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**Anderson, Eric G.** ***Impact of Homogeneous and Heterogeneous Student Groupings Based on Firearms Skill Level on Performance in Firearms Training***

## Abstract

The aim of this study was to examine the firearms knowledge and skill gaps that exist in law enforcement academy students. The intent was to gain insight into the most effective teaching methods and training group assignments based on student ability and previous experience. A cohort of 20 law enforcement academy students were administered a pre-training survey that determined previous experience with a firearm, particularly a handgun. Student skill level was then measured using a pre-training live fire assessment. Based on the results of these two instruments, students were rated as having minimum, moderate or extensive skill and experience. Students were then assigned to either a homogeneous group consisting of all medium performing students and a heterogeneous group consisting of lower and higher performing students. The students attended the standard law enforcement academy firearms training course. Upon completion, students were surveyed again and administered a post-training firearms assessment. The results indicated that students assigned to the homogeneous group showed the greatest gains in skill and experienced a more cohesive learning environment. These findings are important, in that instructors and administrators can benefit from the knowledge that informed and intentional student group assignments can result in a more effective learning experience.

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## Chapter I: Introduction

Law enforcement use of force is an issue that has increasingly come under scrutiny over the past decade. Kutner (2016) reports that tensions between law enforcement and citizens now compare to the 1960's and 1970's when riots and officer killings were common. A 2015 Gallup poll revealed that many Americans feel a lack of confidence in law enforcement and that reform is necessary (Kutner, 2016). This lack of confidence is due, in part, to a number of officer-involved shootings involving African-Americans.

The highest level of force options is the use of deadly force. Although deadly force can be delivered by a multitude of means, given a lawful and imminent set of very specific circumstances, a firearm is the instrument that is considered the primary use of force option (Wisconsin Department of Justice (WI DOJ), 2017). Deadly force and the use of a firearm as a force option are considered to be a high risk, high liability, but low frequency action that must be trained under a variety of conditions and circumstances. In other words, some job tasks require a high level of liability and risk but are performed very infrequently. These high risk, low frequency tasks, such as deadly force decision making and firearms operation, require intentional and consistent training methods to ensure an appropriate and instinctive response under a high level of stress (Slahor, 2006). Firearms training in the law enforcement academy and frequent refresher training throughout an officer's career, are important aspects of effective firearms use under high stress situations (WI DOJ, 2018). Effective firearms training can provide long-term decision-making skills coupled with both fine and gross motor skills that are readily recalled under dynamic and constantly changing circumstances (WI DOJ, 2018).

The objective of the firearms training program is to provide a fundamental understanding and skill building process for law enforcement candidates, regardless of background and

experience. A joint task force research study (U.S. Department of Justice (U.S. DOJ) & U.S. Equal Employment Opportunity Commission (U.S. EEOC), 2016) reported that diversity in law enforcement agencies in regard to race, gender, religion, sexual orientation, gender identity, language ability, background and experience are critically important tools for building trust within communities. With diversity in candidates comes diversity in background and experience, and firearms use and operation may be a new experience for some.

While law enforcement is seeking to become more diverse, there is a continued tendency for law enforcement to attract more male applicants than female applicants (U.S. Department of Labor, Bureau of Labor Statistics (U.S. DOL, BLS) (2018). Current statistics indicate that of the 728,000 law enforcement officers in the United States, only 15.4% are women (U.S. DOL, BLS (2018). The law enforcement profession, as well as law enforcement education and training, is considered a non-traditional occupation for women. The U.S. Department of Labor, Bureau of Labor Statistics (U.S. DOL, BLS) (2010) defines a non-traditional occupation as those in which women represent 25% or less of the total employed. There is a nationwide effort to recruit and retain women in law enforcement as a strategy toward strengthening community policing, reducing use of force incidents, enhancing police response to domestic violence, and providing balance in the workforce (U.S. Bureau of Justice Assistance (U.S. BJS), 2001). In terms of previous experience with a firearm, research indicates that in 2016 only 1.1 million or 10% of the 11.5 million licensed hunters in the United States were women. Across the entire population, 8% of U.S. males were a licensed hunter as compared to only 1% of women (U.S. Fish & Wildlife Service (U.S. FWS), 2016). With these current statistics in mind, possible firearms skill gaps may exist based on gender and other diversity factors.

The employment history of police recruits also adds to diversity of firearms skills. In particular, law enforcement has traditionally provided a pathway for military veterans seeking a paramilitary career that, in some ways, provides a similar occupational experience. A Marshall Project study of U.S. Census data indicated 19% of U.S. law enforcement officers are military veterans (Weichselbaum & Schwartzapfel, 2017). Recruits who are military veterans have a different level of firearms experience than their civilian counterpart upon entering the police academy. For example, the U.S. Marine Corps considers the primary offensive weapon of a Marine to be a rifle, while the primary defensive weapon is a pistol. In basic training Marines receive extensive training in the use of a rifle but may have minimal or no training experience with a handgun (Department of the Navy (U.S. DON), U.S. Marine Corps (USMC), 2012). The primary firearm used by law enforcement officers in the United States is the handgun and a large portion of the training and curriculum is dedicated to this weapon system (WI DOJ, 2017). The operation of a handgun differs greatly from the operation of a rifle or shotgun. McHale (2016) reports that factors such as weight, force required to operate the trigger, sight radius, barrel length, recoil and stability are vastly different between a handgun and a long gun, and these differences will have an impact on performance.

With this information, it is worth considering the level of firearms training that a recruit brings to the firearms training program, and to what degree that experience is applicable to the use of a police handgun. First of many considerations in this training program is the level of stress and performance anxiety that is certain to exist in most recruits. Violanti (1992) reported that law enforcement officers are among the most stressed populations in the United States and during academy training recruits are exposed to training that is both physically and psychologically stressful. Recruits with little to no experience with a firearm may have the need

to overcome the basic anxiety of handling or firing a handgun for the first time. Mosher (2017) reports that an inexperienced firearms operator will experience a fight or flight response when firing the weapon. This autonomic response and release of brain chemicals can cause internal feelings of fear, anxiety or aggression.

Additional stress can occur due to the visibility of training results to peers. Firearms training is conducted as a group and these factors include weapons handling skills, decision making skills and actual firearms proficiency based on shot holes in a paper target. There is objective evidence of student performance that is displayed in full view of all participants. Practice activities, formative assessments and high stakes summative assessments are clearly visible for comparison among students and instructors. Little research has been conducted regarding the social dynamics that occur in this type of training environment. Peer to peer comparison is likely to occur and it is important to understand how this comparison can impact student performance and learning outcomes.

**Statement of the Problem**

The problem addressed in this study is the various levels of firearms skill and experience that each student brings to academy firearms training and the pressure of performing well in front of peers. Festinger's (1954) theory of social comparison suggests that humans have the innate desire to evaluate their own performance based on a comparison to the performance of others. Presently there is not a definitive method for determining the most effective ways for grouping students to maximize their learning outcomes when grouped with peers. Understanding the student skill and experience level could ensure that proper instructional methods and attention can be given. Because recruits are functioning at very different levels of experience

when they enter academy training it can be anticipated that they will be co-mingled with others that operate at a higher or lower skill level.

**Purpose of the Study**

The purpose of this study was to determine the effect that heterogeneous and homogeneous groupings had upon student firearms performance and academy training experience. The aim was to observe and measure the impact that discrete groupings had upon the outcomes for the individual student and capture feelings and perspectives that were experienced by each student given their assignment to a particular group.

The following four research questions were addressed in this study:

1. What effect do heterogeneous student groupings by skill level have upon individual gains in firearms proficiency?
2. What effect do homogeneous student groupings by skill level have upon individual gains in firearms proficiency?
3. What effect do heterogeneous student groupings by skill level have upon their learning experience in firearms training?
4. What effect do homogeneous student groupings by skill level have upon their learning experience in firearms training?

**Significance of Study**

Understanding the impact of homogeneous and heterogeneous grouping based on skill and experience with a firearm will aid the instructor and administrator in proper training group assignment. The intentional grouping of students will hopefully improve outcomes and the learning experience. This improvement of learning outcomes will better prepare the program graduate for entry into the workforce where agency-based training and continuing education will

occur. Positive learning outcomes will also have an effect on the long-term mastery of skills and confidence in the operation of the firearm.

**Assumptions of the Study**

There were several basic assumptions associated with this study. The first was the assumption that students would answer the questions posed to them in the study in an honest and thorough manner. Students entered this program with the intention of gaining knowledge and becoming certified as a law enforcement officer. The assumption was that they would participate in all aspects of their education and the researcher would ensure that the students understood that the research was being conducted for their benefit, as well as, the benefit of the profession.

Second, there was an assumption that instructors would evaluate students thoroughly and objectively when completing the instructor observation survey and qualification courses. The instructors are professionals and have a vested interest in the success of the students and the furtherance of law enforcement academy education.

Third, the assumption was that students would perform at their maximum effort at each level of the training, and consequently, the research study. This assumption was made based on the students' desire to succeed and perform well in all aspects of the academy, and specifically in firearms training.

**Limitations of the Study**

This study had the following limitations:

1. Student success was paramount, and the mechanisms of this study were secondary nature. If an instructor determined that a student required remedial training to be successful in the firearms program, the student received that instruction, regardless of the outcome of the study. Remedial instruction for lower ability students may have

had an impact on the outcome of the study. Remedial instruction is designed to raise the skill level of the student through additional repetitions and one on one instruction that goes beyond that of the standard curriculum.

2. This study was limited to one law enforcement academy cycle and was comprised of a small sample. This study is not generalizable to other sites.

**Definition of Terms**

Terms specific to this study for the Law Enforcement Academy and Wisconsin Department of Justice firearms training program, are defined as follows:

**Firearm.** A handheld or shoulder fired weapon of various operating systems that is capable of firing a projectile by an act of explosion (Crimes and Criminal Procedure, 2006).

**Firearms Instructor.** A Wisconsin Law Enforcement Standards Board (LESB) certified instructor. (WI DOJ, 2016).

**Handgun.** A handheld firearm of various operating systems that is typically used for hunting, sporting or combat purposes depending on caliber and design (Crimes and Criminal Procedure, 2006).

**Rifle.** A shoulder fired firearm of various operating systems that is typically used for hunting, sporting or combat purposes depending on caliber and design. A rifle is designed to fire a single projectile through a rifled barrel (Crimes and Criminal Procedure, 2006).

**Shotgun.** A shoulder fired firearm of various operating systems that is typically used for hunting, sporting or combat purposes depending on caliber and design. A shotgun is designed to fire multiple pellets or a single projectile through either a smooth or rifled bore (Crimes and Criminal Procedure, 2006).

**Wisconsin Law Enforcement Academy.** A 720-hour basic law enforcement academy developed and sanctioned by the Wisconsin Department of Justice and the Wisconsin Law Enforcement Standards Board. The academy is delivered at employer-based academies and each of the 16 Wisconsin Technical Colleges (WI DOJ, 2018).

**Wisconsin Law Enforcement Academy Basic Firearms Training.** A 68-hour training designed to train recruit candidates in basic firearms skills. (WI DOJ, 2017).

