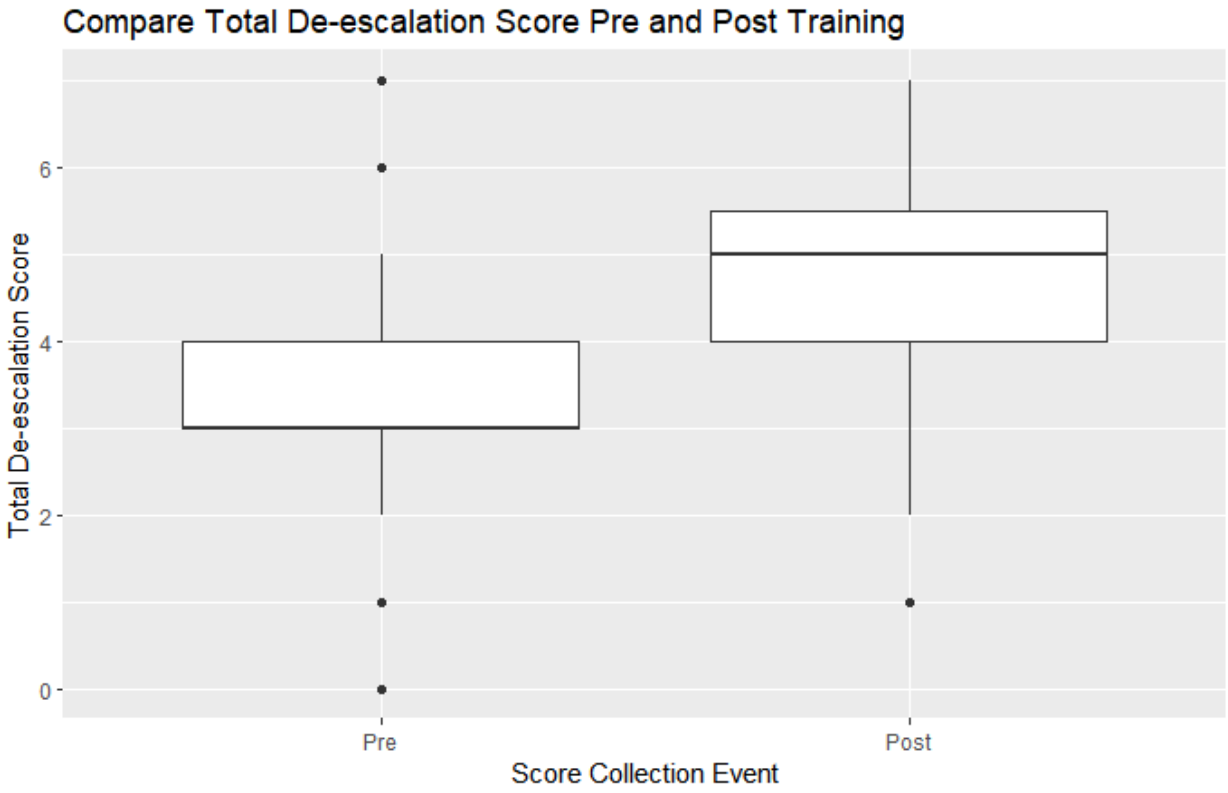


Figure 22 - Comparison of De-escalation Score based on Verbal Judo Pre and Post Training

Again, an F test was run to examine the variances of the two means. In this case the variances were similar, so a T-test was run with the assumption of similar variances. The T-test showed a p-value = 0.007659 indicating this variation was likely not due to chance. The difference may be the result of the training or could be impacted by the scenario in use although it seems less likely that the scenario would affect the officer's attempts to de-escalate.

6.3 Specific De-escalation Behaviors

It is appropriate to use a T-test when the independent variable is compared to results on an interval or ratio scale. For the specific de-escalation behaviors observed, the observations are on a yes/no scale. In this case, a Fisher exact test can be used to compare the number of responses who performed the behavior with the number of responses which did not perform the behavior across the groups (pre/post). When sample sizes are small, Fisher's exact test is more

appropriate that Person's Chi-squared test because Fisher's Exact test is not reliant on assumptions regarding distribution (Connelly, 2016; Scott Jones, 2019). This analysis was done for select behaviors where a noticeable difference in responses was visually apparent.

6.3.1 Behavior – Introduce Yourself

The two groups for the Fisher analysis are our pre training group and our post training group. The categorical variable examined in this section is introducing themselves. There are 33 individuals in the pre training group and 27 individuals in the post training group. The 2x2 matrix for this variable is shown in Table 12 - Matrix of Counts for Fisher Test of the Tactic "Introduce Yourself" and a mosaic plot to visualize this variable is shown in Figure 23 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Introduce Yourself".

Table 12 - Matrix of Counts for Fisher Test of the Tactic "Introduce Yourself"

Matrix for Introduce Yourself

	Pre	Post
Introduction	12	18
No Introduction	21	9

Figure 23 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Introduce Yourself"

The null hypothesis for this test is that there is no association between the officer training status and the officer introducing themselves during the simulation. The test found a significant association between the training status and the likelihood of the officer introducing themselves, p = 0.037. This leads to rejecting the null hypothesis. Completing the training does appear to increase the likelihood that the officer introduces themselves. This is an interesting finding because the training did not explicitly state this tactic. It emphasized respect for the subject which may have influenced the increase in introductions.

6.3.2 Behavior – Reason for Contact

The two groups used for this analysis mirror those in the previous section. The categorical variable is Provide a reason for contact. The counts are shown in Table 13 - Matrix of Counts for Fisher Test of the Tactic “Provide Reason for Contact”. For this variable, the number of times the officers provide a reason for the contact actually decreased in the post training sessions. However, with a p-value = 0.6137 this is not a statistically significant change. Graphically this is shown in Figure 24 - Mosaic Plot of the Counts for Fisher Test of the Tactic

"Provide Reason for Contact". It is likely that this behavior was not affected by the training and the difference is due to random variations.

