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THESIS

**SUFFICIENCY OF NAVY HANDGUN TRAINING
FOR FORCE PROTECTION WATCHSTANDERS**

by

David A. Tate

September 2019

Thesis Advisor:
Second Reader:

Scott E. Jasper
Christopher C. Bone

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**SUFFICIENCY OF NAVY HANDGUN TRAINING FOR FORCE PROTECTION
WATCHSTANDERS**

David A. Tate
Lieutenant, United States Navy
BA, University of North Carolina at Wilmington, 2004

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September 2019**

Approved by: Scott E. Jasper
Advisor

Christopher C. Bone
Second Reader

Afshon P. Ostovar
Associate Chair for Research
Department of National Security Affairs

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ABSTRACT

Military training recently has come under review in the face of numerous service member non-combat deaths. Many of these incidents have catalyzed major changes in procedure and training, but in response to the lesser known USS Mahan shooting incident, the naval small arms training program was not scrutinized. Therefore, this thesis will investigate the following research question: Does Navy handgun training bestow the acquisition, retention, and proficiency of small arms skills necessary to counter real-world threats? This thesis analyzes the sufficiency of the naval small arms training program as written in OPNAVINST 3591.1F. Sufficient conditions for small arms training are developed through a review of quantitative research findings conducted on motor skill acquisition, retention, and proficiency. Based on these sufficient conditions, the naval small arms training program is insufficient to produce watchstanders able to counter real-world threats. In particular, it does not contain a formalized standard operating procedure for instruction, a training timeline, mandatory practice during skill acquisition, or mandatory practice during the one-year training cycle. Most importantly, the training lacks the verisimilitude necessary to prepare force protection watchstanders for the real-world shooting environment, to include the psychological stress of an actual engagement.

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LIST OF ACRONYMS AND ABBREVIATIONS

ARI	Army Research Institute
CBT	Computer Based Training
CNO	Chief of Naval Operations
COF	Course of Fire
CPR	Cardio Pulmonary Resuscitation
DoD	Department of Defense
FBI	Federal Bureau of Investigation
ISMT	Indoor Simulated Marksmanship Trainer
MSC	Military Sealift Command
NHQC	Naval Handgun Qualification Course
NKO	Navy Knowledge Online
NPS	Naval Postgraduate School
NRA	National Rifle Association
NSF	Naval Security Force
POOW	Petty Officer of the Watch
PPC	Practical Pistol Course
PTI	Police Training Institute
RSO	Range Safety Officer
SAMI	Small Arms Instructor
SNMT	Standard Naval Marksmanship Training
SOP	Standard Operating Procedure
USMC	United States Marine Corps
USN	United States Navy
WWII	World War Two

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I. INTRODUCTION

A. BACKGROUND AND SIGNIFICANCE

In recent years the United States Navy has suffered two noncombat-related maritime collisions in the seventh fleet that were caused by a lack of sufficient training. In the collision report for USS Fitzgerald (DDG-62) and USS McCain (DDG-56), it was determined that, “Both of these accidents were preventable and the respective investigations found multiple failures by watch standers that contributed to the incidents,” said Chief of Naval Operations (CNO) Adm. John Richardson.¹ In the USS McCain report it was found that the collision “resulted primarily from complacency, over-confidence and lack of procedural compliance. A major contributing factor to the collision was sub-standard level of knowledge regarding the operation of the ship control console.”² In response to the USS Fitzgerald and USS McCain collisions, Admiral Richardson stated, “We will spend every effort needed to correct these problems and be stronger than before.”³

A lesser-known watchstanding incident that involved insufficient watchstander training occurred at Naval Station Norfolk. On March 24, 2014, Petty Officer Second Class Mark Mayo was shot and killed at close range by a civilian intruder onboard USS Mahan (DDG-72) moored at Naval Station Norfolk.⁴ The civilian forcefully seized the deployed handgun from the Petty Officer of the Watch (POOW) onboard USS Mahan. Petty Officer Mayo, serving as a base security watchstander, responded to USS Mahan, where he was killed with the handgun taken from the POOW. From the front entry gate to the quarterdeck of the USS Mahan, multiple security procedural violations occurred that

¹ Navy Office of Information, “Navy Releases Collision Report for USS Fitzgerald and USS John S McCain Collisions” (official memorandum, Washington, DC: Department of the Navy, 2017), https://www.navy.mil/submit/display.asp?story_id=103130.

² Navy Office of Information, “Navy Releases Collision Report.”

³ Navy Office of Information, “Navy Releases Collision Report.”

⁴ Jeffery A. Harley, *Investigation into the Shooting Incident Onboard USS Mahan (DDG 72) on 24 March 2014, and Associated Installation and Shipboard Force Protection Policies and Processes*, SER N01/068 (Washington, DC: U.S. Fleet Forces Command, 2014), 47–52.

tragic night. This thesis will focus only on small arms training factors that might have led to the POOW failure to effectively deploy a handgun in response to a threat.

After the shooting of Petty Officer Mayo, a critical review of Navy force protection watchstander training is necessary to determine if Navy handgun training is sufficient to counter real-world threats. The investigation into the shooting incident onboard USS Mahan stated that the ship had an adequate force protection plan and the watchstanders' weapons qualification met requirements.⁵ A review of watchstander handgun training records showed all training was in accordance with governing instructions. The incident report made several recommendations but did not address a possible functional failure of Navy handgun training.

Admiral Richardson in response to these incidents stated, "Our culture, from the most junior sailor to the most senior Commander, must value achieving and maintaining high operational and warfighting standards of performance and these standards must be embedded in our equipment, individuals, teams and fleets."⁶ These tragic ship borne events call for a review of military training to ensure that Navy personnel have the capabilities to sufficiently perform their missions.

The purpose of this research is to assess the U.S. Navy small arms training program that is directly related to the naval force protection watchstander incident on USS Mahan. Currently, in accordance with OPNAV Instruction 3591.1F, Navy force protection watchstanders are required to qualify with the M9 service pistol annually.⁷ The purpose of this research is to determine if the level of training for a Navy POOW is sufficient for proper deployment of a handgun for self-defense and defense of others. If Navy handgun training is found to be insufficient to counter real-world threats over the course of the one-year handgun training cycle, changes must be made to small arms training and qualification just as changes to training were made in response to the two ship collision incidents.

⁵ Harley, *Investigation into the Shooting Incident*, 47–52.

⁶ Navy Office of Information, "Navy Releases Collision Report."

⁷ Department of the Navy, *Small Arms Training and Qualification*, OPNAV Instruction 3591.1F (Washington, DC: Department of the Navy, 2009), https://www.public.navy.mil/surfor/Documents/OPNAVINST_3591_1F.pdf.