## Methodology

A quantitative research design was used for this study. Academy students were surveyed and administered a pre-training live fire firearms assessment to determine their level of experience and skill prior to training. Once the student's experience/skill level was measured students were divided into two training cohorts: one comprised of students with the most skill the least skill, and a second cohort consisting of the medium performers.

Academy firearms training proceeded as normal and students were trained in the use of the handgun through standardized curriculum. Upon completion of firearms training a second live fire assessment was conducted to measure student progress. Instructors then submitted an observation survey for each student to inform the researcher on progress and social interactions during training. The final measure consisted of a post-training survey designed to capture student perceptions of the firearms training experience.

## Chapter II: Literature Review

The operation of a firearm in the context of law enforcement application is a complex skill. The task requires physical and decision-making skills that are applied during high stress scenarios that are both mentally and physically demanding (Ivanovski & Rajkovchevski, 2015). Law enforcement academy students bring a wide range of skills and previous experience to the training environment. With this wide range of firearms aptitude in new recruits, it is important to understand and develop instructional methods and training group assignments that are effective and will maximize student performance. This study sought to establish the dynamics that exist in firearms training and the effect that social comparison has upon individual student performance based on the structure of peer groups.

The purpose of this study was to determine the effect that heterogeneous and homogeneous groupings had upon student firearms performance and academy training experience. The aim was to observe and measure the impact that discrete groupings had upon the outcomes for the individual student and capture feelings and perspectives that were experienced by each student given their assignment to a particular group.

The following four research questions will be addressed in this study:

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4. What effect do homogeneous student groupings by skill level have upon their learning experience in firearms training?

Since firearms training was the central focus of this study, related literature was studied. In addition, Festinger's Social Comparison Theory (1954) provided a foundation for this research and is presented in the review of literature. Other literature addresses the ways in which social comparison and discrete ability groupings can affect the performance of candidates based on the skill and experience of fellow students, as well as the presence of stress and performance anxiety in the training environment.

**Firearms Training**

Safe and effective firearms operation is at the core of use of force within law enforcement, and more specifically, deadly force training in both academy and in-service environments. Police powers regarding physical engagement, including the use of a firearm, are very important skills in police training (Ivanovski & Rajkovchevski, 2015). The application of deadly force in a real-world situation is accompanied by heightened levels of stress which can manifest itself through a multitude of autonomic reactions within the human body. Under high stress, the focus and processes of the brain shift from one of thinking to one of reacting (Lewinski, Avery, Dysterheft, Dicks & Bushey, 2015). With these concerns in mind fundamental firearms training must be geared toward developing basic skills that are sub-consciously applied when deadly force is a consideration. The application of authority is very specific because police authority represents acts that may compromise human rights, endanger lives and affect the general security of people and property (Ivanovski & Rajkovchevski, 2015).

In the case of firearms use and deadly force encounters, training should be consistent with generally accepted practices which have been defined by the profession and by court

decisions that have analyzed police conduct (Ryan, 2007). The United States Supreme Court and Court of Appeals have weighed in on law enforcement training and have held that law enforcement firearms training must be conducted regularly and in such a manner that environmental conditions are replicated (Popow v. City of Margate, 1979) Popow v. City of Margate (1979) is significant in that the case involved the accidental shooting of a citizen by an officer who was in foot pursuit of a suspected kidnapper. When the officer testified that he had received minimal training in firearms after graduating from the academy, the courts determined that it was foreseeable that varying environmental conditions and realistic circumstances must be included in firearms training. The courts further determined that training must include deadly force decision making skills under a variety of conditions (Zuchel v. Denver, 1993). In Zuchel v. Denver (1993), an officer confronted a subject who was suspected of causing a disturbance, when someone yelled that he had knife. When the subject turned toward the officer, the officer fired his weapon, killing the subject. It was later determined that the subject was holding a nail clipper. In this case the courts determined that training in deadly force decision-making was inadequate, and the City of Denver was held liable for not having trained its officers properly.

In order to effectively deliver firearms training skills to recruit officers that meet standards that are legally compliant and court defensible, incremental training modules are used to develop muscle memory that begins with fundamental operation and develops through operation of the firearm under realistic conditions (WI DOJ, 2017). Firearms training involves skills that are both mentally and physically demanding (Thomasson, Gorman, Lirg & Adams, 2014). According to the WI Department of Justice (DOJ, 2017) primary firearms training consists of a set of physical skills that fit into a larger set of decision making and incident response skills. The operation of a firearm is considered a psychomotor skill, which is a skill that

involves both the mind and the body. Firearms operation is also considered a critical skill, one that a law enforcement trainee must master during basic firearms training and continue to refine throughout his/her career (WI DOJ, 2017). Finally, firearms operation is considered a perishable skill, which means once mastered the skill tends to fade if training is not revisited frequently. Basic firearms training provides the foundation for skills that will be required and built upon throughout the span of an officer's career (WI DOJ, 2017).

The elements provided in basic firearms training curriculum (WI DOJ, 2017) are a set of skills that build upon one another and as training progresses the intensity and complexity increase. The goal is to train students in the fundamental, and eventually tactical, operation of the firearm while requiring quick decision making in realistic simulation. The following is an overview of the skills emphasized in firearms training and their purpose (WI DOJ, 2017).

**Fundamentals.** The fundamentals of firearm operation include topics such as firearms safety, an overview of training skill development, and the ballistic performance of a handgun. This segment serves as an orientation to the law enforcement use of the firearm (WI DOJ, 2017).

**Introduction to the semi-automatic pistol.** In this segment the basic cycle of operation, nomenclature and maintenance requirements for the pistol are introduced. As a professional practitioner of the firearm, a law enforcement officer must know the function and maintenance of a tool that they will carry daily (WI DOJ, 2017).

**Basic shooting skills.** In the basic skills section the student is trained in the fundamentals of firing the weapon. Basic operation includes knowledge of the stance required to fire the handgun; the grip required to hold and fire the weapon; the proper method for aligning the sights and placing the sights on a target; and lastly the proper method for engaging the trigger. Students are instructed on the proper method for drawing the weapon from a holster and presenting the

weapon in a variety of situations. The basic skills section also provides instruction on the proper techniques applied to loading and unloading the handgun as well as how to reload the handgun. The basic skills segment is the core of firearms training and provides the essential fundamentals required for the remainder of firearms training (WI DOJ, 2017).

**Malfunctions.** In this segment the ability to identify and correct an operational malfunction in the firearm is trained. Because the handgun is the primary firearm for law enforcement officers, the student must have the knowledge and skill to correctly fix a malfunction in the weapon (WI DOJ, 2017).

**Tactical operation.** During this segment students apply what they have learned in the fundamental training to tactical use of the handgun. Topics such as use of cover, shooting from a variety of positions, engaging multiple adversaries, shooting while moving and shooting in lowlight conditions are addressed. This segment also addresses incident response and deadly force decision making. In this segment the real-world application of the firearm is trained – the how, when and why an officer uses deadly force is reinforced throughout this section. This element of training is extremely important, in that it replicates the actual use of the firearm in realistic simulation (WI DOJ, 2017).

## Previous Firearms Experience Related to Training

Students that have previous firearms experience bring with them a level of understanding, context and physical comfort with the firearm. In a research study involving various levels of firearms experience, Lewinski et al. (2015) found that recruits determined to have expert and intermediate experience with a firearm fired more accurately than recruits designated as novice shooters. This research further revealed minimal difference in the shot accuracy of the expert and intermediate shooters. The researchers in this study opined that previous experience with long

barreled firearms, as well as military rifle training, most likely increased accuracy and handling skills resulting from a transference of these skills to handgun manipulation.

For students that have a minimum of firearms experience and are learning operation from a fundamental level, anxiety and awkwardness can affect the learning process. Lohman (2015) reported that Dr. Michael Keyes, psychiatrist and former physician for the United States Shooting Team, has observed that stress will cause the mind of an inexperienced shooter to wander and allow intrusive thoughts and questions to enter.

> An inexperienced person's mind may wander during stress with thoughts such as 'Will I win? Will my teammate do better than me? What will my parents or friends think? Will I be embarrassed?' With experience and maturity, we begin to collate what is important and exclude that which is not. Put another way, we learn to focus. (Lohman, 2015, p. 13)

Not only is the student learning a new skill, they are also learning a skill that is both mentally and physically demanding, but also involves dire consequences should the skill be applied improperly (Honig & Lewinski, 2008). This combination of factors will add to the levels of distress that students may be experiencing. In a study conducted by Detrick, Chibnall and Luebbert (2004), the researchers found that during recruit firearms training higher anxiety predicted poor performance. This higher level of anxiety resulted in apprehensiveness, nervousness, jitters, tension, worry and generalized anxiety.

**Social Comparison Theory**

The theory that provides foundation for this research is the theory of social comparison. As a foundation for his theory, Festinger (1954) hypothesized that humans have an innate desire to evaluate their own level of knowledge and ability to execute certain tasks. In the case of tasks

that include measures that are objective and clearly defined, people begin to compare themselves with others in order to evaluate the quality of their own performance.

In terms of social comparison in the training environment, research suggests that student performance is affected by students' level of anxiety and related stress level. Raat, Kuks, van Hell, and Cohen-Schotanus (1994), found that students in an educational environment who are experiencing a low level of stress were less likely to compare themselves to others. Low stress students tended to not use measures such as self-improvement to compare themselves with students who they perceived were performing worse than they were. Low stress students were also less likely to compare themselves negatively to others who were performing both better and worse than they were (Raat et al., 1994). In regard to high stress students, there was a tendency toward negative comparison and interpretation of outcomes that resulted in pondering the results of these comparisons. Typically, high stress students were found to direct their comparison downward in order to enhance self-confidence (Raat et al., 1994). When applied to the firearms training environment it is possible that an inexperienced firearms operator will experience some degree of stress or anxiety and this level of distress may trigger social comparison with fellow students.

In regard to social comparison with others, it is important to consider that an individual's comparison occurs both upward (those performing better) and downward (those performing worse) (Festinger, 1954). At issue is the effect that both upward and downward comparisons have upon the performance, aspirations and self-esteem of the individual student.

The impact of social comparison in the learning environment relies, in part, upon the direction in which a student chooses to compare themselves (upward or downward). The target of a student's comparison is an important factor when determining the effects of this

phenomenon. In the context of education, students who compare themselves with better performers tend to perform better than those who compare themselves with lower performers (Wehrens, Kuyper, Dijkstra, Buunk, & van der Werf, 2010). Additionally, students will perform better when they feel a connection to or identification with a higher performing student (Huguet, Dumas, Monteil & Genestoux, 2001).

What motivates a person to make a comparison can determine what direction the comparison takes. Generally, if students tend to compare themselves laterally (equals) they are seeking a self-evaluation (Taylor, Wayment & Carrillo, 1996). If a student tends toward an upward comparison, they are seeking self-enhancement and if they tend toward a downward comparison, they are seeking self-improvement.

In studies conducted by Salovey and Rodin (1984), it was confirmed that students in a classroom environment compared themselves with classmates both upward and downward. Wills and Miller (1981) found that upward comparison tended to result in a negative effect due to feelings of inadequacy and inferiority to others, whereas downward comparisons generally tended to be positive, and had an uplifting effect on self-esteem. In other words, students who saw themselves with higher ability than their peers tended to improve, while students perceiving themselves with lower ability tended to decline.