Table 13 - Matrix of Counts for Fisher Test of the Tactic "Provide Reason for Contact"

Matrix for Reason for Contact

	Pre	Post
Reason	17	12
No Reason	16	15

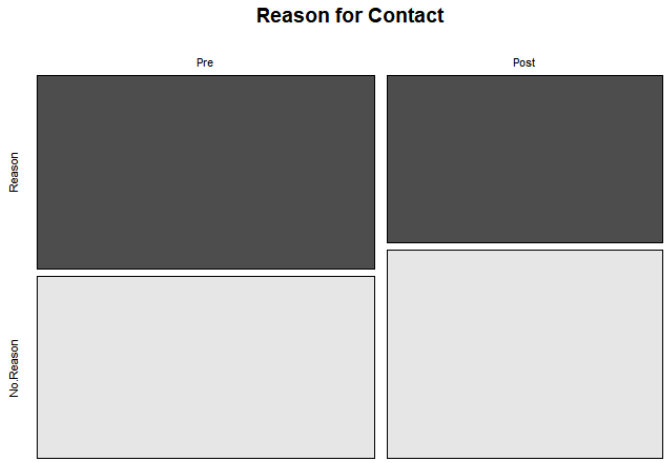


Figure 24 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Provide Reason for Contact"

6.3.3 Behavior – Provide Options

After the training the officers appeared more willing to provide options and alternatives rather than insist upon a course of action. While it may not always be appropriate, there are generally ways of phrasing courses of action which allow the other person some degree of choice or autonomy in responding. Providing alternatives may foster agency from the individual and defuse critical situations. Exact counts for this change are shown in Table 14 - Matrix of Counts

for Fisher Test of the Tactic "Provide Options" and shown graphically in Figure 25 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Provide Options".

Table 14 - Matrix of Counts for Fisher Test of the Tactic "Provide Options"

Matrix for Provide Options

	Pre	Post
Options	4	14
No Options	29	13

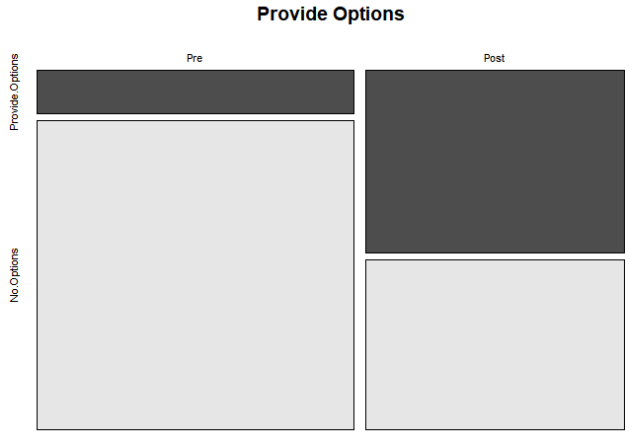


Figure 25 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Provide Options"

Running the Fisher test for this behavior shows a p-value = 0.001476. This is unlikely to occur by chance and lends support to the idea that providing options was increased by the training. This was somewhat expected as the training did discuss providing simple choices rather than making demands on individuals.

6.3.4 Behavior – Use Appropriate Close

The closing or ending of the scenario is also important. Showing a lack of respect at the end of an encounter can cause people to sow frustration with the next person they meet or to react negatively during future encounters with law enforcement. The exact counts for "Use Appropriate Close" are given in Table 15 – Matrix of Counts for Fisher Test of the Tactic "Use Appropriate Close" and shown graphically in Figure 26 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Use Appropriate Close".

Table 15 – Matrix of Counts for Fisher Test of the Tactic "Use Appropriate Close"

Matrix for Use Appropriate Close

	Pre	Post
Appropriate Close	19	19
No Appropriate Close	14	8

Figure 26 - Mosaic Plot of the Counts for Fisher Test of the Tactic “Use Appropriate Close”

In this case it is clear there is little change in the behavior. The calculated p-value = 0.4205 indicating any change is most likely due to chance. The training did not emphasize any need to close the encounter, so no change was expected in this area.

6.3.5 Behavior – Express Empathy

The two groups for this analysis are the same as the previous. The categorical variable is expressing empathy. This behavior was based on verbal statements by the officers rather than facial expressions. The 2x2 matrix for this variable is shown in

Table 16 - Matrix of Counts for Fisher Test of the Tactic "Express Empathy" and a mosaic plot to visualize this variable is shown in Figure 27 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Express Empathy".

Table 16 - Matrix of Counts for Fisher Test of the Tactic "Express Empathy"

Matrix for Express Empathy

	Pre	Post
Express Empathy	18	23
Not Express Empathy	15	4

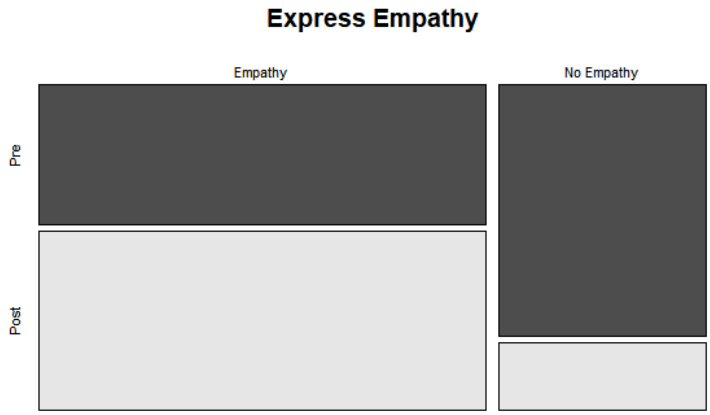


Figure 27 - Mosaic Plot of the Counts for Fisher Test of the Tactic "Express Empathy"

The null hypothesis is that there is no difference in the expression of empathy in the pre training simulation and the post training simulation. The calculated p=0.013 indicates the variation in expression of empathy is not likely due to chance alone. While the null hypothesis can be rejected, the difference in expression of empathy may be due to the difference in the character in the scenario. Martin may elicit more empathy than Stacy.

6.4 Observing Physical Responses Beyond Defined De-escalation Behaviors

In addition to the defined de-escalation behaviors, there is interest in the use of open-ended questions especially those starting with “How” or “What”. In addition, there may be other tactics or behaviors which arise from the training. The DebriefScape tool was used to tag when the officers asked questions. Furthermore, some facial expressions and hand gestures were captured in the recordings. These were categorized as Smile, Frown, Head Tilt, and Hands. Smile and Frown were tagged when the officer’s facial expression differed from their personal neutral. Head Tilt was used to indicate any head movement including nodding or head shaking which was perceived to be in response to the simulation scenario. Movements which appeared to be in response to something in the officer’s local environment were not tagged. Hands was used to note any hand gesture including covering their face with their hands, tugging on their ear, or using their hands for emphasis while speaking. Three categories of questions were tagged: What, How, and Other. Other questions far exceeded any of the other categories.