B. MAJOR RESEARCH QUESTION

This thesis pursues an answer to the research question: Does Navy handgun training ensure the acquisition, retention, and proficiency of small arms skills necessary to counter real-world threats? This thesis will classify the deployment and use of a handgun as a procedural motor skill. The research will apply findings from studies on skill acquisition, retention, and proficiency to determine the sufficiency of Navy handgun training for force protection watchstanders. The current level of small arms training required for a POOW when compared to quantitative research conducted on skill acquisition, retention, and proficiency shows that the small arms level of training does not have the research proven sufficient conditions present to ensure proper hand gun training to counter real-world threats over the length of the training cycle of one year.

C. LITERATURE REVIEW

Research on the acquisition, retention, and degradation of motor skills was developed in the 1960s primarily by military studies to increase the effectiveness of military training in response to the great power competition post WWII. Since the establishment of this area of study, researchers have furthered the knowledge base and applied the principles to specific areas of learning. Recent research has tended to focus on narrow applications with specific learned behaviors or learned tasks such as surgery training and special-needs learning programs.

Modern research in the field of handgun training has focused primarily on the use of simulators rather than live-fire training. Research has not been conducted to evaluate the retention of learned motor skills in reference to Navy handgun qualification and training. The following literature review will focus on defining procedural motor skills, acquisition, retention, and proficiency of those skills.

1. Motor Skills Acquisition

To best apply psychological studies to the level of small arms training received by a POOW, the use of a handgun must be defined scientifically as a specific skill type. Handgun use is a skill, more specifically a procedural motor skill. The Merriam-Webster

dictionary defines the term skill as “1: the ability to use one’s knowledge effectively and readily in execution or performance. 2: dexterity or coordination especially in the execution of learned physical tasks.”⁸ The Dictionary of Psychology defines skill as “1. An acquired high-order ability to perform complex motor acts smoothly and precisely.”⁹ The use of a handgun requires both knowledge of the mechanical function of the weapon combined with the motor skills to properly execute the action of an accurate discharge.

The medical field observes two classifications of motor skills and defines them as “a coordinated pattern of movements acquired through practice involving the ability to execute movements effectively to achieve intended outcomes. *Gross motor skills* movement involves the coordinated use of large muscle groups, such as when kicking a ball. *Fine motor skills* movement involves the ability to manipulate small objects.”¹⁰ Gross motor skills applied to the use of a firearm would be the act that brings the weapon into shooting position. Fine motor skills would be the manipulation of the firearm components.

a. Procedural Motor Skills/Tasks

Procedural motor skills or tasks comprise a combination of fine and gross motor skills. Dr. Joel Schendel and Dr. Joseph Hagman, Ph.D. psychologists who conducted research on learning for the military wrote, “Procedural tasks generally involve series of discrete motor responses (responses with a distinct beginning and end).”¹¹ The U.S. Army Research Institute of the Behavioral and Social Science directly links the medical definitions to military tasks by stating in their research, “Familiar examples of discrete

⁸ Merriam-Webster, s.v. “skill,” accessed November 13, 2018, <https://www.merriam-webster.com/dictionary/skill>.

⁹ Ray Corsini, *The Dictionary of Psychology* (London: Routledge, 2001), ProQuest.

¹⁰ *Dictionary of Sport and Exercise Science and Medicine by Churchill Livingstone*. s.v. “motor skill,” retrieved November 13, 2018, <https://medical-dictionary.thefreedictionary.com/motor+skill>

¹¹ Joel D. Schendel and Joseph D Hagman, “On Sustaining Procedural Skills Over a Prolonged Retention Interval,” *Journal of Applied Psychology* 67, no. 5 (October 1982): 605–10, <https://doi.org/10.1037/0021-9010.67.5.605>.

responses include moving a gear shift, shooting a rifle, or throwing a hand grenade.”¹² The OPNAVISNT 3591.1F also defines the use of a small arm as a motor skill.

b. Skill Acquisition

Motor skill acquisition is a process in which an individual learns to control and integrate body position, movement, and coordinated muscle activations that allow the individual to engage in a variety of motor behaviors that are necessary to perform tasks. Motor skills are not innate and must be learned through some form of training. Dr. Sigmond Tobias and Dr. J. D. Fletcher, educational psychologist, conducted research on training and wrote: “Military training must prepare individuals to enter into harm’s way and perform physically and mentally demanding tasks at the highest possible levels of proficiency. This requirement may be the defining characteristic of military training. It can mean the difference between life and death.”¹³ Training is a systematic process that has evolved from learning theory. The training process includes “the material to be learned by the student, the method used to facilitate learning, and the evaluation of the learning process.”¹⁴ This section will focus on defining the characteristics of a successful training program to include skill acquisition, practice, and proficiency of small arms use.

The field of psychology has conducted research on human learning dating back to 1885. Hermann Ebbinghaus, the author of *Principle of Psychology*, argued that in order to make the accurate repetition of a learned skill possible, frequent practice is critical during initial training. According to Ebbinghaus, even a talented and focused person cannot learn a skill from a single training repetition. Only by conducting sufficient repetitions can final mastery be obtained, and by additional later repetitions, one may secure the skill.¹⁵ One

¹² Joel D. Schendel, J. L. Shields, and M. S. Katz, *Retention of Motor Skills*, Technical Report No. 313 (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1978), 4.

¹³ Sigmund Tobias and J. D. Fletcher, *Training & Retraining: A Handbook for Business, Industry, Government, and the Military* (New York, NY: Macmillian Reference USA, 2000), 267.

¹⁴ Markov M. Mikas, “An Approach to Reduce Skill Loss of the Unrestricted Line Officer in the Venezuelan Navy” (master’s thesis, Naval Postgraduate School, 1982), 3–5, <https://calhoun.nps.edu/handle/10945/20077>.

¹⁵ Hermann Ebbinghaus, “Memory: A Contribution to Experimental Psychology,” *Annals of Neuroscience* 20, no. 4 (October 2013): 155–156, <https://doi.org/10.5214/ans.0972.7531.200408>. 156.

hundred and thirty years of psychology has remained consistent on the subject that initial training should take place over days and that subsequent practice post initial training, also known as sustainment, is key to remaining proficient.

c. Initial Training

Initial training is the evolution in which a subject learns to perform a skill to meet an organization's need. The purpose of OPNAVINST 3591.1F is "to establish Navy policy and prescribe the minimum requirements for individual small arms training and qualification."¹⁶ Dr. Tal Savion-Lemieux and Dr. Virginia Penhune, educational psychologists, conducted research on how to optimize the retention of motor skills during initial training produced a three-stage process for skill acquisition.