The ways in which a student makes the comparison with peers is also a factor in the impact of the comparison. Buunk et al. (1990) observed that if a student tended to view the contrast between themselves and a higher performing student, they focused more on the ways in which they were different. If the student viewed the ways in which they positively compared with a higher performing student, they tended to focus on the ways in which they were similar. The contrast comparison tended to create feelings of negativity and inadequacy, while the

feelings of similarity and identification motivated a student to aspire toward better performance (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990). In studies related to peer-to-peer comparison, Buunk and Ybema (1997) found that upward comparison served to motivate and inform students on ways to improve or discover within themselves that they had the potential to improve their performance; consequently, the influence of individual improvement through upward comparison had the potential to increase a student's self-esteem and confidence level.

In contrast to upward comparison, downward comparison occurs when a subject compares themselves to a peer that they believe performs at a lower level. In downward comparison there is an overall feeling of satisfaction and an improvement of self-assessment (Wills & Miller, 1981). A positive self-assessment results when a student compares downward and views a contrast between themselves and those who they perceive are performing to a lesser degree. However, should the student assimilate and identify with a lesser performing student, they may lose hope in their success or improvement (Buunk et al., 1990).

In summary, research on social comparison informs suggests that humans will innately rate their own performance in comparison to the performance of others. When a student makes this comparison, it can occur both upward toward those that perform better and downward toward those who perform worse. Comparison also occurs laterally among students that are performing at the same level. A variety of responses can be expected to occur, and research indicates that self-assessment can have both positive and negative results, regardless of the direction in which comparisons are made. Depending upon the levels of experience that each student brings to academy firearms training, there may be vast differences in performance. With the dynamic of social comparison in mind, it is predictable that students will evaluate their own performance based on the performance of their peers.

**Effects of Heterogeneous and Homogeneous Ability Groupings**

Police academy recruits come in as a cohort with varying firearms skills and are trained in groups. Research by Lou et al. (1996) has determined that, when placed in heterogeneous groups, lower ability students were found to learn more through the help received from other students. Average or medium ability students showed more gains when assigned to a homogeneous group. Higher ability students tended to perform equally well in both types of groupings (Lou et al., 1996). In similar studies conducted by Saleh, Lazonder, Ard and De Jong, (2005) students were divided into discrete groupings of heterogeneous and homogeneous students based on ability and were provided consistent curriculum and instruction. The researchers confirmed the findings that low ability students performed better in a heterogeneous grouping but were also observed to display higher levels of motivation than low ability students assigned to a homogeneous group.

When placed in a heterogeneous grouping, higher ability students also took on the role of leader, mentor and teacher, while homogeneous groupings allowed for medium ability students to share thoughts and ideas through a mutual relationship with peers (Lou et al., 1996). While this relationship was found to benefit high ability and low ability students in heterogeneous groups, medium ability students were found to have less opportunity for assistance from their peers (Webb & Palinscar, 1996).

In terms of the development of critical thinking skills and group interaction, higher ability students have been found to have more sophisticated reasoning strategies in heterogeneous groups through their ability and opportunity to mentor and teach others, while displaying a more collaborative nature when assigned to a homogeneous group (Saleh et al., 1996). The grouping of students in homogeneous groups tended to develop a cohesiveness among students due to the

sharing of similar experiences and expectations. In this type of environment, high ability students do not have to compromise their learning in order to accommodate the lower ability students (Lou et al., 1996).

With all the benefits of grouping students, there are also some challenges. Research by Lou et al. (1996) has shown that low ability students that have been assigned to a homogeneous group may show signs of distraction or inattentiveness and may perform poorly due to the lack of a fellow student to provide mentorship and guidance. Medium ability students require observation as they may neither lead nor be led within the group and tend to fall in the middle and not benefit from the influence of other students (Lou et al., 1996). In a further concern for medium ability students, Saleh et al. (1996) found that when assigned to heterogeneous groups these students may not take advantage of learning opportunities.

**Summary**

A review of the literature has indicated that fundamental firearms training in the law enforcement academy is an important foundation for police recruits. The appropriate use of a firearm in a deadly force situation is an important aspect of law enforcement statutory authority. Basic training is consistent and in accordance with accepted professional practices and follows legal standards that have been established by professional organizations and applicable case law. The literature also established that firearms training is stressful and involves psychomotor skills coupled with decision making and critical thinking skills. Research conducted with students who bring varying levels of previous firearms experience and skill to the training environment suggests that novice shooters will experience higher levels of anxiety which has been shown to impact performance. This information was considered when forming groups for this study.

The relevance of social comparison to this study is based on the ways in which firearms training is conducted, where students have ample opportunity to compare themselves to others. Firearms training is conducted as a group and these factors include weapons handling skills, decision making skills and actual firearms proficiency. Practice activities, formative assessments and high stakes summative assessments are clearly visible for comparison among students and instructors.

The literature indicates that social comparison occurs in the classroom and students compare themselves upward toward better performers, downward toward lesser performers and laterally toward similar performers. Peer to peer comparison is inevitable and can have both positive and negative effects on individual performance. The literature revealed that, in general, lower ability students will perform better in a heterogeneous group, while average or medium ability students will perform better in a homogeneous group. The higher ability students can be expected to perform well in either group. This research guided formation of groups for the current study and survey questions asked of students regarding their comparison to others.

## Chapter III: Methodology

The operation of a firearm in the context of law enforcement application is a complex skill. The task requires physical and decision-making skills that are applied during high stress scenarios that are both mentally and physically demanding. Law enforcement academy students bring a wide range of skills and previous experience to the training environment. With this wide range of firearms aptitude in new recruits, it is important to understand and develop instructional methods and training group assignments that are effective and will maximize student performance. This study sought to establish the dynamics that exist in firearms training and the effect that social comparison had upon individual student performance based on the structure of peer groups.

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4. What effect do homogeneous student groupings by skill level have upon their learning experience in firearms training?

**Research Design**

The research design for this study involved a quantitative approach. Survey methodology was used to gather data relevant to previous firearms experience, while additional quantitative measures were used to evaluate performance. The independent variables in this study were the homogeneous and heterogeneous groups to which each student was assigned based on skill and experience level. The dependent variable was the individual students' performance on an objective pre and post training firearms course of fire. The control variables in this study were the skill and experience level that each student possessed prior to the start of firearms training. In order to measure the impact that social comparison had upon the individual student a post-training survey was administered to students upon completion of the course.

**Setting**

The setting in which this study occurred was the Wisconsin Law Enforcement Academy located within a technical college campus where associate degree and continuing education courses are conducted. The firearms training program is a 70-hour curriculum that is embedded within the Wisconsin Department of Justice (WI DOJ) 720-hour Law Enforcement Academy curriculum.

**Subject Selection and Description**

The sample in this study was a convenience sample of students enrolled in a 2018 law enforcement academy class. Candidates met the minimum age requirement of 18 years and had a minimum of 60 associate degree level credits, or higher. Candidates were either a civilian (self-sponsored) or employed (law enforcement agency employee), seeking certification as a law

enforcement officer in the state of Wisconsin. The firearms training course was the standardized curriculum provided by the Wisconsin Department of Justice, Bureau of Training and Standards and the Wisconsin Law Enforcement Standards Board. The lead instructor and assistant instructor remained constant throughout the training course.

## Instrumentation

The instrumentation in this study consisted of a series of surveys and assessments designed to measure the experience and progress of each student. The surveys in this study were developed and reviewed with the assistance of researchers with experience in survey development that are assigned to a technical college institutional research department.

**Instrument 1: Participant pre-training survey.** This instrument was a survey created by the researcher and reviewed by a technical college institutional research and evaluation specialist. The instrument consisted of a series of multiple choice and selected response questions. Some questions included an "Other" option to allow students an opportunity to expand upon their response or include a response that was not provided. This instrument was developed and delivered using an online Qualtrics™ survey program. The initial survey consisted of questions designed to gather demographic information, such as age and gender, and questions related to firearms experience (Appendix A). This survey also captured student feelings associated with the upcoming firearms training. The firearms experience questions established the age at which the student became familiar with firearms, years of firearms experience, level of previous training or experience, and the type of firearm with which they have experience. The questions submitted during this segment of the survey were developed and reviewed by experienced firearms instructors, including the researcher, who are trained and certified by the Wisconsin Department of Justice, Bureau of Training and Standards.

**Instrument 2: Firearms assessment.** The second research instrument consisted of a pre-training firearms assessment administered prior to firearms training. The purpose of this initial assessment was to rate the individual based on their current skill level using a paper target that yielded a numerical score. The researcher also made observations related to their current level of familiarization with a firearm based on their knowledge and handling of the weapon. The target used during this segment of the study was a National Rifle Association B-2 Style 50-foot slow fire pistol target (Appendix B). The target was a bullseye style target with scoring rings designating 4, 5, 6, 7, 8, 9 and 10 points. Students fired a total of 10 rounds at the target, with a maximum possible score of 100 points. The target paper measured 8 ½ inches wide by 11 inches high, with the scoring area maximum diameter measuring 7 inches. Each target was marked with the stage (pre-test or post-test), the student roster number and the numerical score.

**Instrument 3: Participant post-training survey.** This instrument was a selected response survey created by the researcher and reviewed by a technical college institutional research and evaluation specialist (Appendix C). This instrument was developed and delivered using an online Qualtrics™ survey program. The questions were based on a review of the literature that indicated students tend to compare and evaluate their own performance based on the performance of classmates. The survey asked students to rate their own feelings, perceptions, influence, performance and comparisons made during firearms training using response options provided. Students rated their performance in comparison to their peers at the beginning and at the end of firearms training. Students were given the opportunity to select multiple responses on certain questions. This survey aimed to capture the influence that students had upon one another during their firearms training course.

**Instrument 4: Instructor survey.** The final instrument was a paper and pencil survey developed by the researcher with multiple choice and selected responses. This survey was not validated. The survey was completed by the firearms instructor and it assessed the performance of each individual recruit and their overall ability to safely handle, manipulate and accurately fire the handgun (Appendix D). The survey asked the instructor to assess the student's attitude, confidence and ways in which they interacted with others in the class. This survey was administered upon completion of the firearms training course.

## Data Collection Procedures

Approval for this research was obtained prior to the student orientation and first survey launch. The participants in this study were briefed on the content and an abbreviated purpose of this research during the orientation segment of the academy, which occurred prior to the start of training. Students were addressed collectively as a group and given an overview of the study and their role in the research, if they chose to participate. Students were advised verbally and in writing that participation in the study was voluntary and their decision to participate or not would have no bearing on their status in the academy. Data collection occurred before and throughout the law enforcement academy firearms training.

**Pre-training assessment.** Data collection for the pre-training assessment was collected in an online Qualtrics™ survey program. Participants were briefed by the researcher on the nature of the research and given access to the on-line survey during an orientation session prior to firearms training. Consent to participate was incorporated into the first page of the Qualtrics™ survey form. Participants were given one opportunity to take the survey and advised they had seven days to complete it.