Given that the time the officers spent in the simulator was not consistent, it does not seem reasonable to just examine the number of these occurrences. Officers who resolved the situation quickly might do so by asking lots of questions or by listening attentively and nodding their head. Instead of just looking at the count, calculate the rate of each tag during per 1000 seconds during the Pre-Training scenario recordings. This analysis was repeated for the Post Training Scenarios. The Post Training recordings do not have the same pair groups as the Pre-Training recordings and there is no explicit way to match individuals from before and after training. Therefore, a pairwise comparison for changes in individual responses can’t be run. However, it is worth examining differences in the rate of occurrence between the Pre-Training Sessions and

the Post Training Sessions. This is shown in Figure 28 - Other Behaviors Captured from Video of Mt. Dora.

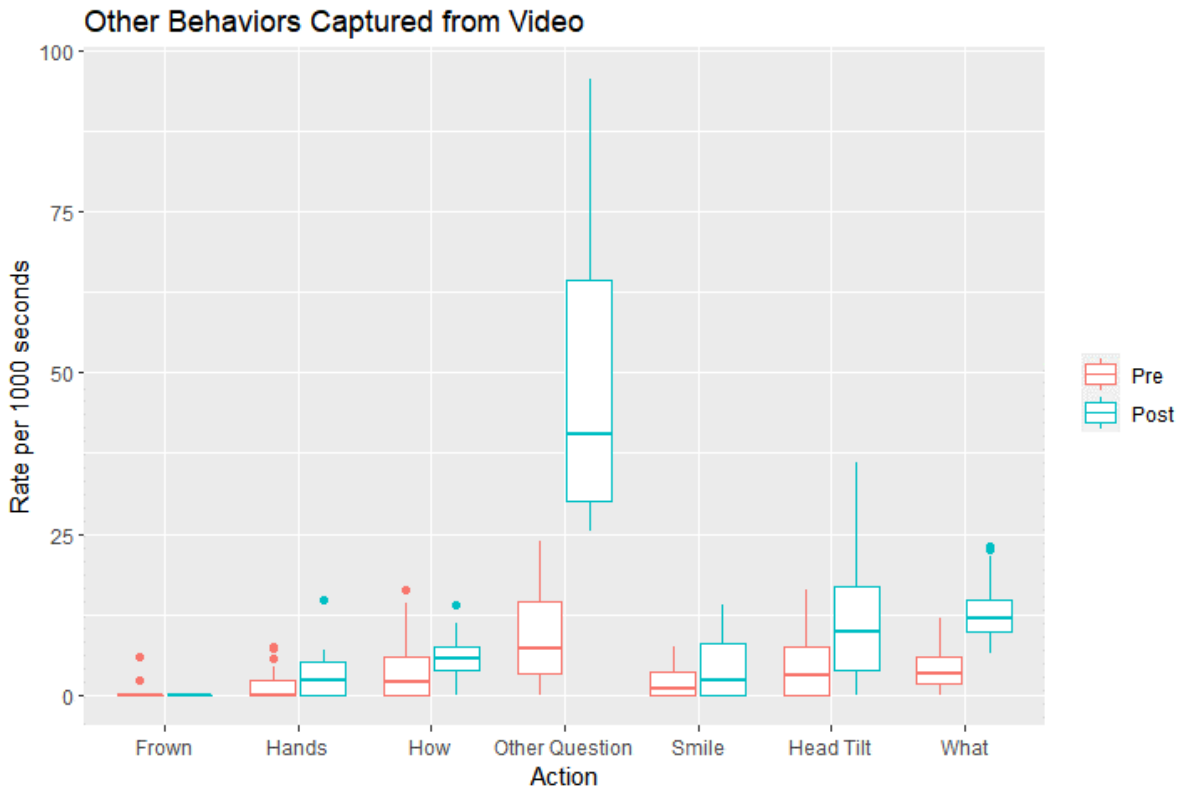


Figure 28 - Other Behaviors Captured from Video of Mt. Dora

For each behavior in Figure 28 a t-test was run comparing the rates of occurrence prior to the training and after the training. Table 17 - Results of t-tests for Other Behaviors from Mt. Dora Video below shows which tests indicate a statistically significant difference.

Table 17 - Results of t-tests for Other Behaviors from Mt. Dora Video

Behavior	*p-value*	*Significant*
Frown	0.20	no
Hands	0.21	no
How	0.11	no
Other Question	7.17×10^{-7}	yes
Smile	0.14	no
Head Tilt	0.01	yes
What	3.67×10^{-7}	yes

In the same way that the additional time spent in the scenario may be an effect of the scenario rather than a training result, it is possible that there is something in the Martin scenario which prompts the additional questions. However, part of the training included the need to engage individuals while maintaining physical distance. In addition, working through the training scenario may encourage asking more questions. The increase in head motions may indicate increased attention or an increase in body language meant to convey attention to the speaker. This was also a point in the training. The increase in the number of questions starting with "What" may indicate more open-ended questions allowing the person to explain the situation. The increase in questions especially questions starting with "What" offers support for H6: After training, officers would use more open-ended questions.

6.5 Summary of Video Analysis Results

Analysis of the changes between video recorded before the training and video recorded after the training offers some measure of the benefits of the training. It is important to bear in mind that this is not a pairwise comparison looking at the changes for an individual. The behaviors noted are a composite of the change in the overall group. Unfortunately, this does not help to address which form of training may be most beneficial. Across the Mt. Dora police force the time spent in the de-escalation scenario increased after training. While it is unusual for increased time to be considered a positive, that is the effect that is expected in de-escalation. Slowing down and spending time interacting with the individual is often important in attempting to intervene in a crisis. There is a statistically significant change in behaviors Introduce Yourself, Provide Options, and Express Empathy. These are behaviors which have previously been associated with improved de-escalation (Giacomantonio et al., 2020). In addition, using

video this researcher observed statistically significant increases in both asking questions and making head motions indicative of attentive listening.