The first stage occurs within the initial session of practice, where rapid improvements in performance are observed. The second stage, referred to as consolidation, occurs following the initial practice session. At consolidation, significant improvements in performance are observed following a period of rest, of greater than 4 h, with no additional practice. In addition, it has been demonstrated that a night of sleep further improves the performance of a recently acquired skill. The third stage of motor skill learning occurs throughout the remaining practice sessions (days or weeks), where slower and more gradual gains lead to a plateau in performance.¹⁷

The best military example of the effectiveness of the three-step process tested by Savion-Lemieux and Penhune is a study conducted by Captain Charles Walters, USMC at the Naval Postgraduate School. In Captain Waters thesis, *Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification*, he highlighted the initial training timeline for Marines: "Those Marines who are armed with the M1911A1 pistol or .38 revolver are required to fire the pistol in 'A' course for requalification as described in Appendix A. The training spans a five-day period with one hour per day involving live fire

¹⁶ Department of the Navy, *Small Arms Training and Qualification*, 2.

¹⁷ Tal Savion-Lemieux and Virginia Penhune, "The Effects of Practice and Delay on Motor Skill Learning and Retention," *Experimental Brain Research* 161, no. 4 (March 2005): 423–431, <https://doi.org/10.1007/s002211-004-2085-9>.

exercises.”¹⁸ The naval small arms training program in contrast has never been scientifically studied to determine skill retention over the course of the training cycle.

2. Skill Retention

Research in the field of long-term motor skill retention is sparse. Most of the research conducted on retention is focused on short-term retention, typically twenty-four hours. Savion-Lemieux and Penhune highlighted this research gap through a review of motor skill retention studies dating back to 1962. The field consensus shows varying results ranging from satisfactory skill retention out to three years post initial training and skill degradation in a little as two weeks post initial training. Savion-Lemieux and Penhune were unable to determine if skill retention was directly linked to the length of the initial training period or the length of the non-utilization/no-practice period.¹⁹

a. Non-utilization

The non-utilization of a skill or the no-practice period are terms used to “express a period of disuse of that skill. During this period the skill (or skills) are not practiced. The term non-utilization [sic] generally refers to an extended period of time.”²⁰ The potential non-utilization period if one were to follow the minimum practice guidance of OPNAVINST 3591.1F is between six to eight months. “The condition resulting from nonutilization [sic] of a skill that has already been learned is called skill degradation.”²¹

b. Skill Degradation/Skill Loss

The issue of military skill degradation has been researched regarding various job

¹⁸ Charles E. Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification”(master’s thesis, Naval Postgraduate School, 1981), 16, <https://calhoun.nps.edu/handle/10945/20420>.

¹⁹ Savion-Lemieux and Penhune, “The Effects of Practice and Delay on Motor Skill Learning and Retention,” 424–425.

²⁰ Mirko Markov Mikas, “An Approach to Reduce Skill Loss of the Unrestricted Line Officer in the Venezuelan Navy” (master’s thesis, Naval Postgraduate School, 1982), 10. <https://calhoun.nps.edu/handle/10945/20077>

²¹ Barbara H. Fletcher, “Verification of the Need for Hospital Corpsman Follow-On/Refresher Training” (master’s thesis, Naval Postgraduate School, 2000), 16, <https://calhoun.nps.edu/handle/10945/9259>.

fields but not yet applied to firearm skill degradation. The first effort the Department of Defense made to understand the degradation of skills among military personnel was conducted in 1961 by the United States Air Force Aeronautical Systems Division. The study was a comprehensive review of the literature on long-term skill retention. The study combined the existing studies of the time period on long-term skill retention. Barbara Fletcher summarized the findings of studies with the following significant finding of the research.

1. Motor tasks are retained better than verbal tasks, and continuous tasks are retained better than discrete procedural tasks.
2. Practice facilitates skill retention.
3. Skill losses occur over time. The retention varies in each situation.
4. Retention is a direct function of the quality and amount of original learning.
5. Skill is lost over time and is retained in proportion to rehearsal.²²

The training and use of a handgun were previously classified as a discrete procedural task earlier in the literature review sec. 1 subsection (a).

c. Sustainment Training/Refresher Training

Skill sustainment, also known as refresher training, for this thesis is any practice or repetition of learned handgun skills in-between initial qualification and requalification outlined in OPNAVINST 3591.1F. Refresher training is recommended in OPNAVINST 3591.1F but not mandated: “Once this level has been achieved, it is important to continue to practice those skills as often as possible so that they are not diminished. Small arms training is a perishable skill that will be lost in a short amount of time without regular training.”²³ OPNAVINST 3591.1F recognizes the effect of skill degradation on motor skills and the need for practice during the non-utilization period, but practice is not mandated.

²² Barbara H. Fletcher, “Verification of the Need for Hospital Corpsman Follow-On/Refresher Training” (master’s thesis, Naval Postgraduate School, 2000), 16, <https://calhoun.nps.edu/handle/10945/9259>.; C. J. Naylor and E. G. Briggs, *Long-Term Retention of Learned Skills: A review of the Literature*, Technical Report 61–390 (U.S. Air Force Aeronautical Systems Division, 1961).

²³ Department of the Navy, *Small Arms Training and Qualification*, 2.

As previously stated above, the period between training sessions is known as the retention period. If a skill is not practiced, the period in-between qualifications become the no-practice/non-utilization period. To bridge the gap between qualification/training sessions, refresher training frequently is used to sustain or promote skill retention.²⁴ Refresher training must be conducted before skill loss occurs. Commander Mirko Markov Mikas of the Venezuelan Navy conducted research on skill loss at the Naval Postgraduate School and determined that, “If, for any reason, a period of nonutilization [sic] of a particular skill occurs, a period of retraining is required to reestablish the skill and alleviate the skill loss. Thus, in this study, retraining will not refer to learning a new skill; instead, it will refer to relearning a previously learned skill.”²⁵

Educational psychology research on when to conduct refresher training to maintain skill proficiency varies widely from a matter of days to years. The issue with the refresher training timeline research is that it has to standardize a testing procedure and can only research one skill at a time, thus making all research effectively case studies. Research has been able to produce universal variables that influence the periodicity of refresher training. The length of the retention interval, the difficulty of the task, level of initial training, and individual practice all influence the formulation of refresher training periodicities.²⁶

Regarding handgun training, only one study has been conducted on handgun marksmanship proficiency. The study concluded that marksmanship scores did not significantly decrease until the three-year mark post initial qualification.²⁷ Conversely, the U.S. Army Research Institute for the Behavioral and Social Sciences conducted a study on retention of military-specific motor skills that showed, “performance on the procedural aspects of the task deteriorated to an unacceptable level within 1 to 4 months of no practice. At the end of one month of no-practice, trainees required five times longer to complete the

²⁴ Schendel and Hagman, “On Sustaining Procedural Skills,” 605–10.

²⁵ Markov M. Mikas, “An Approach to Reduce Skill Loss,” 12.

²⁶ Schendel, Shields, and Katz, *Retention of Motor Skills*, 16.