**Firearms performance assessment.** Data collection during this firearms assessment occurred twice during the research study period. The pre-test, which was intended to be a pre-training assessment of the students' baseline experience occurred prior to the start date of the firearms training period. The post-assessment was administered after the completion of firearms training. The purpose of the post-assessment was to capture the students' skill proficiency after receiving the training curriculum. The researcher, who is a certified firearms instructor, administered the pre and post assessment to each participant. Participants were escorted individually into the firearms range and completed the assessment under the supervision of the researcher. There were no other participants, researchers or observers in the room while the assessment took place. This practice is not the norm as typical firearms training and assessment occurs with the full group present. With full group training and assessment all participants can watch the performance of fellow students. In this study each participant was assessed privately and therefore did not have the added pressure of being observed by peers while performing their assessment.

The handgun used in the study was a Glock 17 (Generation 4) 9mm, semi-automatic pistol. The handgun was owned by the Law Enforcement Academy and is rack number 7, serial number BEPX584. The ammunition was Magtech brand, 9mm Luger, 115 grain, FMJ (full metal jacket). For purposes of consistency, the same handgun was used for all students. Students were staged at a distance of 15 feet from the target. Upon approaching the testing area, the student was instructed to load 5 rounds into a magazine, then load and charge the weapon and fire the 5 rounds at the target. The student was instructed to take their time and shoot as accurately as they could, with an objective of getting all 5 rounds into the center of the target. Students were informed there was no time limit and they could take as long as they wanted to fire the 5 rounds.

Upon completion of the first magazine, the student was instructed to reload and fire 5 more rounds with the same instructions. Students were not given further instructions unless there was a safety concern for the exercise. If the student asked for help minimal assistance was given to ensure the completion of the exercise. The researcher did not praise, coach or encourage the student during this stage of the study. The researcher collected, marked and scored each target noting the stage (pre-test or post-test) and student roster number.

The same process was completed for the firearms post-assessment that occurred after the completion of firearms training. During each firearms assessment process the researcher documented firearms handling skills, as well as knowledge, comfort and skills displayed. When collecting the targets, the researcher ensured that the participants did not see the target of the student that preceded them. A clean target was posted for each participant.

**Perceptions of training.** Data about participants perceptions of the training were gathered through a post training survey administered via a Qualtrics™ survey program after the completion of training. Participants were given an overview of the status of the research study and the nature of the post training survey during a routine academy briefing session. The researcher facilitated access to the survey through an email that included a link to Qualtrics™. Participants were given one opportunity to take the survey.

**Instructor assessment of students.** Data from the training instructor was captured via a paper and pencil survey form that was developed by the researcher and distributed to the firearms instructor upon completion of the firearms training. The researcher met with the instructor prior to the start of firearms training to explain the process of this study, and again once training had completed in order to issue the survey and explain its purpose. The instructor was directed to complete the survey based on their observation of students during firearms

training and return the completed surveys to the researcher. To complete this process the instructor filled out the survey forms at their convenience within two weeks following the end of firearms training.

**Data Analysis**

Using the data collected from the student survey and firearms pre-test, candidates were rated by the researcher based on their experience, skill level, and performance on the pre-test. Students were assigned to discrete cohorts and rated as follows:

1. Minimal Experience
2. Moderate Experience
3. Extensive Experience

Two cohorts of 9 candidates each were created with groupings described as follows:

Group 1 – Heterogeneous Group (Highest rated students and lowest rated students)

Group 2 – Homogeneous Group (Mid-range students)

Once the students had been rated and assigned to a group based upon their skill level and experience, students continued as normal throughout their attendance in the law enforcement academy. The assigned groups experienced the Wisconsin Department of Justice, 68 hour standardized basic firearms curriculum as a cohort. Group dynamics and interaction occurred naturally throughout this process and through post-training assessment, survey and instructor observation, the student experience was documented.

Once the raw data was collected it was analyzed using descriptive data analysis. The data consisted of student survey results, instructor evaluations and the results of the pre and post-assessment of firearms skill.

## Limitations

This study has the following limitations:

1. This study was limited to one law enforcement academy cycle and was comprised of a small sample which is not generalizable.
2. The surveys administered during this study were developed by the researcher and were not externally tested for reliability.
3. Some students during this study received remedial training that was in addition to the standard curriculum. Students who were struggling with handgun skills were scheduled for additional training that was provided under the supervision of the firearms instructor. This additional training would have elevated a lesser skilled student to a level of proficiency required for successful completion of the skills competencies and final assessment course. Consequently, this elevation of skills through extra training may have impacted the final results of the study.
4. Some students conducted self-guided practice outside of normally scheduled training hours. Self-guided practice outside the confines of the training curriculum is permitted and encouraged, as long as the repetition of skills is performed correctly. The self-guided practice is not monitored or documented by the instructor and is entirely at the discretion of the individual student. This self-guided practice may have had either a positive or negative effect on the skills of the participating students and could have impacted the results of the final assessment.

## Chapter IV: Results

The operation of a firearm in the context of law enforcement application is a complex skill. The task requires physical and decision-making skills that are applied during high stress scenarios that are both mentally and physically demanding. Law enforcement academy students bring a wide range of skills and previous experience to the training environment. With this wide range of firearms aptitude in new recruits, it is important to understand and develop instructional methods and training group assignments that are effective and will maximize student performance.

The purpose of this study was to determine the effect that heterogeneous and homogeneous groupings had upon student firearms performance and training experience. The aim was to observe and measure the impact that discrete groupings had upon the outcomes for the individual student and capture feelings and perspectives that were experienced by each student given their assignment to a particular group.

The research questions addressed in this study are as follows.

1. What effect do heterogeneous student groupings by skill level have upon individual gains in firearms proficiency?
2. What effect do homogenous student groupings by skill level have upon individual gains in firearms proficiency?
3. What effect do heterogeneous student groupings by skill level have upon their learning experience in firearms training?
4. What effect do homogenous student groupings by skill level have upon their learning experience in firearms training?

Students responded to a pre-training survey that captured demographic information as well as previous firearms experience and perceptions related to firearms training. Students were assessed in both a pre-training and post-training live-fire firearms assessment designed to measure aptitude. To capture student performance and interactions during training, the firearms instructors rated the students on their skill and attitude. The final instrument was a post-training survey designed to capture the students' personal experience in the training environment.

**Sample Demographics and Pre-Training Skills**

The original sample for this study was a cohort of 21 law enforcement candidates ranging in age between 20 and 35, with an average age of 23. Seventeen male candidates (80%) and 4 female candidates (20%) participated in this study. All candidates met the minimum age requirement of 18 years and possessed a minimum of 60 associate degree level credits, or higher. Six students (30%) indicated they had military experience and five students (25%) reported having prior law enforcement experience. All candidates were medically cleared prior to training and met the statutory requirement of U.S. citizenship. Sixteen candidates represented a civilian status (self-sponsored) and five candidates were agency sponsored (employed by a law enforcement agency). All candidates were in attendance with the objective of completing basic law enforcement academy training and seeking certification as a law enforcement officer in the state of Wisconsin.

Following the start of the academy, and after the initial survey was completed, two students voluntarily withdrew from training. One student completed the live fire assessment but opted not to complete the survey. The final student count was 18 participants with a demographic breakdown of 14 male candidates (78%) and 4 female candidates (22%), with 13 being civilian students (72%) and five students (28%) representing a law enforcement agency.

Students were asked to characterize their level of firearms experience before starting the academy as either minimal, moderate or extensive. More than half of the group (55%) indicated they had a moderate level of firearms experience, while a lesser number (38%) indicated their experience was moderate. Only 1 student reported having extensive experience. If students had previous firearms experience they were asked to report the source of previous education and training. Results indicated that most students had been introduced to firearms through a family member (55%) or friend (66%), 4 students (22%) reported prior military training while another 2 students (11%) reported prior law enforcement training. A smaller number of students reported organized civilian or other training as the source of their experience. In general, most students reported hunting as their primary experience involving a firearm (Table 1).

Table 1

*Student Previous Firearms Experience*

| Experience | Heterogeneous Group 1 (n=9) | Homogeneous Group 2 (n=9) |
|---|---|---|
| Level of Experience | | |
| Minimal | 4 (44%) | 3 (33%) |
| Moderate | 4 (44%) | 6 (66%) |
| Extensive | 1 (11%) | 0 (0%) |
| Type of Experience | | |
| Hunting | 5 (55%) | 7 (77%) |
| Military | 2 (22%) | 2 (22%) |
| Law enforcement | 2 (22%) | 0 (0%) |

A major portion of law enforcement academy firearms training consists of handgun operation. Because the primary firearm for U.S. law enforcement officers is the handgun, it was

important to capture the students' level of proficiency and previous experience with a handgun. Students were surveyed and asked to self-assess and rate their proficiency with a rifle, shotgun and handgun. No student reported having No Experience with a handgun, but most students reported have low to medium experience with a handgun (Table 2). One student reported on their handgun experience but did not report on their experience with a rifle or shotgun.

Table 2

*Level of Student Experience by Firearm Type*

| Firearm Type (n=18) | None | Low | Medium | High |
|---|---|---|---|---|
| Rifle | 0 (0%) | 7 (38%) | 9 (50%) | 1 (.05%) |
| Shotgun | 0 (0%) | 7 (38%) | 10 (55%) | 1 (.05%) |
| Handgun | 0 (0%) | 7 (38%) | 9 (50%) | 1 (.05%) |

As a measure of student attitude towards firearms training, and a means to make a comparison between pre-training and post-training perceptions, students were asked to characterize their current feelings regarding academy firearms training. Students could provide multiple responses this question. The students most commonly responded that they were excited (83%) and confident (33%) in their view of the upcoming training course, followed by 22% who felt nervous about the training and another 22% who felt anxious or apprehensive.

The information gained from the student self-assessment of experience was combined with an analysis of the scores achieved on the pre-training firearms assessment. Students were divided into three categories: Minimal Experience, Moderate Experience and Extensive Experience. The researcher then examined the firearms pre-test scores and selected the highest and lowest scores from each category and assigned these students to the Heterogeneous Group

(Group 1). The remainder of students in the Minimal Experience and Moderate Experience categories were assigned to the Homogeneous Group (Group 2).

**Research Question 1: Heterogeneous Grouping Firearms Proficiency**

Heterogeneous Skill Group 1 brought together students that had been determined through survey and assessment to be the most skilled and experienced and the least skilled and experienced within the Police Academy 101. Their firearms skills with a handgun were assessed prior to and following training.

Upon completion of the initial firearms skill assessment, the target scores were examined, and the results showed that students had scored in a range between 0 points and 73 points out of a possible 100, with a mean score of 49.11 points (Table 3). This range of scores reflected in the standard deviation which measured high at 26.77. This measure of standard deviation could be attributed to the presence of outlying scores.

Table 3

*Group 1 (Heterogeneous Group) Firearms Assessment Scores*

| Group 1 | Pre-Test | Post-Test | Score Change |
|---|---|---|---|
| n | 9 | 9 | 9 |
| Mean | 49.11 | 63.11 | 14 |
| Std. Deviation | 26.77 | 17.06 | 21.38 |
| Minimum | 0 | 33 | 33 |
| Maximum | 73 | 88 | 15 |

Results from the post-test showed the scores ranged from a low score of 33 to a high score of 88, with a mean score of 63.11 (Table 3). Scores of 2 candidates decreased from the pre

to post assessment, while the scores of 2 others increased substantially, one by more than 40 points and the other by more than 50 points out of a possible 100.