The next chapter discusses the findings from Chapters 4 through 6 and the support they provide for the hypotheses delineated in Chapter 3. The implications of these findings for law enforcement agencies are discussed. These include some recommendations on how to get the most benefit from existing training regarding de-escalation. In addition, the chapter provides some directions for future research and possible ways to improve the use of simulation for training in social interactions.

CHAPTER SEVEN: DISCUSSION OF DE-ESCALATION RESULTS AND AVENUES FOR FURTHER RESEARCH

7.1 Key Findings for Law Enforcement De-escalation

The study examined several ways of assessing de-escalation skills including a post training survey regarding the training experience, a post training survey on de-escalation, and analysis of video captured during a simulated encounter. Overall, the video provided the most insight though additional work exploring tactics for law enforcement would be advantageous. Officers who have practiced show more alignment with expected de-escalation practices than those who have not. However, de-escalation as practiced by law enforcement may not correspond to the expected practices of those outside of law enforcement.

In general, participants were very willing to practice de-escalation tactics in the virtual environments. The simulators offered an enhanced training experience compared to more traditional methods. Officers who engage in virtual reality for training express lower negative effects scores than those who simply watch a movie. This implies that simulation may be better received as a training mechanism than watching recordings. Interactive participation may give virtual reality practice some advantage over videos as a training mechanism.

The responses to the de-escalation survey show a statistically significant difference between the Orange County deputies who trained in the simulator and the local community. Interestingly, this difference is away from agreement with the expected responses based on recommended de-escalation techniques. It could be that something covered in the simulation session is contrary to these recommendations or that the simulation experience gives the officers other ideas about how to approach the de-escalation task. Both trained and untrained officers from Mt. Dora were significantly different from the responses of the local community. There

may be something in the police culture or training of these officers that moves them away from the expected responses.

Analysis of captured video showed the simulation scenarios after training lasted longer than the scenarios prior to training. The training may be effective in helping officers to slow down a potentially emotional encounter. Officers also exhibited more de-escalation behaviors after the training, even exhibiting behaviors that were not mentioned in the training material. Focusing on better ways to engage with an individual may help officers to think about encounters in new ways and bring about an overall increase in actions designed to defuse a critical incident.

7.2 Summary of Support for Hypotheses

Regarding the hypotheses introduced in Chapter 3, support for each is presented below.

H1: Changes in an officer's attitudes and behaviors regarding de-escalation can be measured and observed.

This study showed some support for being able to observe changes in de-escalation practices after training. Behavioral measures appear to offer more insight into de-escalation skills than survey type measures. However, the specific behaviors to measure are not yet clear and may differ by the circumstances where they are applied.

H2: Practice in a simulator will improve an officer's ability to de-escalate a crisis situation.

The practice Orange County performed appeared to shift their responses to questions regarding de-escalation. That could be an indication of improved ability in a realistic scenario. The officers free text responses indicate they felt practice is beneficial.

The change in de-escalation practices before and after simulation training in Mt. Dora indicates this training may be effective in improving de-escalation behaviors. As there is still no consensus on how to measure de-escalation skills, there is limited ability to show improvement in those skills.

H3: De-escalation of a crisis in a public law enforcement venue requires different approaches than in other venues.

The differences in response between law enforcement and the local community indicate some support for law enforcement requiring different approaches than other venues. A comparison of de-escalation techniques across the literature (the mental health techniques) to law enforcement (the ones used here) show significant differences. This study adds support to the literature that law enforcement needs to approach de-escalation somewhat differently than other professionals. The skill improvement that comes from training and practice support the continued training of de-escalation for the law enforcement community. This fits with emerging understanding of the knowledge, skills and abilities that are needed for law enforcement de-escalation (Bennell et al., 2022).

H4: After training, officers would slow down and spend more time in a scenario as they work through de-escalation techniques.

The Mount Dora session indicate support for officers spending more time working with individuals after the de-escalation training. The sessions after the training were significantly longer than sessions prior to the training.

H5: After training, officers would exhibit more of the de-escalation behaviors listed in Table 11 - De-escalation Behaviors from Verbal Judo.

After training the officers were more likely to use the behaviors: Introduce Yourself, Provide Options, and Express Empathy. It is possible in other scenarios that other behaviors may increase. This was measured in a before and after manner where the virtual reality environment is used to measure behavior that is expected to happen in the work environment. This offers some support for the behaviors being adopted but it's not as strong as recording incidents of these behaviors while working.

H6: After training, officers would use more open-ended questions.

Mount Dora officers used more "What" questions after training and used more questions in general. This offers some support for the practice of asking more open-ended questions. Again, this is treating the virtual environment as a reasonable measure for how officers may act with citizens in a less controlled environment.

7.3 Implications from these Findings

7.3.1 De-escalation is a Social Skill Rather Than a Physical Skill

Many police actions involve use of force and can be modelled using physics. Other police training concerns itself with laws and policies focused on knowledge retention and application. De-escalation is different in that it is a social skill. The results of an encounter depend on both the officer's knowledge, skills, and abilities and the expectations and intentions of one or more other people. While role-play has been used to provide training, involving other people using simulation can provide more consistent responses. However, that implies there is a body of data regarding how people respond to the police in crisis situations. That body of data may need to grow as our society continues to become more diverse. It may also need to accommodate differing responses depending on location, age, implicit bias, and other factors.

To understand how to minimize the use of force by law enforcement while keeping the officers and the community safe, we need to continually examine how the public reacts to the police.

The officers need to build their KSAs with regular practice. The practice needs to take into account the types of situations they are likely to encounter and the localities where they are likely to be working. The officers need a repertoire of de-escalation tactics corresponding to the variety of force options that may be employed. These officers should have the opportunity to build decision making skills in de-escalation in addition to judgement skills on the appropriate level of force. Observation both through recording and through watching others can be an important part of building these abilities. Discussion between officers of de-escalation tactics can encourage a culture of reducing the use of force.

7.3.2 Law Enforcement De-escalation Differs from De-escalation in Other Forums

Compared to the local community, the law enforcement community showed a statistically significant difference in responses to de-escalation questions. This difference appears to be further away from the recommendations of experts regarding de-escalation. It is quite possible this difference indicates a need for alternate approaches to de-escalation in police settings. The public often expects a rapid response and resolution from the police, which may be essential if a violent crime is in progress. However, many crisis situations can be more safely resolved when the police slow down the unfolding events. When there is no obvious danger, the police can spend more time in dialog improving their understanding of the situation and increasing their ability to de-escalate. The public often expects the responding officer to know exactly what to do. Yet, like emergency medicine, the police officer must first observe the situation and gather vital information prior to determining the appropriate course of action. Generally, law enforcement does not have an existing relationship with the individuals who are in crisis and

must therefore work through establishing the relationship as part of their de-escalation actions. The need to build this relationship contributes to the addition of introducing oneself and providing one's agency on the behavior scale used in this study.