²⁷ Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification,” 44.

procedural sequence than they did at the end of training.”²⁸ This demonstrates the variability of skill retention in the research which results in an inability to prescribe a research-based and accurate timeline for refresher training.

d. Simulators

The military, functioning on a limited budget and time to train has invested in technology to supplement training. In an effort to reduce the time and cost of handgun training for force protection watchstanders, the use of simulators has been instituted fleetwide. Sustainment/refresher training is a critical component of the training cycle, especially if the task is important, difficult, and not performed frequently.²⁹

OPNAVINST 3591.1F mandates simulator firearm sustainment training to be conducted between six and eight months post-live-fire qualification. The use of simulators has become the Navy standard for the required sustainment training. The Naval Postgraduate School is the leading research institute in the use of simulators to supplement the Standard Naval Marksmanship Training (SNMT). Research conducted by LT Timothy Jensen USN and LT Tommy Getty USN at the Naval Postgraduate School yielded three main results. The first result is that the use of a simulator in conjunction with the SNMT yielded better marksmanship scores than the control group that received only the SNMT.³⁰

Both authors also agree that the Indoor Simulated Marksmanship Trainer (ISMT) is a tool that both the Navy and Marine Corps can utilize based on evidence that proves the effectiveness of the ISMT through experimentation. The ISMT “provides a medium of training that is more versatile than live training in that it can be accomplished in any

²⁸ Schendel, Shields, and Katz, *Retention of Motor Skills*, 17.

²⁹ Peter Bramley, “Effective Training,” *Journal of European Industrial Training*, 13 no. 7 (July, 1989): 11, <https://doi.org/10.1108/EUM00000000000203>

³⁰ Tommy J. Getty, “A Comparison of Current Naval Marksmanship Training vs. Simulation-based Marksmanship Training with the Use of Indoor Simulated Marksmanship Trainer (ISMT)” (master’s thesis, Naval Postgraduate School, 2014), 55–57, <https://calhoun.nps.edu/handle/10945/41383>; Timothy Jensen and John Woodson, “A Naval Marksmanship Training Transfer Study The Use of Indoor Simulated Marksmanship Trainers to Train for Live Fire” (master’s thesis, Naval Postgraduate School, 2012), 44–52, <https://calhoun.nps.edu/handle/10945/41383>.

weather conditions.”³¹ The ISMT allows sailors and marines to practice the perishable motor skill of handgun use for sustainment and conduct additional training opportunities resulting in fewer incidents and casualties.³²

Getty built upon the research done by Jensen and was able to demonstrate that both expert and novice shooters showed improvement in marksmanship scores as a result of the ISMT. Getty, in the analysis of his experiment, showed a significant improvement in marksmanship performance for the novice shooter but little improvement in expert shooters. The small improvement in expert shooter scores was attributed to a high initial marksmanship score, which created a smaller improvement margin but one still statistically significant showing improvement.³³

3. Skill Proficiency

Initial training effectiveness is often measured by a metric or test to determine if the objectives of the original training were met. In the case of naval handgun training a marksmanship test, the Naval Handgun Qualification Course (NHQC). The NHQC is a basic marksmanship course with a stationary shooter and stationary targets. The NHQC is conducted no more than 30 days post completion of the Standard Naval Marksmanship Training (SNMT).³⁴ The NHQC in terms of measurement is an assessment of learned skills at the peak performance period, the period immediately following initial training.

Over the past quarter of a century, the law enforcement community has collected data on gunfighting performance. The Federal Bureau of Investigation (FBI) and other law enforcement agencies have begun to question the now one-hundred-year-old handgun qualification standard that includes loading, reloading, gripping, aiming and firing during

³¹ Jensen and Woodson, “A Naval Marksmanship Training Transfer Study,” 51.

³² Getty, “A Comparison of Current Naval Marksmanship Training,” 54–55.

³³ Getty, “A Comparison of Current Naval Marksmanship Training,” 56–57.

³⁴ Department of the Navy, *Small Arms Training and Qualification*, 4.

the training process.³⁵ Research in the field is now producing scientific evidence calls for organizations that qualify personnel to use firearms to ask the question; does the nature of the initial training in firearm use enable the operator to counter a real-world threat?

As a result of gunfight data and research, organizations have already started making changes to their firearms training programs. The FBI, having a large volume of data regarding gunfights, broke from three decades of marksmanship training history in 2013.³⁶

The FBI has quietly broken with its long-standing firearms training regimen, emphasizing close-quarters combat to reflect the overwhelming number of incidents in which suspects are confronting their targets at point-blank range. The new training protocols were formally implemented last January after a review of nearly 200 shootings involving FBI agents during a 17-year period. The Analysis found that 75% of the incidents involved suspects who were within 3 yards of agents when shots were exchanged.³⁷

Research is now being conducted on the effectiveness of firearms training with a focus on real-world interactions with active law enforcement officers. The results of the research state that “training programs should incorporate a greater proportion of training time devoted to combat situations involving high-stress exercises.”³⁸ Feedback from the trainers and officers on the new method of training is trending towards “more realistic training techniques involving various scenarios, force-on-force, and non-lethal weapons would better prepare officers for the demands placed on an officer during a high-stress deadly conflict.”³⁹ This new trend in real-world firearms training translates to a change in the training evaluation as well, moving away from shooting stationary targets as a measure of skill retention and performance.

³⁵ Gregory B. Morrison and Bryan J. Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” *Policing: An International Journal of Police Strategies & Management* 21, no. 3 (September 1, 1998): 514–516, ProQuest.

³⁶ Kevin Johnson, “FBI Changes Its Firearms Training Focus,” *USA Today*, January 8, 2013, 3, <https://search.proquest.com/docview/9834794/9AB42E0303354E8EPQ/1?accountid=12702>

³⁷ Johnson, “FBI Changes Its Firearms Training Focus,” 3.

³⁸ John Thomasson, Dean R. Gorman, Cathy D. Lirgg, and Douglas J. Adams, “An Analysis of Firearms Training Performance Among Active Law Enforcement Officers in the USA,” *The Police Journal: Theory, Practice and Principles* 87, no. 4 (December 2014): 225. Sage.

³⁹ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226.

4. Naval Small Arms Training Critical Review

The reason that OPNAVINST 3591.1F has avoided critical review is due to two basic factors. The first factor is until recently there have been only one casualty of a force protection watchstander to call for a training review. Without a mechanism in place to call for periodic review of small arms training, an event would be the only trigger. A lack of training evaluation is not unique to the Navy. Bramley in his article *Effective Training*, identified that organizations seem to combine the training program objectives of efficiency and effectiveness into one concept. In function, an organization will determine if the training objectives were met in an economic manner. Bramley points out that “very few people have asked the question, Was the training effective?,” meaning not only was it well done but, “Was it a worthwhile thing for the organization be sponsoring.”⁴⁰ Bramley found this observation interesting considering that the definition of training is a “systematic process carried out for an organization concerned with changing concepts, skills or attitudes of people treated whether as individuals or as groups intended to improve job performance and thus enhance organizational effectiveness.”⁴¹ Bramley’s stance is that organizations develop training programs with a true desire to change job performance for the better. This training becomes part of the day to day operations and is not reevaluated due to either cost or the organization does not have an apparent reason to revise the training.