In comparing the pre-test and post-test standard deviation there was a decrease in 10 points, indicating that students had scored closer to the mean in the post-test, thus reducing the skill gap that existed during the pre-test. Further improvement for Group 1 was indicated by the decrease in the range of scores on the post-test. The Group 1 pre-test showed a 73 point difference between the minimum and maximum scores, while the post-test indicated a 55 point difference between the minimum and maximum scores.

The descriptive statistics in Table 3 indicate that Group 1 experienced a 14 point improvement in the mean score from the pre-test to the post-test. A paired sample $t$-test was applied to the Group 1 pre-test and post-test scores and the difference between the mean values were not statistically significant ($t = -1.9636$, $df = 8$, $p > .05$).

Upon completion of training, the instructors were surveyed and asked to evaluate student performance based on their observations (Appendix D). The instructors were first asked to evaluate the students' ability to safely and effectively manipulate a firearm. Among the Group 1 students 5 (55%) were evaluated as having Above Average skills, while 3 (33%) displayed Average skills and 1 student (11%) showed Below Average skills. The instructors were then asked to evaluate student marksmanship and accuracy with a firearm. Four students (44%) were observed as having Above Average skills, while 4 students (44%) displayed Average skills. One student (11%) was evaluated as having Below Average skills.

**Research Question 2: Homogeneous Grouping Firearms Proficiency**

Homogenous Skill Group 2 brought together students that had been determined through survey and assessment to be the medium level performers in the academy class. Based on

previous experience and aptitude displayed in the firearms assessment, Group 2 students were neither the highest performing nor the lowest performing students in the class. Group 2 was homogenous in their makeup based on previous experience and the firearms aptitude assessment. Using the same testing protocols as Group 1, Group 2 was assessed by administering a live fire assessment before and after firearms training. The results were collected and compared to reveal what changes may have occurred as a result of the training.

Upon completion of the initial firearms skill assessment, the target scores were examined, and the results showed that Group 2 students had scored in a range between 28 points and 63 points out of a possible 100, with a mean score of 43.55 points. (Table 4).

Table 4

*Group 2 (Homogeneous Group) Firearms Assessment Scores*

| Group 2 | Pre-Test | Post-Test | Score Change |
|---|---|---|---|
| n | 9 | 9 | 9 |
| Mean | 43.55 | 70.22 | 26.66 |
| Std. Deviation | 12.35 | 11.38 | 16.68 |
| Minimum Score | 28 | 57 | 29 |
| Maximum Score | 64 | 96 | 32 |

Results from the post-test showed the scores ranged from a low score of 57 to a high score of 96, with a mean score of 70.22 (Table 4). The scores of 2 students increased substantially, one by more than 40 points and the other by more than 50 points out of a possible 100, while a third student increased their score by only 1 point.

In comparing the pre-test and post-test standard deviation there was a decrease in only 1 point, indicating that students had scored consistently closer to the mean in both the pre-test and post-test. To further support the consistent performance among Group 2 students there was only a 3 point increase in the range of scores on the pre and post-tests. The Group 2 pre-test showed a 36 point difference between the minimum and maximum scores, while the post-test indicated a 39 point difference between the minimum and maximum scores (Table 4). A paired sample $t$-test was applied to the Group 2 pre-test and post-test scores and the difference between the mean values was found to be statistically significant different ($t = -4.8$, $df = 8$, $p < .05$).

Upon completion of training, the instructors were surveyed and asked to evaluate student performance based on their observations (Appendix D). The instructors were first asked to evaluate the students' ability to safely and effectively manipulate a firearm. Among the Group 2 students 3 (33%) were evaluated as having Above Average skills, while 6 (66%) displayed Average skills. No student was observed as having Below Average skills. The instructors were then asked to evaluate student marksmanship and accuracy with a firearm. Two students (22%) were observed as having Above Average skills, while 7 students (77%) displayed Average skills. No student was observed as having Below Average skills.

In comparing the pre-test mean scores of Groups 1 and 2 only a slight difference of 5.56 points was indicated (Table 5). An independent $t$-test was applied to the Group 1 and Group 2 pre-test scores and mean values. The difference between the groups' pre-test mean scores were not statistically significant ($t = 0.57$, $df = 16$, $p > .05$).

Table 5

*Group 1 and Group 2 Firearms Pre-Test and Post-Test Score Comparison*

| Student Group # | Pre-Test Mean Score | S.D. | Min | Max | Post-Test Mean Score | S.D. | Min | Max |
|---|---|---|---|---|---|---|---|---|
| Group 1 (n=9) | 49.11 | 26.77 | 0 | 73 | 63.11 | 17.06 | 33 | 88 |
| Group 2 (n=9) | 43.55 | 12.35 | 28 | 64 | 70.22 | 11.38 | 57 | 96 |

While Group 1 and Group 2 were similar in pre-test mean scores, the standard deviation showed greater variation in scores. In a comparison of the standard deviation for the pre-test, Group 1 showed a high standard deviation in scores that was 14.42 points higher than Group 2. This indicated that Group 2 scores were less variable around the mean than Group 1 (Table 5).

When examining the post-test mean scores for Groups 1 and 2, there was a slightly higher difference in mean score between the two groups at 7.11 points. Group 1 showed a reduction in standard deviation from pre-test to post-test, indicating that students in this group scored closer to the mean on the final test. Group 2 standard deviation showed consistent scoring around the mean in both the pre and post-test (Table 5).

In terms of score improvement, a comparison was made between the pre-test mean and post-test mean for Groups 1 and 2. This comparison indicated that Group 1 experienced a 14 point improvement between the pre-test and the post-test, while Group 2 experienced a 26.7 point improvement between the pre and post-test (Table 6).

Table 6

*Group 1 and Group 2 Firearms Assessment Score Comparison (Average)*

| Student Group # | Pre-Test Mean Score | Post Test Mean Score | Improvement in Mean Score |
|---|---|---|---|
| Group 1 (n=9) Heterogeneous | 49.11 | 63.11 | 14 |
| Group 2 (n=9) Homogeneous | 43.55 | 70.22 | 26.7 |

An independent $t$-test was applied to the Group 1 and Group 2 post-test scores and mean values. The difference between the groups' post-test mean scores were not statistically significant ($t = -1.04$, $df = 16$, $p > .05$).

**Research Question 3: Heterogeneous Group Learning Experience**

During the course of this study, two factors were considered as part of the students' learning experience. First, was the level of confidence that each student had prior to and following firearms training. The second factor was the peer to peer interaction and comparison that occurred during training and the resultant impact on performance.

To assist the researcher in gaining a measure of student self-confidence prior to entering firearms training, Group 1 students were asked to self-assess and rate their level of confidence with the operation of a firearm (Table 7). This data revealed that most students were either very confident or not confident in their skills, with a lesser percentage reporting they were somewhat confident (Table 7). Following training students reported being more confident in their skills.

Table 7

*Student Confidence Regarding Firearms Training (Heterogeneous)*

| | Not Very Confident | Somewhat Confident | Very Confident |
|---|---|---|---|
| Pre-test (n=9) | 4 (44%) | 2 (22%) | 3 (33%) |
| Post-test (n=9) | 3 (33%) | 0 (0%) | 6 (66%) |

Student confidence with the firearm was observed by the instructors and the majority of students were either confident or somewhat confident. Four Group 1 students (44%) were evaluated as displaying confidence during training, while 5 Group 1 students (55%) were evaluated as being somewhat confident.

To determine the influence that students had on one another the post-training survey asked how they had been influenced by classmates and how this influence impacted their attitude and performance. A majority of the Group 1 students indicated that they had been helped by the influence of others (Table 8).

Table 8

*Influence Experienced from Other Students (Heterogeneous)*

| Type of Influence | Student Responses (n=9) |
|---|---|
| Helped | 6 (66%) |
| No Influence | 3 (33%) |
| Wanted to be Like | 1 (11%) |
| Intimidated | 1 (11%) |
| Inspired | 0 (0%) |
| Did Not Help | 0 (0%) |

*Note.* More than one response option was available.

To further examine the ways in which students influenced the performance of others, participants were asked if their performance had improved as a result of the influence experienced from classmates. A majority of the Group 1 students, 5 (55%) indicated that their performance level had improved through the influence of others. Three students (33%) felt that influence from their classmates did not improve their performance. No student felt that their performance had been hampered by others.

To capture the influence that students felt they had on their classmates, participants were asked to comment on the ways they had impacted the performance of others. A majority of Group 1 heterogeneous students felt they had helped or positively influenced their classmates. No student felt they had negatively impacted the performance of others (Table 9). When asked if they felt their influence had improved the performance of their classmates, all 9 Group 1 students (100%) reported they believed it had.

Table 9

*Influence on Other Students (Heterogeneous)*

| Type of Influence | Student Responses (n=9) |
|---|---|
| Helped | 9 (100%) |
| Influenced | 6 (66%) |
| Inspired | 2 (22%) |
| No Influence | 0 (0%) |
| Aspired to be like | 0 (0%) |
| Hampered | 0 (0%) |

*Note.* More than one response option was available.

To identify the ways in which students were encouraged by classmates during training, Group 1 students were asked to identify if words or actions from fellow students had encouraged them. Group 1 students confirmed they had been encouraged most by words, actions and body language. No student felt they had not received encouragement from others (Table 10).

Table 10

*The Ways in Which Students Were Encouraged by Others (Heterogeneous)*

| Mode of Encouragement | Student Responses (n=9) |
|---|---|
| Actions | 8 (88%) |
| Words | 8 (88%) |
| Body Language | 5 (55%) |
| Not Encouraged | 0 (0%) |
| Other | 0 (0%) |

*Note.* More than one response option was available.

With Festinger's Theory of Social Comparison (1954) as a foundation, Group 1 was structured in such a way that students with varying levels of skill and experience would have an opportunity to observe and respond to classmates with a different skillset than their own. To determine the students' perception of their own skill level in comparison to classmates, participants were surveyed pre and post-training, and asked to rate themselves as performing better, the same, or worse than their fellow students. The results indicated that four Group 1 students (44%) considered themselves to be worse than others before training; this fell to zero after training. Three (33%) considered themselves to be the same in ability as others before training, and this number increased to 66% after training, while 3 (33%) considered themselves to be better than others before training and 44% after training.

When measuring the existence of peer-to-peer comparison in the classroom, students were asked if they had compared themselves to classmates who performed better, performed the same as or performed worse than they did. The majority of Group 1 students (66%) indicated they had compared themselves to students that performed better, while 2 students (22%) reported comparing themselves to students who performed the same as they did. One heterogeneous student reported they had compared themselves to students who performed worse (Table 11).

Table 11

*The Impact of Peer to Peer Comparison on Student Performance (Heterogeneous)*

| Classmate | Who Did You Compare Yourself To? | Which Students Caused You to Perform Better? | Which Students Caused You to Perform Worse? |
|---|---|---|---|
| Better Performing | 6 (66%) | 2 (22%) | 6 (66%) |
| Same Performing | 2 (22%) | 1 (11%) | 2 (22%) |
| Worse Performing | 1 (11%) | 6 (66%) | 1 (11%) |

To further examine the peer to peer comparison in this training group, the participants were asked, when comparing themselves to others, which of their classmates (better performing, same performing or worse performing) caused them to perform better and which caused them to perform worse. The majority of Group 1 students said that when observing and comparing themselves to a worse performing classmate they performed better and comparing themselves to a better performing classmates caused them to perform worse (Table 11). It is interesting to note that participants said they compared themselves to others who were better performing and yet they perceived better performing students caused them to perform worse.