For these reasons it is important to build additional knowledge regarding the best de-escalation practices in different law enforcement situations. Additional video of law enforcement successfully de-escalating situations outside the training environment should be used to capture tactics which are applicable for this profession. These techniques and behaviors may vary by location or by the type of scenario. As shown in the Mount Dora training de-escalation of an individual who is neurodivergent differs from the approach used for those who present as neurotypical. De-escalation tactics may also differ depending on the type of crisis. De-escalating someone who is lost and disoriented is not the same task as de-escalating someone who has just lost their job.

Resources for de-escalation training need to include examining what works in these many law enforcement settings. From this knowledge additional simulation scenarios can be created. Drills in appropriate responses can be run in simulation based on evidence of how situations have been successfully resolved. Officers should be encouraged to report the use of de-escalation on a regular basis and possibly to contribute de-escalation experiences to a knowledge base. Given the many small police and sheriff departments in the U.S. it would be worthwhile for a federal agency to invest in applied research to create validated measures (and perhaps certifications) related to de-escalation practices in different law enforcement scenarios.

7.3.3 Further Work is Needed for De-escalation Training Evaluation

Kirkpatrick and Kirkpatrick (2016) discuss four levels of training evaluation. Each level involves its own set of measurements, some of which may be affected by activities other than the

training. It is vital in doing this type of evaluation to attempt to measure each level prior to commencing the training. Initial measurement will assist in better identifying the changes that are expected from the training. Training curriculum can be designed or tailored with these objectives in mind.

The first level of measurement is the participant response to training. Participant responses is the easiest level to measure and many training classes include some type of survey to gauge class sentiment. The free response questions in this study indicate the participants felt their training was beneficial. Many respondents felt they would like more training and additional opportunities with the simulator. The Mount Dora participants indicated verbally that the intensity of the scenarios could be increased.

The second level described by Kirkpatrick is the knowledge or skill check often done through demonstration or through paper-based testing. This study did not attempt to evaluate at this level, in part because there does not appear to be a commonly agreed upon set of criteria. Training courses employ different approaches to de-escalation with evaluations geared to each course.

The third level, the focus of this study, involves the behavior changes that come about through training and underly the resulting effectiveness seen by the public. The desired behaviors are not yet well known or understood in the policing environment. Techniques for de-escalation vary across professions in part due to the environmental conditions of the professions (Spielfogel & McMillen, 2017). As the police work in very public settings part of what they must manage during de-escalation is the environment. This study helps to define some behaviors which are increased after de-escalation training. It also shows that general knowledge of effective de-escalation techniques may change through practice in using those techniques.

However, the nature of the change is dependent on the environment where those techniques are applied. The simulation practice for Orange County appears to move deputies away from the expected responses for de-escalation, but that may well indicate that effective de-escalation in the law enforcement setting requires a somewhat different set of tactics than in other settings. Practice using those tactics may confirm their effectiveness for law enforcement even if they are not appropriate in other environments.

The fourth level is the demonstration of the effectiveness to stakeholders. In this case it would be the demonstration of de-escalation effectiveness to the public and a corresponding reduction in police use-of-force. Engel et al. (2022) takes steps toward showing that type of evaluation in one locality. Additional resources measuring use of force and incidents of de-escalation would be beneficial in examining the effectiveness of different approaches to de-escalation and de-escalation training for law enforcement.

7.3.4 Recommendations for Law Enforcement De-escalation Training Practices

Departments using simulation for de-escalation training should enhance the review after the simulation. Simulation holds out the promise for increased repetition and repetitive practice to improve skills. Unfortunately, simulation training is still expensive in light of the budget challenges of many police departments. This is due to the cost of the technology and the operating costs, including labor, to run the training programs. However, the departments would have increased value to the training if they take additional time for a debrief after the simulation experience. As part of this session, the departments could capture comments from the participants regarding why they did or did not attempt various de-escalation techniques. These could serve as a database to further knowledge of the constraints on law enforcement when attempting de-escalation.

Departments should record officers during the simulation. Often decisions made in haste can be better analyzed or better courses of action determined after the experience. Recordings can assist officers in learning more from their experience. The cost for digital video has fallen dramatically and it can be easily incorporated in the simulation experience.

7.4 Limitations of This Study

Policing is a localized activity. Training, especially annual training, is conducted by the municipality and under the guidance of the state. By necessity it varies based on locality. This study only included agencies in Central Florida so results may not generalize. Prior experience of the officers is primarily in Florida and Georgia. The culture of the police force and the community may generate other expectations and other results depending on location.

The training provided in Mt. Dora was one exposure. The study has no way of knowing how long the training effect may last. Effects may be different or more pronounced if the training included multiple sessions across a longer time span. It is unfortunate that the training groups were mixed during the follow up scenarios. This limited the ability to analyze changes in behavior that might have been related to the training method.

The simulation experience in Orange County was a one session follow up to a training course given the previous year. Assuming the differences between the simulation group and the driving group were due to the simulation experience, there is no way of knowing how long the effect from the simulation experience may last.

7.5 Directions for Future Research Regarding Law Enforcement De-escalation Training

7.5.1 Creation of a Better Survey Instrument

The plethora of questions and actions by officers in the Mount Dora sessions show de-escalation practices can vary with multiple approaches being successful. There is a variety of

curricula relating to de-escalation and no consensus on a rating scale for successful application of the KSAs. The survey used in this study could inform the creation of a more robust instrument to look at expectations regarding what will work for evaluating de-escalation. Such an instrument could be informed by current de-escalation practices to include questions regarding some of the behaviors identified in (Giacomantonio et al., 2020). It could also be influenced by existing curricula for de-escalation. Finally, as steps are being taken to measure the effectiveness of a training curriculum, comparisons with a survey instrument could provide indications as to how this knowledge corresponds to changes in policing.