The cliché, if it is not broken do not fix it, proves valid in training culture. The second factor is that the handgun instruction produces the desired outcome, a marksmanship score within an acceptable range, that has been the standard across the military and law enforcement for over seventy years. Again, if it is not broken, do not fix it. This is not an issue unique to small arms training: “In a study of 13 members of a national organization of trainer, researchers at the University of Southern California School of Education concluded that corporations and other businesses are failing to determine the effectiveness of their employee training programs.”⁴² The study found that even though

⁴⁰ Bramley, “Effective Training,” 3.

⁴¹ Bramley, “Effective Training,” 3.

⁴² Fletcher, “Verification of the Need,” 22.

business leaders are spending upwards of \$100 billion a year in employee training, “ they are not determining if they’re getting their money’s worth.”⁴³

D. POTENTIAL EXPLANATIONS AND HYPOTHESES

This thesis will consider two hypotheses. Hypothesis one is that the nature of the initial training does not represent the demands of real-world engagements. The OPNAVIST 3591.1F directs the major components of the naval small arms training program that is focused on developing the marksmanship skill measured by shooting stationary targets. Due to emerging research in the field of small arms training for FBI and police, the effectiveness of shooting stationary targets, the marksmanship model, is now being called into question since stationary targets do not replicate real-world threats.

The second hypothesis is that the length of the no-practice period, up to 365 days-post qualification, negatively impacts the ability to use a handgun in response to a real-world threat effectively. OPNAVINST 3591.1F, naval small arms training, operates on the assumption that the learned handgun skill will be retained for six to eight months before simulator sustainment training and up to a year before reacquisition/initial training is repeated. Preliminary research shows that the length of the no-practice period directly impacts the ability to perform the learned skill due to skill degradation or skill loss. Preliminary research also suggests that learned motor skills degrade to the point of skill loss during an extended no-practice period. This hypothesis functions on the premise that the initial training is sufficient but during the no practice period, 365 days, the ability to use the firearm to counter real-world threats is degraded to the point of ineffectiveness.

E. RESEARCH DESIGN

The research design is an analysis of OPNAVINST 3591.1F against research findings in the fields of skill acquisition, retention, and proficiency. It is important to note that the naval small arms training program is not the sole source of Navy force protection watchstander training. Watchstanders undergo administrative training in the areas concerning deadly force, use of force, and security reaction force tactics in addition to the

⁴³ Fletcher, “Verification of the Need,” 22.

small arms training. This research will not analyze force protection training in any other subject matter required by the Navy, only the sufficiency of the naval small arms training program. Sufficiency for this thesis will be the presence of a set of sufficient conditions that will produce the desired event. The desired event is the ability to deploy and use a handgun in response to real-world threats at any point during the continuous training cycle. The sufficient conditions will be derived from quantitative research studies on learning. The qualitative comparison of OPNAVINST 3591.1F to the research derived sufficient conditions will be coded as go/nogo for each sufficient condition. All-sufficient conditions must be present for the naval small arms training program to be determined sufficient.

F. THESIS OVERVIEW AND DRAFT CHAPTER OUTLINE

This thesis will be divided into five chapters. The first chapter will introduce the problem, thesis question, background, and literature review. The literature review will provide a snapshot of the past and present research on motor skills, skill acquisition, skill retention, and skill proficiency. A review of the research design and thesis outline will conclude the first chapter.

The second chapter will compare the initial training program of OPNAVINST 3591.1F to quantitative research in skill acquisition. The preliminary areas of focus will be the method of skill acquisition to included teaching methodology, the timeline, and the standard operating procedure for instruction. Research on standardized procedures and training timelines will be used to develop sufficient conditions for skill acquisition.

Chapter III will focus on the retention phase of small arms instruction to include the naval skill sustainment small arms training that takes place six to eight months into the one-year training cycle. The naval small arms training program will be reviewed to determine how small arms practice is being conducted over the course of the training cycle. Research on motor skills practice will be analyzed to determine sufficient conditions for small arms practice. Lastly, Chapter III compares the no practice period outlined in OPNAVINST 3591.1F to quantitative research on skill retention. The focus will be the effect of the no-practice-period/non-utilization period on procedural motor skills.

Chapter four will address skill proficiency, the capability of OPNAVINST 3591.1F to produce the small arms skill to counter real-world threats. OPNAVINST 3591.1F will be classified as marksmanship-based training. FBI and police gun fight statistics from both marksmanship trained and scenario trained officers will be analyzed to determine if marksmanship based training alone is sufficient.

Chapter V will summarize the findings of the research conducted on skill acquisition, retention, and proficiency. A grounded theory on sufficient small arms training will be developed based on the research to define the sufficient conditions that must be present to achieve a sufficient handgun training program. The naval small arms training program will be compared to the research findings to determine if the sufficient conditions are present in the program and will answer both hypotheses. The second section of Chapter V will provide the significance of the research for naval small arms training, make policy recommendations, and make recommendations for further research.

II. SKILL ACQUISITION

This chapter will address skill acquisition in terms of the initial instruction or the original learning to include classroom instruction, practice, and qualification directly referenced in the naval small arms training program. This chapter will breakdown the governing document for small arms training, OPNAVINST 3591.1F, and state the learning objectives with the supporting processes for instruction. Then it will present research findings on standard operating procedures (SOPs) and training timelines as sufficient conditions for a small arms training program. Finally, it will analyze the naval small arms training program to determine if naval small arms training has the sufficient conditions present to produce watchstanders who can engage real-world threats. Chapter II will show that U.S. Navy small arms training for skill acquisition does not contain the sufficient conditions proven through research to produce a force protection watchstander capable of performing in real life shooting incidents.

A. NAVAL SMALL ARMS TRAINING AND QUALIFICATION

The purpose of OPNAVINST 3951.1F, the master naval instruction for small arms training and qualification, is to “establish Navy policy and prescribe minimum requirements for individual small arms training and qualification per references.”⁴⁴ The OPNAVINST 3591.1F specifies required learning objectives that must be met through formal small arms instruction, practice and qualification. The training objectives for naval small arms instruction, that all students must be familiar with, are “weapon condition codes, clearing barrel procedures, characteristics/nomenclature, operation, remedial actions, assembly/disassembly, marksmanship fundamentals, weapon presentation, weapon engagement, and use of deadly force.”⁴⁵

Naval small arms training “applies to all active duty and reserve Navy personnel, all Navy law enforcement, and all Navy security personnel” to include civilians and

⁴⁴ Department of the Navy, *Small Arms Training and Qualification*, 2.