To further explore the effect of peer to peer comparison in training, students were asked how comparison affected their performance. Six Group 1 heterogeneous students (66%) said that comparison with other students had improved their own performance while 3 Group 1 students (33%) said that comparison with others had no effect on their performance.

While students believed they positively influenced others in their group, the feelings they experienced when making the comparison were less positive. A majority of Group 1 students said they were both encouraged and motivated by others (Table 12) however, 1/3 of students felt

intimidated or demotivated when comparing themselves to other students. This is the same number who said those who performed the same or worse caused them to perform worse (Table 11).

Table 12

*Feelings Experienced When Comparing to Others (Heterogeneous)*

| Feelings | Student Responses (n=9) |
|---|---|
| Encouraged | 5 (55%) |
| Motivated | 4 (44%) |
| Intimidated | 2 (22%) |
| Demotivated | 1 (11%) |
| Other | 0 (0%) |

*Note.* More than one response option was available.

Student attitudes were observed by the instructors, and Group 1 students showed positivity in the areas of confidence and cooperation. The heterogeneous students were diverse in representation of attitude and showed characteristics that could be considered negative such as apathy, anxiety and apprehension (Table 13).

Table 13

*Instructor Observation of Student Attitude During Training (Heterogeneous)*

| Student Attitude | Student Responses (n=9) |
|---|---|
| Cooperative | 9 (100%) |
| Apathetic | 4 (44%) |
| Confident | 4 (44%) |
| Anxious | 3 (33%) |
| Apprehensive | 1 (11%) |
| Excited | 1 (11%) |

*Note.* More than one response option was available.

To capture the peer to peer interaction in training the instructor observed classroom dynamics and Group 1 students showed a higher number of follower type characteristics (Table 14).

Table 14

*Instructor Observation of Student Interaction with Others During Training (Heterogeneous)*

| Student Interaction | Student Responses (n=9) |
|---|---|
| Follower | 3 (33%) |
| Mentor | 2 (23%) |
| Loner | 2 (22%) |
| Role Model | 1 (11%) |
| Mentee | 0 (0%) |
| Advisor | 0 (0%) |
| Leader | 0 (0%) |

*Note.* More than one response option was available.

**Research Question 4: Homogeneous Group Learning Experience**

In the pre-training survey Group 2 students were asked to rate their confidence level as they were about to enter firearms training. The results indicated that the majority of Group 2 students were either Somewhat or Very Confident in their skill level and use of a firearm (Table 15). Following training students reported being more confident in their skills.

Table 15

*Student Confidence Regarding Firearms Training (Homogeneous)*

| Group | Not Very Confident | Somewhat Confident | Very Confident |
|---|---|---|---|
| Pre-test (n=9) | 1 (11%) | 5 (55%) | 3 (33%) |
| Post-test (n=9) | 2 (22%) | 0 (0%) | 7 (77%) |

Student confidence with the firearm was observed by the instructors and the majority of students were either Confident or Somewhat Confident, while only one student was observed to be Not Confident. Three Group 2 students (33%) were evaluated as displaying confidence during training, while 2 students (22%) were evaluated as being somewhat confident.

To examine the ways in which students influenced others a post-training survey was conducted, and Group 2 students were asked how the influence of others impacted their own performance. The majority of Group 2 students indicated they had been helped by the influence of others (Table 16).

Table 16

*Influence Experienced from Other Students (Homogeneous)*

| Type of Influence | Student Responses (n=9) |
|---|---|
| Helped | 8 (88%) |
| Inspired | 3 (33%) |
| Did Not Help | 1 (11%) |
| Intimidated | 1 (11%) |
| Wanted to be Like | 1 (11%) |
| No Influence | 0 (0%) |

*Note.* More than one response option was available.

To further examine the ways in which students influenced the performance of others, participants were asked if their performance had improved as a result of the influence experienced from classmates. A majority of the Group 2 students, 8 (88%) indicated that their performance level had improved through the influence of others. One student (11%) felt that

influence from their classmates did not improve their performance. No student felt that their performance had been hampered by others.

To capture the influence that students felt they had on their classmates, participants were asked to comment on the ways they had impacted the performance of others. A majority of Group 2 students felt they had helped or positively influenced their classmates. No student felt they had negatively impacted the performance of others (Table 17). When asked if they felt their influence had improved the performance of their classmates, 8 students (88%) felt their influence had improved the performance of their classmates, while 1 student (11%) felt they had not helped to improve others. No student felt they had hampered the performance of others.

Table 17

*Influence on Other Students (Homogeneous)*

| Type of Influence | Student Responses (n=9) |
|---|---|
| Helped | 9 (100%) |
| Influenced | 4 (44%) |
| Inspired | 1 (11%) |
| Aspired to be like | 0 (0%) |
| Hampered | 0 (0%) |
| No Influence | 0 (0%) |

*Note.* More than one response option was available.

With Festinger's Theory of Social Comparison (1954) as a foundation, Group 2 was structured in such a way that students with similar skill and experience levels would have an opportunity to observe and evaluate their performance with similarly skilled classmates. During the pre-training survey students were asked to categorize their skills in comparison to others.

Four Group 2 students (44%) considered themselves to be worse than others, while another 4 students (44%) considered themselves to be the same as others. One Group 2 student (11%) considered themselves to be better than others. In a post-training survey, no student considered themselves to be worse than others, while the number of students who considered themselves to be the same as others increased to 5 (55%) and the number of students who considered themselves better than others increased to 4 (44%).

To identify the ways in which students were encouraged by classmates during training, Group 2 students were asked to identify if words or actions from fellow students had encouraged them. Group 2 students confirmed they had been encouraged most by words and body language. No student felt they had not received encouragement from others (Table 18).

Table 18

*The Ways in Which Students Were Encouraged by Others (Homogeneous)*

| Mode of Encouragement | Student Responses (n=9) |
|---|---|
| Words | 8 (88%) |
| Body Language | 7 (77%) |
| Actions | 5 (55%) |
| Not Encouraged | 0 (0%) |
| Other | 0 (0%) |

*Note.* More than one response option was available.

When measuring the existence of peer-to-peer comparison in the classroom, students were asked if they had compared themselves to classmates who performed better, performed the same or performed worse than they did. The majority of Group 2 students responded that they had compared themselves to students that performed better (Table 19). A lesser number of

students said they had compared themselves with students who performed the same, while no student compared themselves to students who performed worse. One student did not respond to this survey question.

Table 19

*The Impact of Peer to Peer Comparison on Student Performance (Homogeneous)*

| Classmate | Who Did You Compare Yourself To? | Which Students Caused You to Perform Better? | Which Students Caused You to Perform Worse? |
|---|---|---|---|
| Better Performing | 6 (66%) | 6 (66%) | 2 (22%) |
| Same Performing | 2 (22%) | 1 (11%) | 4 (44%) |
| Worse Performing | 0 (0%) | 1 (11%) | 2 (22%) |

To further examine the peer to peer comparison in this training group, the students were asked, when comparing themselves to others, which of their classmates (better performing, same performing or worse performing) caused them to perform better and perform worse. The majority of Group 2 students said that comparing themselves to a better performing classmate caused them to perform better (Table 19). One student did not respond to this survey question. In a contrast to the previous question, more students said that classmates who performed the same as them, caused them to perform worse. One student did not respond to this question (Table 19).

While further studying the effect of peer to peer comparison in training, students were asked how comparison to classmates affected their performance. Six Group 2 students (66%) said that comparison with other students had improved their own performance. Two students

(22%) said that comparing themselves to others had hampered their performance. One student did not respond to this question.

Students were asked to characterize how they felt when they compared themselves to other students. A majority of Group 2 students said they were both encouraged and motivated by others. A lesser number of students felt they were intimidated when they compared themselves to others (Table 20).

Table 20

*Feelings Experienced When Comparing to Others (Homogeneous)*

| Feelings | Student Responses (n=9) |
|---|---|
| Motivated | 5 (55%) |
| Encouraged | 3 (33%) |
| Intimidated | 2 (22%) |
| Demotivated | 0 (0%) |
| Other | 0 (0%) |

*Note.* More than one response option was available.

Student attitudes were observed by the instructor and most Group 2 students were found to fall into positive categories such as cooperative, confident or excited (Table 21).

Table 21

*Instructor Observation of Student Attitude During Training (Homogeneous)*

| Student Attitude | Student Responses (n=9) |
|---|---|
| Cooperative | 8 (88%) |
| Confident | 6 (66%) |
| Apathetic | 1 (11%) |
| Excited | 1 (11%) |
| Apprehensive | 0 (0%) |
| Nervous | 0 (0%) |

*Note.* More than one response option was available.

To capture the peer-to-peer interaction in training the instructor observed classroom dynamics and determined that Group 2 homogenous students showed mainly leadership type characteristics within the group, such as leader, advisor, and role model (Table 22).

Table 22

*Instructor Observation of Student Interaction with Others During Training (Homogeneous)*

| Student Interaction | Student Responses (n=9) |
|---|---|
| Leader | 3 (33%) |
| Follower | 2 (22%) |
| Advisor | 1 (11%) |
| Role Model | 1 (11%) |
| Loner | 1 (11%) |
| Mentor | 0 (0%) |
| Mentee | 0 (0%) |

## Chapter V: Discussion, Conclusions and Recommendations

The operation of a firearm in the context of law enforcement application is a complex skill. The task requires physical and decision-making skills that are applied during high stress scenarios that are both mentally and physically demanding. Law enforcement academy students bring a wide range of skills and previous experience to the training environment. With this wide range of firearms aptitude in new recruits, it is important to understand and develop instructional methods and training group assignments that are effective and will maximize student performance.

Literature supports the importance, complexity and legal considerations associated with firearms use and law enforcement academy firearms training (Ivanovski & Rajkovchevski, 2015; Ryan, 2007). The literature also reinforces that the use of a firearm and application of deadly force is a stressful process that requires both physical and mental focus (Lewinski, Avery, Dysterhaft, Dicks & Bushey, 2015; Lohman, 2015; Violanti, 1992). Law enforcement recruits are becoming increasingly diverse in demographic make-up, background and experience (U.S. BJS, 2001; U.S. DOJ, & U.S. EEOC, 2016; U.S. DOL, 2010). A recruits' personal experience with a firearm may include hunting, law enforcement or military experience (U.S. DON, 2012; U.S. FWS, 2016).

The literature also provided a theory for social comparison when evaluating one's performance (Buunk et al., 1990; Festinger, 1954). Past research on social comparison theory indicated ways in which students with various backgrounds, skill levels and experience tend to react to one another in the learning environment (Lou et al., 1996; Saleh et al., 1996; Wehrens, Kuyper, Dijkstra, Buunk, & van der Werf, 2010). In terms of student grouping, the research suggested that lower ability students performed better in heterogeneous groupings, while

medium ability students performed better in homogeneous groupings. Higher ability students were found to perform equally well in both groupings (Lou et al., 1996; Saleh, Lazonder, Ard & De Jong, 2005; Webb & Palinscar, 1996).