Training appears to be having some effect. It is surprising that the Mount Dora study found a significant increase in use of introductions after the training. This is surprising because the training did not include introductions as a de-escalation technique, nor did it bring out introductions as necessary police procedures. It is possible something else occurred between the first and second sessions that brought up the importance of introductions, but conversations with the police chief and the training officer indicated they were not aware of anything that would have emphasized this topic. They did say it was part of standard practice and it is possible that any level of training or reminder of best practices served to bring this to a higher level of awareness.

Currently the simulator is assumed to be an effective means of measuring how an officer may perform. This is a reasonable approach to measuring the ability to apply a set of skills however, it would be more effective to devise means of measuring the application of these skills in the working environment. It is difficult to determine how to effectively measure the use of known behaviors in a dynamic public environment. It may be appropriate to have a tally sheet on the use of de-escalation tactics or have a weekly summary of one instance where de-escalation

skills were put to use. It might also be appropriate to document use of de-escalation through body worn cameras similar to the video captured for use of force. The advantage of this approach for de-escalation is the recorded videos could be used as material for future training.

7.5.2 Additional Comparison of Modes of Training

Comparison of the simulator to the custom video for training purposes showed a slight preference for the simulator. As the measurement of de-escalation skills becomes more refined, it would be advantageous to do further comparisons between training tools. It may be that some behaviors are better observed on video prior to practicing them. It could be that many of the behaviors could be profitably practiced using role play with other police officers, although similar strategies for classroom teacher preparation have proven to be less effective than simulation, possibly because fellow teachers do not have the same appearances and nonverbal behaviors as actual students. For this reason, simulation could then be used to refine skills or to create high pressure situations for judgement practice, using the role play as input data to the simulation, rather than as the end strategy. Similarly, it may be that some skills require repeated practice in a simulator to get timing and nuanced behavior that are needed for success. There may be less expensive technology, such as chat, that could be combined with an artificial intelligence engine, to create practice scenarios that would be mobile and useful. Additional work focused on crafting simulators for social interaction as opposed to use of force may be needed to promote more attention to the reduction in the use of force.

7.5.3 Creation of a Knowledge Base of Scenarios Based on Actual Encounters

The various policing agencies should not rely on simulator manufacturers to create scenarios for use in de-escalation training. In putting de-escalation into practice, these agencies should create local knowledge of techniques that work and include those techniques in their

training. Ideally, these could be based on actual encounters and similar encounters could be combined to allow the scenarios to unfold in alternate ways based on the approach of the officers. By building this knowledge base, the agencies will be able to develop simulation scenarios unique to their concerns. They may also be able to further develop the skill of their officers in reviewing the best practice for different types of engagements.

7.6 Summary of the Discussion of Results

The key findings of this study come from examining some of the changes in behavior captured on the video recordings from Mount Dora. The limited differentiation from the de-escalation survey indicates the need for better measurement tools regarding de-escalation practices for law enforcement. Creation of the best tools and techniques for training necessitates a good means to measure the desired effects from the training. Future research should continue to examine tactics that are useful for de-escalation in types of scenarios encountered by the police. To further that research, policing agencies should begin to capture their own institutional knowledge regarding scenarios where de-escalation has been successful. The last chapter offers a short conclusion focusing on why simulation training for de-escalation may differ from simulation training for other skills.

CHAPTER EIGHT: CONCLUSION

"We need to train police like we train pilots because if we don't people will die" – Lawrence O'Donnell

The importance of training for law enforcement should not be underestimated. However, the challenges facing law enforcement are fundamentally different from most commercial aircraft issues. Pilots must respond to unexpected conditions, but the laws of physics governing the response of the aircraft are well-known and consistent. Police officers respond to the unknown, but the police are not manipulating controls on mechanical objects. They are dealing with human interactions and the rules governing human interactions do not operate with the consistency of the laws of physics. Humans generate unexpected behaviors without malice or criminal intent. The training for law enforcement officers needs to bring about safety for all concerned despite the less predictable nature of human behavior. To do this, law enforcement needs access to resources and studies regarding human behavior. While they are making do based on anecdotal experience, society often complains about inappropriate responses, too much force, too little force, and the failure of the police to resolve ongoing problems.

There is another difference between pilot training and police training. Pilots are trained as part of a larger system focused on flight safety. From the security agents in the airport to the air traffic controllers in the tower, the system is designed to get people to their destinations safely. This system is based on decades of research into flight safety including investigation of crashes, near misses, and mechanical failures. There are air worthiness standards for the planes and accreditation tests for the pilots. Law enforcement is not supported by a similar system. Officer involved shootings are investigated from the point of view of adhering to policy and being legally defensible. The investigations do not focus on how the shooting could have been

avoided entirely. There is little inquiry into lesser uses of force other than ensuring it is appropriate. The system does not include regular analysis regarding the necessity to use force or how police officers could change the dynamic of the situation to avoid such use. A standard lexicon of de-escalation tactics for law enforcement has yet to be established.

This work offers a contribution, albeit a limited one, to filling the large knowledge gap between public perception of what police officers should know how to do and what has been sufficiently agreed upon as a trained response. In the realm of de-escalation, the public perception of what law enforcement should do clearly differs from the perception of trained officers. However, training in de-escalation tactics improves the use of those tactics. Other studies are needed to determine if those are the best tactics to use or if different approaches are needed based on the situation the officer needs to resolve. Helping officers take time to reflect on what they have learned and how to put it into practice is one role for simulation technology in the law enforcement training realm. It is possible to provide this practice in traditional training centers, but modern technology allows the use of simulation across the Internet in diverse locations. Increased access to practice opportunities can allow officers to drill for particular types of encounters, making them better prepared for a multitude of human reactions. Still this practice needs to be based on valid data indicating probable responses based on officer action. A pilot simulator that did not respond to maneuvers in a realistic manner would provide negative training to the pilot. It the same manner, law enforcement trainers should not present all humans as criminal opponents. To prevent tragedy the scenarios must realistically present a wide variety of human encounters with the possibility of using verbal persuasion to resolve the crisis without resorting to use of force.