⁴⁵ Department of the Navy, *Small Arms Training and Qualification*, 3.

contractors.⁴⁶ In short, this instruction applies to anyone authorized by the Department of the Navy to carry and use small arms. OPNAVINST 3591.1F breaks small arms qualification requirements into four categories based on the job requirements ranging from ship board armed watchstanders to special operations. For the purpose of this thesis, the focus will be on Category I personnel to best relate to the level of small arms training for a POOW. OPNAVINST 3591.1F defines category I as:

Category I. Personnel who are issued a pistol primarily for personal protection. This category includes most officers, chief petty officers, officer accession personnel, enlisted accession personnel, disbursing officers, couriers, aircrews, shipboard armed watch standers (officer of the deck/petty officer of the watch, rovers) as designated by TYCOMS, and Military Sealift Command (MSC) personnel who are armed in the course of their duties. Personnel/units in this category are those non-security personnel/units whose mission exposes them to potential hostile fire, thus requiring them to be armed for self-defense. Category I personnel must qualify on the Navy Handgun Qualification Course on an annual basis with the same type pistol they shall be issued.⁴⁷

1. CLASSROOM INSTRUCTION FOR SKILL ACQUISITION

OPNAVINST 3591.1F fits the conventional instruction model that is prominent in the United States Military. Tobias and Fletcher define conventional instruction as follows: Conventional instruction refers to lectures, discussions, practical exercises and remedial tutoring delivered by human instructors.”⁴⁸ The naval small arms training program when compared to the conventional instruction model is devoid of formalized lectures, discussions, and mandatory practical exercises. The main guidance for skill acquisition are the aforementioned training objectives *shall* be conducted before practice or qualification. The term *shall*, common in military instructions, is a military order. Any guidance that follows the word *shall* is treated as a requirement and go/nogo criteria for the training evolution.

⁴⁶ Department of the Navy, *Small Arms Training and Qualification*, 2.

⁴⁷ Department of the Navy, *Small Arms Training and Qualification*, 2–3.

⁴⁸ Tobias and Fletcher, *Training & Retraining*, 36.

The naval small arms training program, OPNAVINST 3591.1F, references material from 19 instructions, federal laws, manuals, and reference publications located in Appendix 1. Upon review of all nineteen OPNAVINST 3591.1F references, only five directly correlate to OPNAVINST 3591.1F required training objectives: The Army Field Manual 3-23.35, Marine Corps Reference Publication 3-01B, SW300-BC-SAF-010, SECNAVINST 5500.29C, and NTRP 3-07.2.2. The other fourteen references cover non-training subject matter in areas such as ammunition storage and policy.

All of OPNAVINST 3591.1F references are thus technical documents and are the only materials that shall be used in accordance with the instruction to facilitate small arms training. Note that technical documents are not formal courseware materials. The term technical document refers to any document that describes handling, functionality, or technical description of an item. Technical documents can be used as teaching materials to supplement a formal education program. They are written by subject matter experts to be utilized by personnel trained in the particular field. In function, technical documents are used to develop teaching courseware to train future subject matter experts. In summation, the reference material required to meet the training objectives and to facilitate the evolution is not only present but extremely comprehensive. At this time there are no insufficiencies related to lack of information to support learning objectives outlined in OPNAVINST 3591.1F.

2. PRACTICE FOR SKILL ACQUISITION

The practice phase of skill acquisition is where the actual application of the techniques and procedures learned during classroom instruction takes place. OPNAVINST 3591.1F although not requiring mandatory practice does state that the teaching of the psychomotor skill of small arms techniques requires numerous hours of training by stating the following:

The goal is to have armed Naval Security Force (NSF) personnel, trainees, and students practice techniques until they have achieved the goal of being able to perform the same thing, the same way, every single time. It should be quick, smooth, and accurate. Once this level has been achieved, it is important to continue to practice those skills as often as possible so that they

are not diminished. Small arms training is a perishable skill that will be lost in a short amount of time without regular training.⁴⁹

OPNAVINST 3591.1F does not mandate practice through direct language such as shall. The only requirement in reference to practice stated by OPNAVINST 3591.1F is that the student, before qualification, “must demonstrate the ability to safely handle and present the weapon to the instructor before live fire qualification. Shooters must also demonstrate knowledge of the four general safety rules, weapon commands, and weapon condition codes before live firing.”⁵⁰ In the absence of required practice, OPNAVINST 3591.1F provides several optional practice methods. The optional practice methods include dry fire training, clearing stoppages training, computer-based training (CBT), and the use of a small arms simulator.

The OPNAVINST 3591.1F specifies required learning objectives that must be met through formal small arms instruction and practice before progressing to the qualification phase of small arms training. In contrast to the small arms classroom instruction, the naval small arms training program practice phase does outline training methodologies for dry firing and clearing weapon stoppages. For example, “When conducting dry fire training iterations, use of the demonstration-performance teaching method where an instructor demonstrates a technique and then the students perform that technique”⁵¹ is suggested but not mandated. Another example of suggested practice methodology is peer coaching. “Peer coaching is another option where students are broken into relays and one student becomes the shooter, while the other becomes a coach. In this situation both students will learn from each other. Trainers ensure they monitor peer coaching closely to ensure corrections are being made and that both students receive adequate time to dry fire.”⁵² The small arms training program also suggests examples of dry fire training complete with step by step instruction and the roles/responsibilities of both the students and trainers. The dry firing training is not mandatory.

⁴⁹ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

⁵⁰ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁵¹ Department of the Navy, *Small Arms Training and Qualification*, Encl 2, 2.

⁵² Department of the Navy, *Small Arms Training and Qualification*, Encl 2, 3.

Additional training such as computer-based training and training courseware are not in the reference section of OPNAVINST 3591.1F. The following is the section that addresses the additional training aids. Note the use of the words “can” and “should.” The use of the words can and should is repeated throughout OPNAVINST 3591.1F, thus highlighting the lack of a standard training model.

The CENSECFOR CBT is located on NKO (Navy E-Learning). Have students go through this training, as it will provide a lot of the prerequisite skills they need. Small arms trainers should attain sets of the weapons handling courseware to be used during training evolutions. The trainer can use the courseware to demonstrate a technique, pause the courseware, and conduct practice drills with the students. Remember the key to success is to do the same thing, the same way every time. To do this, trainers must all teach standardized weapons handling procedures as laid out in the weapons handling courseware and reference (n).⁵³

3. SMALL ARMS QUALIFICATION

The Naval Handgun Qualification Course (NHQC) is the baseline marksmanship standard for all categories of force protection watchstanders and the only standard required for a POOW.⁵⁴ As previously mentioned in this chapter, there are four categories of small arms qualifications, all categories with the exception of category I, require additional advanced small arms training in addition to the NHQC. “All Navy personnel armed with a pistol are required to qualify on the Navy Handgun Qualification Course.”⁵⁵ All personnel must requalify on an annual basis with the live fire NHCQ.⁵⁶ “Before each qualification fire and sustainment training session, all shooters shall receive instruction on marksmanship, safety, and weapon familiarization.”⁵⁷ The format for the instruction is not designated.