The purpose of this study was to determine the effect that heterogeneous and homogeneous groupings had upon student firearms performance and training experience. The aim was to observe and measure the impact that discrete groupings had upon the outcomes for the individual student and capture feelings and perspectives that were experienced by each student given their assignment to a particular group.

The research questions addressed in this study are listed as follows.

1. What effect do heterogeneous student groupings by skill level have upon individual gains in firearms proficiency?
2. What effect do homogenous student groupings by skill level have upon individual gains in firearms proficiency?
3. What effect do heterogeneous student groupings by skill level have upon their learning experience in firearms training?
4. What effect do homogenous student groupings by skill level have upon their learning experience in firearms training?

Students in a Wisconsin police academy cohort responded to a survey that captured demographic information as well as, previous firearms experience and perceptions related to firearms training. Students were assessed in both a pre-training and post-training live-fire firearms assessment designed to measure aptitude. To capture student performance and interactions during training, firearms instructors rated the students on their skill and attitude. The

impact of firearms training was captured in a post-training survey that sought to gain insight into the social interaction within the discrete training cohorts.

This chapter discusses the findings of this study and provides conclusions and recommendations based on the results.

## Discussion

The focus of this study was the effect that grouping of students based on skill and experience had upon the final outcome of firearms training. The assessments and data collection for this study revealed that students bring a variety of experience with a firearm to the training environment. The data also captured the performance level and gains or losses experienced by each student. Finally, the study captured each student's learning experience related to firearms training and the established cohort groupings.

**Impact of grouping students on firearms proficiency.** Research Question 1 sought to determine the effect that heterogeneous grouping of students based on skill level had upon individual gains in firearms proficiency, while Research Question 2 sought to determine the effect that a homogeneous grouping had upon student proficiency. The homogeneous grouping was comprised of students who were similarly skilled with minimum or moderate experience and had scored moderately on the firearms pre-test. The heterogeneous grouping was comprised of students who had achieved the highest and lowest scores on the firearms pre-test. Members of this group represented all three skill level designations (minimal, moderate and extensive).

When comparing the firearms proficiency of heterogeneous and homogeneous groups, this study found that the homogeneous group showed a lower standard deviation and more consistency in scoring through the pre-test and post-test than did the heterogeneous group. The homogeneous group also showed a higher improvement in mean score between the pre-test and

post-test than the heterogeneous group, although throughout the pre-test and post-test the groups registered mean scores that differed by only 7 points or less.

Students in the homogeneous grouping did experience a statistically significant increase between their pre-training and post-training assessment when the groups' mean score increased by 27 points. The heterogeneous group did not experience a statistically significant increase as that groups' mean score increased by only 14 points. The literature supported these findings as Lou et al., (1996) found that average or medium ability students tend to demonstrate more gains when they are assigned to homogeneous groups. However, the heterogeneous groups' standard deviation in score from the pre-test to the post-test decreased from 26.77 to 17.06, indicating that their post-training skills were more consistent. When comparing the post-test scores of the groups there was no statistically significant difference between the two, indicating that firearms training had been effective.

Although there was improvement in the heterogeneous group scores, individual scores showed some students experienced increases, while others experienced a negative score improvement. These extremes may have skewed the final collective scores for this group. Furthermore, as discussed in the Limitations section of this study, individual student practice outside of class and remedial training provided to students requiring extra assistance could have had an impact upon skill improvement and final scores.

The instructor further supported this firearms proficiency data when their survey indicated that students in both groups displayed average or above average skills based on their observation, with only one student displaying below average skills.

**Influence of grouping on training experience.** Research Question 3 explored the effect that heterogeneous grouping of students by skill level had upon the learning experience for

students in firearms training, while Research Question 4 explored the same effect for a homogeneous grouping of students.

This study determined that both a student group consisting of those with the highest and lowest skills and experience (heterogeneous) and a student group consisting of those with similar, mostly minimal and moderate levels of skill and experience (homogeneous) had an improved perception of their own abilities after completion of the training. The two groups were similar in that they reported varying levels of confidence (minimal to moderate) prior to training. Both groups similarly reported feeling confident in their skills after training had been completed.

In terms of influence among the groups, both the heterogeneous and homogeneous student groups felt they were mostly helped by their classmates and had been instrumental themselves in helping and influencing fellow students. Students in both groups reported that the influence they received from classmates and imparted upon classmates was mostly positive, and this inward and outward influence resulted in improvement in their own performance. There was a difference between the groups in their perception of the influence they experienced from other students. The homogeneous group felt more help and inspiration from others, while the heterogeneous group reported being helped, but also reported experiencing no influence from others. The majority of positive influence was reported by the homogeneous group and could be attributed to the similarities within that group. Both groups reported they had received similar types of positive encouragement from classmates and experienced an improvement in their own performance as a result.

For the most part, students in both groups reported they were encouraged or motivated by comparing their performance to others. This study found that all students in both groups reported that at one point or another during the training they compared their performance to another

student. Most reported being encouraged or motivated by comparison to others, but equally across both groups, some did feel intimidated or discouraged. These results were supported by Festinger's Theory (1954) that humans have an innate desire to compare their performance to others.

The most apparent difference between the heterogeneous group and the homogeneous group was the type of student that participants reported comparing themselves to and the impact of that comparison.

Most students in the heterogeneous group reported comparing themselves to a better performer but felt that comparing themselves to that better performer caused them to perform worse. Heterogeneous students further reported that comparing themselves to a worse performer caused them to perform better. This diverges from the results of a study by Wehrens, Kuyper, Djikstra, Buunk and van der Werf (2010) who found that students who compare themselves with better performers tend to perform better than those who compare themselves with lower performers. The results of this study also diverge from research conducted by Buunk and Ybema (1997) who reported that upward comparison in an educational environment can serve to motivate and inform students on ways to improve or discover the potential within themselves. However, research conducted by Wills and Miller (1981) reported that upward comparison tends to result in negative effects due to feelings of inadequacy and inferiority, while downward comparison results in positive feelings and increased self-esteem and gives the student an overall feeling of satisfaction. In regard to the influence of upward and downward comparison within the heterogeneous group, a comparison of the findings in the literature review and the findings of this study are inconclusive.

Most students in the homogeneous group felt that comparing themselves to a better performer caused them to perform better, while comparing to a student with equal skills caused them to perform worse. The results from this study are similar to a study by Wehrens, Kuyper, Djikstra, Buunk and van der Werf (2010) who found that students who compare themselves with better performers tend to perform better than those who compare themselves with lower performers. In terms of comparing themselves laterally with equal performers, the literature shows that students who compare themselves to equals are seeking self-evaluation (Taylor, Wayment & Carillo, 1996). The aspect of lateral peer to peer comparison in this study requires further investigation.

Differences in the heterogeneous group and homogeneous group were evident in the ways in which the students viewed their peers, and this may reveal that an intentional student grouping may have an effect on the overall educational experience. This study revealed that students compared themselves to others differently based on the group to which they were assigned. A notable finding in this study is that the heterogeneous group reported that when comparing their performance to other students worse performing students caused them to perform better while the homogeneous group reported that better performing students caused them to perform better. Upward, downward and lateral comparison occurred differently in the two groups as well as the measure of influence that students felt from others.

**Conclusions**

This study sought to determine if assigning students to either a heterogeneous or homogeneous training group based on skill and experience would have an impact upon their improvement in firearms operation and their overall educational experience. Based upon the pre-training survey and firearms pre-test, it was evident that academy students possessed varying

levels of experience and skill with a firearm prior to entering basic training. The firearms post-test showed skills but did not indicate whether comparison had any impact.

In terms of heterogeneous and homogeneous training group assignments, it was clear that skill improvement was statistically significant in the homogeneous group, but not in the heterogeneous group. When comparing the groups to one another, there was not a statistically significant difference in score improvement between the groups. This study also concluded that a homogenous grouping of students consistently scored closer to a mean score throughout the pre and post-test than the heterogeneous students who demonstrated a higher measure of standard deviation. This is a logical conclusion as the homogeneous students were similarly skilled prior to the training and were grouped accordingly. Further studies over time with a larger sample may be required to definitively determine if an intentional student grouping would be beneficial for firearms training.

This study confirmed that social comparison does occur in academy training and this fact must be considered when planning, assigning and evaluating students. Students will compare themselves to others and this comparison has the potential to both positively and negatively impact the educational experience. Students may tend to view the performance and skill level of classmates differently based on the group to which they are assigned. Being aware and paying attention to student group assignments and classroom dynamics will be an important consideration for instructors and administrators. This study revealed that regardless of student grouping effective training will result in skill improvement and consistency in student performance. A higher level of skill improvement may be experienced by a homogeneous grouping of students. In terms of performance a homogeneous group may perform more

consistently throughout the training, while a heterogeneous group may show more consistency upon completion of training.

**Recommendations**

Based on the findings of this research study it is recommended that law enforcement academy instructors and administration develop a strategy to assign recruits to groups that are similar. The intentional evaluation of each student prior to the start of firearms training is important when grouping students within a similar cohort. It is suggested that the following recommendations be considered when developing firearms training program.

- Develop and administer a questionnaire, prior to training, that captures demographic information and the previous firearms skill and experience of each recruit. Use this information to group students within cohorts that are similar.
- Monitor and evaluate not only the skill development of each student, but also the learning environment and peer to peer dynamic in the classroom.
- Monitor the individual characteristics of each student to ensure they are interacting in a positive manner within the classroom.

The following recommendations for further study should be considered.

- It is recommended that further research regarding homogeneous and heterogeneous grouping of students be conducted across a larger population and with a larger sample size.
- The impact of social comparison in firearms training informed this study. It would be beneficial to collaborate with a sociologist in future studies of this nature when developing survey questions and analyzing the data.

- The literature indicated that stress and anxiety can also play a part in peer to peer comparison. A future study could be conducted to capture student feedback on stress and anxiety experienced in firearms training.
- The pre and post assessments were conducted in private with only the student and researcher present. A future study should be conducted in the presence of others to maintain the influence of peer to peer comparison.

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## Appendix A: Firearms Training Pre-Training Survey

Firearms Pre-Training Survey

The purpose of this survey is to capture limited demographic information, as well as, a measure of your previous firearms experience and attitude regarding firearms training. Your completion of this survey is required, however, the survey and the research study that it supports, will have no bearing on your class standing nor your final grade or status in the law enforcement academy. The information gathered will be considered confidential with appropriate security measures in place to protect your privacy. Your honest responses in this survey will be important to this research and will serve to improve training for not only you, but also for future academy classes. Your cooperation is greatly appreciated.