APPENDIX A: FREE TEXT RESPONSES

1. What additional information on de-escalation would you like?	
Orange County Driving Training	
	None
	Asking open ended questions will keep a person talking. Effective pauses gives people time to think. Never use "I understand" if you don't. Repeating part of the statement makes the speaker know you are listening.
	Every situation is different and every person is unique. No one thing will solve or de-escalate everything all the time. I need as much information as I can have.
	More scenario-based training
	Live role player scenario-based training
	feedback from instructors after completing scenarios
Orange County Simulator Training	
	Good program
	What is going to happen when de-escalation does NOT work?
	N/A
	Additional training on how to properly de-escalate a situation.
	na
	none
	Actual de-escalation training would be beneficial.
	None
	Various techniques from real-world scenarios.
Mt Dora	
	More training would be nice.
	N/A
	I think the training provided a good opportunity to practice escalation techniques. I think completing more of the same training would help officers skills.
	none needed
	Options to provide the person in crisis
	none
	None
	Training in de-escalation regarding any age or mental group.
	Different scenarios with different crisis
	Anything you can provide would be greatly appreciated. Perhaps small, laminated card(s) with key points for quick reference to carry with us.
	continued training
	KNOWING THE PROBLEMS
	I am personally good to go but as a whole Tactical Communications Training is needed here unfortunately it's a 40 hour class with specialized instructors.
	Resources and contact information on programs and/or after hours help.

		Different types of communication. I always use a low tone, or talk about random things to grab there attention first before trying to handle the situation.
		Nothing.
		information on body language and non verbal clues
2. What would help you to be more comfortable with calming an individual in crisis?		
	Orange County Driving Training	
		Nothing additional required
		Letting them talk and let them know someone is there to listen.
		Recognizing the different states of mental health and knowing enough not to trigger negative interaction.
		Information about that subject
		know as much about the individual as possible
	Orange County Simulator Training	
		This was fine.
		Knowing the media and public will understand that choices made are made in a split second.
		Getting to know their name.
		maybe some calming techniques to practice
		Receiving crisis intervention training.
		De-escalation technique classes.
		give it a little more time
		Contrary to the public's belief, de-escalation is the preferred method of law enforcement. Knowing how to talk to people is much more valuable than fighting skills.
		Training
		Nothing, not all people can be calmed.
		More training.
	Mt Dora	
		Speaking to the individual more, being able to connect with them on a certain level.
		Finding a common ground or interest.
		feel pretty comfortable
		Building a rapport with the individual.
		none
		I'm relatively comfortable with calming a crisis.
		Having another officer on scene.
		Have another officer on scene
		That is a difficult question since my experience with persons in crisis has been minimal at best.
		More Knowledge
		RESOURCES ON HOW TO HELP THE INDIVIDUAL
		I have decades of experience and have the required training.

		Having every officer go to Crisis Intervention Training (CIT) so they can feel more comfortable when coming into contact with people in crisis.
		It would make me more comfortable knowing the subject is safe while attempting to calm the individual in crisis.
		Developing a bond, listening and identifying nuances in the conversation.
		Stop hassling me with surveys.
		just having more information approaching the situation
3. What would help you to be more comfortable with attempting to use de-escalation techniques?		
	Orange County Driving Training	
		Nothing additional required
		letting people talk and vent. This allows you to hear what has put them into the crisis.
		Having more knowledge of de-escalation techniques.
		Training
		more training
	Orange County Simulator Training	
		perimeter
		Knowing if it doesn't work we will not be crucified for making a different choice.
		n/a
		possibly more practice, even with laptop scenarios where you put in an answer or question and then it reacts. It could tell you what you might need to improve on
		Active listening skills, asking appropriate questions for how to de-escalate, and negotiation skills.
	Mt Dora	
		Through working with people in crisis, I have had a different look with de-escalation. CIT training helps Officers think differently as well. We live in a different environment then 20 years ago, my background is from the military and even today we treat and handle people differently. No more yelling in their faces and throwing their things around to raise their stress levels. Now it can be as simple as someone not completing a task and frustrating them to the point the same stress is achieved. Now how to re-direct the stress and help them work through it.
		Having more controlled training would make me more comfortable with using de-escalation techniques.
		Again, being able to connect with an individual on a certain level, being able to have something in common.
		More practice in scenario training.
		none needed
		Focusing on the individual and having something to talk about,
		none
		As an experienced officer, I tend to take the lead in these type of situations. In today's age, young officers with no life experience are being tasked with trying to

		help someone in crisis. I would be more comfortable if younger officers knew how to deal with someone in crisis.
		Having another officer on scene.
		Learning in person with relief scenarios
		Continued, on-going education and training.
		More Knowledge
		EDUCATION ON DE-ESCALATION TECHNIQUES
		N/A do to my experience and training already accomplished.
		More CIT training.
		I would use a calming voice instead of yelling. Just talk to them like a normal person, and calm them down.
		Leave me alone.
		more hands on practice and visual aides

APPENDIX B: IRB LETTERS

UNIVERSITY OF CENTRAL FLORIDA

CHECKLIST/DATABASE: Non-Committee Review		
NUMBER	DATE	PAGE
HRP-402	8/1/2026	1 of 2

The purpose of this checklist is to provide support for Designated Reviewers conducting Non-Committee Review. This checklist is to be completed by the Designated Reviewer, signed, dated, and retained or completed in the Designated Review Smart Form in the database

IRB Number:	STUDY00002626
Study Title:	Law Enforcement De-escalation Simulation
Short Title:	Law Enforcement De-escalation Simulation
Investigator:	Julie Kent

☒	Initial review	☐	Modification	☐	Request for Human Research or engagement determination
☐	Continuing review			☐	Review of Modifications Required to Secure Approval

1 REVIEWER CRITERIA (Check if "Yes." All must be checked) Otherwise, sign the form, and return all materials.)

- ☑ I do not have a Conflicting Interest.
- ☑ I have the expertise to review this research, or I have obtained it through consultation with others.