⁵³ Department of the Navy, *Small Arms Training and Qualification*, Encl 2, 7.

⁵⁴ Department of the Navy, *Small Arms Training and Qualification*, 2.

⁵⁵ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

⁵⁶ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

⁵⁷ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

Before a trainee is can participate in the live fire qualification, “it is recommended that shooters complete weapons CBT”⁵⁸ and is also “recommended that shooters complete and successfully pass each course of fire (COF) for each weapon using an approved simulator.”⁵⁹ Another recommendation, not requirement, is “that shooters practice the marksmanship fundamentals by completing a minimum of 3 hours of dry fire or simulator training before live firing as directed by the SAMI [Small Arms Instructor].”⁶⁰ The only “shall” reference that the naval small arms training program makes for practice is, “shooters shall also practice drawing from the holster and must demonstrate the ability to safely handle and present the weapon to the instructor before live firing.”⁶¹ As a quality check for the SAMI, “Shooters must also demonstrate knowledge of the four general safety rules, weapons commands, and weapon condition codes before live firing.”⁶² The only reference to a training timeline formally stated in the OPNAVIST 3591.1F is, “The period of time between the marksmanship/safety/weapons familiarization training and live fire qualification should not exceed 30 days.”⁶³ The timeframe for the small arms training program is not defined but no more than thirty days after completing skill acquisition shall pass to qualify. The following guidance in regard to a failed qualification from the trainee is given to the SAMI:

The course is to be fired until achieving a qualifying score, not to exceed three consecutive times. Those personnel who do not qualify on their third attempt shall be carefully evaluated to determine if remedial training will correct their deficiencies. If remediation is determined by the small arms instructor to be effective, an additional attempt to qualify is authorized; however, if multiple fundamental and presentation issues exist, then all dry fire and simulator fire training shall be repeated prior to attempting qualification again.⁶⁴

⁵⁸ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

⁵⁹ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁶⁰ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁶¹ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁶² Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁶³ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 2.

⁶⁴ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 5.

B. NAVAL SMALL ARMS TRAINING CRITIQUE

The naval small arms training program contains requirements for student classroom instruction, practice, and materials designated to facilitate small arms skill acquisition. What is not present in OPNAVINST 3591.1F is a formal naval instructor guide, authorized courseware, training schedule, or any document that governs the delivery of the material required to meet the learning objectives. The instruction identifies the learning outcomes but not the methodology by which the instruction be delivered. As a result there two major problems: (1) The naval small arms training program does not contain an SOP for the formal presentation of material in a logical and standardized manner; (2) The naval small arms training program does not contain a timeline for instruction to facilitate long term retention of information presented or skills acquired during training.

1. LACK OF STANDARD OPERATING PROCEDURE

This section will briefly review the purpose and function of a SOP, compare OPNAVINST 3591.1F to research on effective SOP's and determine if OPNAVINST 3591.1F has the sufficient conditions present to support the skill of handgun deployment over the course of the training cycle and to engage real-world threats.

OPNAVINST 3591.1F does not contain a SOP. In place of an SOP OPNAVINST 3591.1F contains the nineteen references presented in Appendix 1. All of OPNAVINST 3591.1F references are technical documents not instructional material containing formal course material. When a military instruction such as OPNAVINST 3591.1F is compared to an SOP, the two documents share common structure. Both documents are organized as follows: introduction, purpose, scope, safety, responsibilities personnel, training requirements, and testing requirements.⁶⁵ However, nowhere does OPNAVINST 3591.1F provide a SOP to standardize the instruction phase. In OPNAVINST 3591.1F, there are numerous references to courseware to aid the small arms instructor but states the trainer

⁶⁵ Department of Homeland Security, *Writing Guide for Standard Operating Procedures* (Washington, DC: Department of Homeland Security, 2019), 3–15, https://www.dhs.gov/sites/default/files/publications/Writing%20Guide%20for%20Standard%20Operating%20Procedures_0.pdf

“can,” not “shall,” use to aid in instruction. To further exacerbate the issue of lack of standardization, the website Navy Knowledge Online, formerly accessible at www.nko.navy.mil, is no longer available on the internet therefore the additional material are not available at the designated location. In summation the materials that “can” be used by the trainer are not required for instruction and the online site that previously provided the reference course materials is no longer active. One must ask, how are small arms instructors providing training to the fleet?

SOPs are not a new tool for the military. The first use of an SOP appears to be in nineteenth century Germany as “a military strategy championed by German Field Marshal Helmuth Karl Bernhard Graf von Moltke.”⁶⁶ SOPs were utilized as a process that military leaders developed “mission goals into specific tasks based around a particular event. This concept revolutionized the military approach to command and control by allowing commanders to write a set of orders that encompassed the overall mission while tailoring specific instructions for subordinates to execute in the field.”⁶⁷ SOPs have since evolved from a primarily a military tool into a tool used by businesses to ensure a safe work environment, product quality, efficiency, and adaptability.⁶⁸ In government, the Environmental Protection Agency defines an SOP as a document that “minimizes variation and promotes quality through consistent implementation of a process or procedure within the organization... Ultimately, the benefits of a valid SOP are reduced work effort, along with improved comparability, credibility, and legal defensibility.”⁶⁹ Regardless of the setting, SOPs are the dominate tool utilized by organizations to standardize a process to ensure a consistent product.

⁶⁶ Shawn M. Harwood, “Adaptive Standard Operating Procedures for Complex Disasters” (master’s thesis, Naval Postgraduate School, 2017), 16, <http://search.proquest.com/docview/2206252608/>.

⁶⁷ Harwood, “Adaptive Standard Operating Procedures for Complex Disasters,” 16.

⁶⁸ Harwood, “Adaptive Standard Operating Procedures for Complex Disasters,” 17.

⁶⁹ Environmental Protection Agency, *Guidance for Preparing Standard Operating Procedures (SOPs)* EPA 600/B-07-001 (Washington, DC: Office of Environmental Information, 2007), 1–2, <https://www.epa.gov/sites/production/files/2015-06/documents/g6-final.pdf>.