1. Please rate your firearms experience on the following scale. (Select one)
    a. No experience
    b. Minimal experience
    c. Moderate experience
    d. Extensive experience
2. How many years of experience? _____
3. At what age did your experience begin? _____
4. How were you trained? (Select all that apply)
    a. Family member or friend
    b. Organized civilian training
    c. Military training
    d. Law enforcement training
    e. Other

    i. Please describe

5. What type of experience do you have? (Select all that apply)
    a. Hunting
    b. Shooting sports
    c. Military
    d. Law Enforcement
    e. Other
        i. Please describe
6. Do you have military experience? If yes,
    a. What branch or branches of the military did you serve in?
    b. How many years did you serve in the military?
    c. What is/was your military occupational specialty or specialties? (Please respond with MOS number and title)
    d. List any specialized firearms training you received in the military beyond basic training and annual qualification.
7. Do you have law enforcement experience? If yes,
    a. What is the name of the law enforcement agency or agencies you are/were employed by?
    b. How many years have you been employed as a law enforcement officer?
    c. Please list any specialized firearms training or experience that you have.
8. What types of firearms do you have experience with? (Select all that apply)
    a. Rifle
        i. Single shot

ii. Bolt action

iii. Semi-automatic

iv. Automatic

v. Muzzle loader

vi. Revolver

b. Shotgun

i. Single shot

ii. Pump

iii. Semi-automatic

iv. Muzzle loader

v. Revolver

c. Handgun

i. Single shot

ii. Revolver

iii. Semi-automatic

iv. Muzzle loader

v. Revolver

9. How would you rate your own proficiency with a firearm?

a. Rifle (Select one)

i. Low

ii. Medium

iii. High

iv. No Experience

b. Shotgun (Select one)
    i. Low
    ii. Medium
    iii. High
    iv. No Experience
c. Handgun (Select one)
    i. Low
    ii. Medium
    iii. High
    iv. No Experience

10. Given your current level of experience, please rate your confidence with the operation of a firearm prior to the start of academy firearms training.
    a. Very confident
    b. Somewhat confident
    c. Not very confident
11. Please characterize your current feelings regarding academy firearms training. (Please select all that apply)
    a. Apprehensive
    b. Anxiety
    c. Nervous
    d. Frightened
    e. Apathetic
    f. Excited

g. Confident

12. What is your age? _____

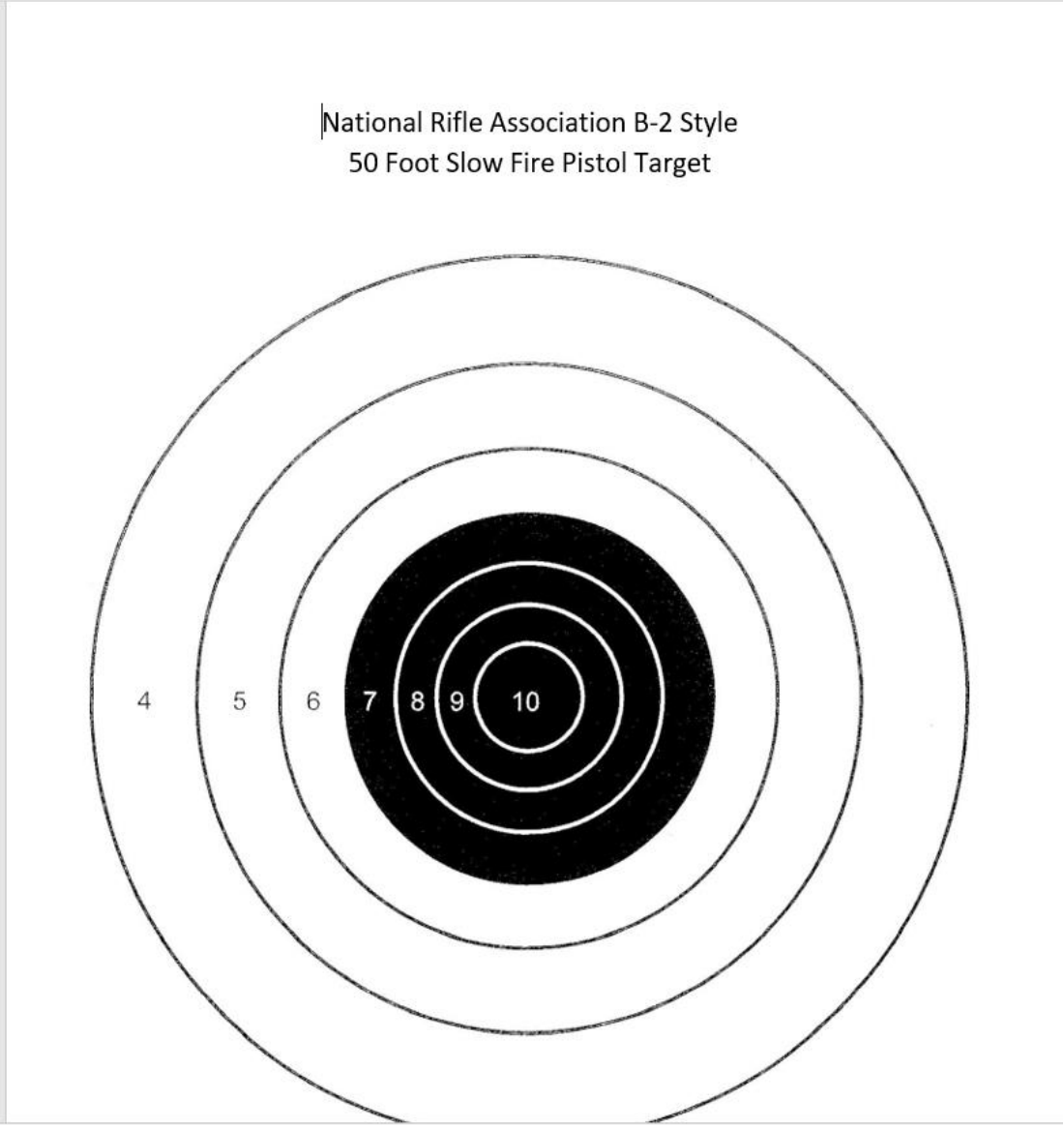
13. What is your gender?

a. Male

b. Female

14. What is your academy roster number?

**Appendix B: NRA B-2 Style 50 Foot Slow Fire Pistol Target**



## Appendix C: Firearms Post-Training Survey

Firearms Post-Training Survey

To inform this research study it is important to understand your personal perceptions during firearms training. Your responses to this study are required but will remain confidential. Your participation in this study and the responses that you provide, will have no bearing on your class standing or final grade. Please reflect on your academy firearms training experience and answer the following questions. Your cooperation in this study is greatly appreciated and will serve to improve not only your training experience, but also the experience of future academy classes.

1. How would you rate your performance in comparison to your peers at the beginning of firearms training?
    a. Better than my peers
    b. Same as my peers
    c. Worse than my peers
2. How would you rate your performance in comparison to your peers upon completion of firearms training?
    a. Better than my peers
    b. Same as my peers
    c. Worse than my peers
3. What were the feelings that you experienced during firearms training? (Select all that apply
    a. Confidence
    b. Anxiety
    c. Fear

   d. Self-Conscious
   e. Intimidation
   f. Other – Please describe

4. How did you feel while performing in front of others? (Select all that apply)
   a. Encouraged
   b. Unaffected
   c. Nervous
   d. Intimidated
   e. Anxious
   f. Self-conscious
   g. Better than other
   h. Not as good as good as others
   i. Same as others
   j. Other – please describe

5. What influence did others have upon you, either directly or indirectly, during firearms training? (Select all that apply)
   a. They helped me
   b. They did not help me
   c. They intimidated me
   d. They inspired me
   e. I wanted to be like them
   f. I was not influenced by others
   g. Other – please describe

6. Based on the influence of others discussed in the previous question, what effect did that influence have upon your performance in firearms training?
    a. Improved my performance
    b. Did not improve my performance
    c. Hampered my performance
7. What influence did you have upon others, either directly or indirectly?
    a. I influenced others
    b. I inspired others
    c. I helped others
    d. Others aspired to be like me
    e. I hampered others
    f. I did not influence others
    g. Other – Please describe
8. Based on your influence on others discussed in the previous question, what effect did your influence on others have upon your performance in firearms training?
    a. Improved my performance
    b. Did not improve my performance
    c. Hampered my performance
9. Did your classmates? (Select all that apply)
    a. Encourage you
    b. Discourage you
    c. Motivate you
    d. Demotivate you

e. Intimidate you

f. Other – Please describe

10. In what ways did your classmates encourage you during firearms training? (Select all that apply)

    a. Words

    b. Actions

    c. Body language

    d. I was not encouraged by my classmates

    e. Other – Please describe

11. Were one or more of your classmates: (Select all that apply)

    a. Encouraging

    b. Discouraging

    c. Motivating

    d. Demotivating

    e. Role model

    f. Intimidating

    g. Mentor

    h. Mentee

12. Based on the influence described in the previous question, how did this influence affect your performance in firearms training?

    a. Improved

    b. Impaired

    c. No effect

13. At any point during firearms training did you compare your performance to the performance of your classmates?
    a. Yes
    b. No
14. How often did you compare yourself to others?
    a. Most of the time
    b. Some of the time
    c. Rarely
15. Which classmates did you compare yourself to?
    a. Those that were better than me
    b. Those that were worse than me
    c. Those that were the same as me
16. When comparing yourself to others how did this comparison affect your performance?
    a. Improved my performance
    b. Hampered my performance
    c. Did not affect my performance
17. What did you feel when comparing yourself to others?
    a. Encouraged
    b. Intimidated
    c. Motivated
    d. Demotivated
    e. Other – please describe
18. When comparing yourself to others, which classmates caused you to perform better?

a. Those better than me

b. Those worse than me

c. Those the same as me

19. When comparing yourself to others, which classmates caused you to perform worse?

a. Those better than me

b. Those worse than me

c. Those the same as me

20. What is your gender?

a. Male

b. Female

21. What is your age?

22. What is your academy roster number?

## Appendix D: Firearms Instructor Student Assessment

Firearms Instructor Student Assessment

To the Firearms Instructor, the purpose of this assessment is to first, correctly categorize the recruit on their firearms operation skills before academy firearms training. The categorization of students will allow for placement in discrete groups and will facilitate the conduct of this research study. The second purpose of this assessment is to inform the researcher on the progress made at the program mid-point and final. Your cooperation and assistance in this study is greatly appreciated.

Student Name: _____
Academy Roster Number: _____
Squad: _____
Training Group: _____
Assessment:

- Pre-Training Assessment: _____
- Training Assessment: _____
- Post-Training Assessment: _____

1. Please rate the recruit on their weapon handling skills, to include loading, unloading, reloading, malfunction clears and safe handling practices. (Select one)
    a. Unsatisfactory
    b. Average
    c. Above Average
    d. Outstanding
2. Please rate the recruit on their marksmanship skills. (Select one)
    a. Unsatisfactory
    b. Average
    c. Above Average

    d. Outstanding

3. Please rate the recruit on their confidence while operating the firearm. (Select one)
    a. Confident
    b. Somewhat confident
    c. Not confident
4. Please characterize the attitude of the recruit while operating a firearm. (Select all that apply)
    a. Apprehensive
    b. Nervous
    c. Anxious
    d. Apathetic
    e. Excited
    f. Confident
    g. Cooperative
    h. Uncooperative
    i. Other (Please explain)
5. Please characterize the ways in which the recruit interacted with others during firearms training. This observation should not only include times of active operation of the firearm, but also instances such as breaks, downtime, practice time, prep time, etc. (Please select all that apply)
    a. Role model
    b. Mentor
    c. Mentee

d. Advisor

e. Leader

f. Follower

g. Loner

h. Other (Please explain)