2 REVIEW LEVEL (Select one of the following if Approve checked above)

	Level	Documents to use	Categories
☐	Not Human Research	WORKSHEET: Human Research (HRP-310)	
☐	Human Research Not Engaged	WORKSHEET: Engagement (HRP-311)	
☑	Exempt.	WORKSHEET: Exemption (HRP-312) WORKSHEET: Limited IRB and Broad Consent (HRP-319)	☐ (1) Educational settings ☐ (2)(i) Tests, surveys, interviews, or observation (non-identifiable) ☑ (2)(ii) Tests, surveys, interviews, or observation (low risk) ☐ (2)(iii) Tests, surveys, interviews, or observation (identifiable); and for which limited IRB review was conducted via expedited review ☐ (3)(i)(A) Benign behavioral interventions (non-identifiable) ☐ (3)(i)(B) Benign behavioral interventions (low risk) ☐ (3)(i)(C) Benign behavioral interventions (identifiable); and for which limited IRB review was conducted via expedited review ☐ (4) Secondary research on data or specimens (no consent required) ☐ (5) Demonstration projects ☐ (6) Taste and food quality ☐ (7) Storage or maintenance of data or specimens (broad consent required); and for which limited IRB review was conducted via expedited review ☐ (8) Secondary research use of data or specimens (broad consent required); and for which limited IRB review was conducted via expedited review
☐	Expedited.	WORKSHEET: Expedited Review (HRP-313) WORKSHEET: Criteria for Approval (HRP-314)	☐ (1)(a) Drug studies ☐ (1)(b) Device studies ☐ (2)(a) Blood samples from healthy, non-pregnant adults ☐ (2)(b) Blood samples from others ☐ (3) Noninvasive biological specimens ☐ (4) Noninvasive procedures ☐ (5) Data, documents, records, or specimens ☐ (6) Voice, video, digital, or image recordings ☐ (7)(a) Behavioral research ☐ (7)(b) Social science methods ☐ (8)(a) Long-term follow-up ☐ (8)(b) No subjects enrolled ☐ (8)(c) Data analysis ☐ (9) Convened IRB determined minimal risk

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CHECKLIST/DATABASE: Non-Committee Review		
NUMBER	DATE	PAGE
HRP-402	1/21/2019	2 of 2

3	**DETERMINATION** (Select one of the following)
☑	Meets criteria
☐	Modifications required to meet criteria
	☐ The activity would not be Human Research if the following modifications were made:
	☐ The Human Research would be exempt from IRB review and meet ethical criteria if the following modifications were made:
	☐ The Human Research would be approved using the expedited procedure if the following modifications were made:
	☐ The following modifications required by the convened IRB have yet to be made:
☐	Send to convened IRB

Delineate modifications required to secure approval or notes:

4	**Continuing Review (for Expedited Review only)**
☑	Continuing review not required.
☐	Continuing review required. Rationale:

Attach required completed checklists and documentation of protocol-specific findings justifying regulatory determinations.

Reviewer Signature:	Katie M. Kilgore Digitally signed by Katie M. Kilgore Date: 2021.01.27 11:10:33 -05'00'	Date:	

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
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IRB00001138
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

CLOSURE

July 22, 2022

Dear Julie Kent:

On 7/22/2022, the IRB reviewed the following protocol:

Type of Review:	Continuing Review
Title:	Law Enforcement De-escalation Simulation
Investigator:	Julie Kent
IRB ID:	CR00001803
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None

The IRB acknowledges your request for closure of the protocol effective as of 7/22/2022. As part of this action:

- The protocol is permanently closed to enrollment.
- All subjects have completed all protocol-related interventions.
- Collection of private identifiable information is completed.
- Analysis of private identifiable information is completed.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

UCF IRB

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

NOT HUMAN RESEARCH DETERMINATION

April 28, 2021

Dear Julie Kent:

On 4/28/2021, the IRB reviewed the following protocol:

Type of Review:	Initial Study
Title of Study:	Local scenery impact on law enforcement interpersonal skills scenarios
Investigator:	Julie Kent
IRB ID:	STUDY00002969
Funding:	None
Grant ID:	None
Documents Reviewed:	• HRP-251- OCSO - Faculty Advisor Scientific-Scholarly Review fillable form_CEH_Scanned_Signed.pdf, Category: Faculty Research Approval; • Al Rollins letter of support.pdf, Category: Letters of Support; • Ethnographic Questions Mt. Dora.pdf, Category: Survey / Questionnaire; • HRP-250-FORM Mt Dora Request for NHSR.docx, Category: IRB Protocol; • Mt Dora Simulation Training Schedule.xlsx, Category: Other; • Open Ended Questions Mt. Dora.pdf, Category: Survey / Questionnaire; • Scenarios.docx, Category: Other; • Skills Survey Mt Dora.pdf, Category: Survey / Questionnaire; • SOPI No Background Qualtrics.pdf, Category: Survey / Questionnaire

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Katie Kilgore
Designated Reviewer

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
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12201 Research Parkway
Orlando, FL 32826-3246

CLOSURE

September 19, 2022

Dear Julie Kent:

On 9/19/2022, the IRB reviewed the following protocol:

Type of Review:	Continuing Review (NHSR)
Title:	Local scenery impact on law enforcement interpersonal skills scenarios
Investigator:	Julie Kent
IRB ID:	CR00001889
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None

The IRB acknowledges your request for closure of the protocol effective as of 9/19/2022. As part of this action:

- The protocol is permanently closed to enrollment.
- All subjects have completed all protocol-related interventions.
- Collection of private identifiable information is completed.
- Analysis of private identifiable information is completed.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Yariela Thompson
UCF IRB

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
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IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

EXEMPTION DETERMINATION

October 29, 2021

Dear Julie Kent:

On 10/29/2021, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Category 2(ii)
Title:	De-escalation Expectations
Investigator:	Julie Kent
IRB ID:	STUDY00003602
Funding:	None
Grant ID:	None
Documents Reviewed:	• HRP-251- Orange Pop - Faculty Advisor Scientific-Scholarly Review_CEH.pdf, Category: Faculty Research Approval; • Email Request for Volunteers.docx, Category: Recruitment Materials; • HRP-254 Orange Pop Explanation of Research.pdf, Category: Consent Form; • HRP-255-Orange Pop - Request for Exemption.docx, Category: IRB Protocol; • Survey_Academic_Population.docx, Category: Survey / Questionnaire

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Katie Kilgore
Designated Reviewer

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

CLOSURE

September 15, 2022

Dear Julie Kent:

On 9/15/2022, the IRB reviewed the following protocol:

Type of Review:	Continuing Review
Title:	De-escalation Expectations
Investigator:	Julie Kent
IRB ID:	CR00001890
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None

The IRB acknowledges your request for closure of the protocol effective as of 9/15/2022. As part of this action:

- The protocol is permanently closed to enrollment.
- All subjects have completed all protocol-related interventions.
- Collection of private identifiable information is completed.
- Analysis of private identifiable information is completed.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Yariela Thompson

UCF IRB

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