The term SOP today, “is used to describe a procedure or set of procedures for the performance of a given action or for a reaction to a given event.”⁷⁰ SOP’s are developed by an organization to provide a set of step-by-step set of instructions to standardize the method in which work tasks are performed. The goal of an SOP is to provide quality control of the finished product, increase efficiency, ensure compliance with regulation, and reduce communication errors, resulting in a measurable process that can be improved. “The military is based on core missions that standard operating procedures and routine tasks reinforce, providing stability and reducing uncertainty.”⁷¹ An SOP “is said to be standing [which] indicates that it is in effect until further notice, and that it may later be amended or dissolved.”⁷² Isin Akyar, a medical process expert, stated in her article on quality control:

(SOP) is a process document that describes in detail the way that an operator should perform a given operation. SOPs involve the purpose of the operation, the equipment and materials required, how to perform the set-up and operations required for the process, how to perform the maintenance and shutdown operations carried out by the worker, a description of safety issues, trouble-shooting, a list of spare parts and where to find them, illustrations, and checklists. The SOP is one of many process documents which is needed for consistent operation of a given process, with other documents involving process flow charts, material specifications, and so forth.⁷³

When workers or trainers perform tasks in a uniform manner, “it becomes possible to run controlled experiments to test the impact of changing various process parameters. When a process change is shown to improve process performance, SOPs are updated and workers are trained to the new procedures.”⁷⁴ The term quality control is most familiar in the industrial environment. Quality control in an objective term that implies that a product

⁷⁰ T.S. Sathyanarayana Rao, Rajiv Radhakrishnan, and Chittaranjan Andrade, “Standard Operating Procedures for Clinical Practice,” *Indian Journal of Psychiatry*, 53, no. 1 (2011): 1, <http://www.indianjpsychiatry.org/text.asp?2011/53/1/1/75542> .

⁷¹ Michael B. Siegl, “Military Culture and Transformation,” *Joint Force Quarterly* no. 49 (2008): 104 <http://handle.dtic.mil/100.2/ADA518278>.

⁷² Rao, Radhakrishnan, and Andrade, “Standard Operating Procedures,” 1.

⁷³ Isin Akyar, *Latest Research on Quality Control* (IntechOpen, 2012), 365, <https://www.intechopen.com/books/latest-research-into-quality-control/standard-operating-procedures-what-are-they-good-for->

⁷⁴ Akyar, *Latest Research on Quality Control*, 367.

must meet or exceed a defined standard. In the medical field, the quality control process utilizes SOPs to ensure the product meets the objective standard or measurement.

In contrast to the classroom instruction and practice portions of the naval small arms training program, the course of fire for the NHQC is a perfect example of a well written procedure. OPNAVINST 3591.1F Enclosure (1) contains a very meticulous set of small arms range regulations. Weapon safety, weapon commands, range safety, general safety, M-9 safety, remedial actions, prescreening questions, range orientation, and range operation are clear and concise. OPNAVINST 3591.1F Enclosure (3) contains the NHQC procedure. “The NHQC is the foundation course for this weapon and provided the necessary requisite marksmanship skills.”⁷⁵ The actual course of fire is a standard procedure that is a step by step process for every person involved in the evolution from RSO to student. The targets and range regulations are again covered to ensure that the process and environment are universal throughout the fleet.

The governing instruction OPNAVINST 3591.1F and associated reference instructions lacks a SOP to ensure each small arms training and qualification are in accordance with the instruction and so, are ambiguous, subjective, and not uniform. Therefore, the execution cannot be consistent from one instructor to another. However, OPNAVINST 3591.1F contains a measurable outcome of a marksmanship score and therefore quality control through a SOP is achievable.

2. LACK OF TRAINING TIMELINE

While a SOP dictates the logical sequencing of the course material to support knowledge progression and mastery, the timing of the delivery of information is just as important. The second issue identified with the naval small arms training program is that a timeline to present the course materials does not exist. While OPNAVINST 3591.1F does contain reference (r), the Army Field Manual 3-23.35, which in turn contains an U.S. Army Specific 9-MM training schedule, OPNAVINST 3591 does not specify the use of the example training schedule.

⁷⁵ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 5.

Training time is critical to skill acquisition. In formal education, there is “little concern about the amount of time students need to master the content of instruction.”⁷⁶ The reason for the lack of concern is that in most formal education settings, the student pays to attend vice in the training setting where an organization pays the student to attend. This means that trainees are not engaged in their primary work function to benefit the organization. Organizations tend to reduce training times for employees in order to maintain productivity.⁷⁷ This is particularly resonating in the U.S. Navy. LT Barbara Fletcher in her thesis on Hospital Corpsman training noted that “due to the needs of the Navy, Hospital Corpsman are frequently assigned to jobs outside their respective skill areas, i.e., Security, Maintenance, and Administration.”⁷⁸ The small arms training that the a POOW receives is for the watchstation of POOW, which in most cases is a collateral job requirement outside of the primary duties of a sailor’s rate. This highlights a potential conflict of interest in the U.S. Navy in regard to small arms training. Small arms training without a mandatory timeline may be subject to the needs of the organization and the organization’s need for the trainees to perform their primary duties.

When research was conducted on how other institutions that use small arms conduct training, a formal timeline was a common component of training. The Marine small arms training spans a five-day period and showed long term retention of small arms marksmanship skills up to 36 months post original training evolution.⁷⁹ This unique retention of small arms marksmanship ability will be discussed in the section on “Overtraining” in Chapter 3 of this thesis. The state of Illinois has a firearms training and qualification process that was established for its police officers in 1997. At that time, the Illinois Police Training Institute (PTI) mandated 50 hours of firearms instruction broken down as follows: ten hours classroom instruction, twelve hours basic firearms instruction, twelve hours tactical firearms instruction, four hours night shooting, two hours shotgun

⁷⁶ Tobias and Fletcher, *Training & Retraining*, 5.

⁷⁷ Tobias and Fletcher, *Training & Retraining*, 5.

⁷⁸ Fletcher, “Verification of the Need,” 13.

⁷⁹ Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification,” 16.

training and eight hours for practice and qualification.⁸⁰ The key takeaway is that the Marines, Army, FBI, and police have a SOP and training timeline.

The importance of a timeline is not just to ensure adequate time is devoted to present course material or facilitate practice; it is to also ensure periods of rest. Multiple psychiatric studies have shown that scheduled rest periods during instruction increase retention and prevent mental overload. Mental overload is a condition in which a one's working memory capacity is filled with too much information. Mental overload is common among novices during instruction. As the novice's working memory capacity fills, the ability to process new information slows, and performance improvement ceases. Humans' ability to absorb information is effectively bottlenecked by working memory.⁸¹ "However, a phenomenon called *automaticity* rescues our limited working memory capacity. After hundreds of repetitions, and any task (motor or cognitive) becomes hardwired into long term memory and no longer requires working-memory resources."⁸² Until information has transitioned into long term memory, rest and time to process is the key piece of the puzzle to clear the mental bottleneck of working memory. In the article, "The effects of Practice on Motor Skill Learning and Retention," the researchers concluded that the "amount of practice per se did not affect learning and retention of the task. Rather, distribution of practice over several days was the most important factor affecting learning and retention. We hypothesize that passage of time is essential for a maximum benefit of practice to be gained, as the time delay may allow for consolidation of learning."⁸³

Working memory capacity is relative to each individual learner. Before getting into the quantitative research conducted on training timelines, it is important to highlight six general training rules: "(1) reduce the amount of information trained to essential knowledges and skills; (2) off-load the job required information from memory to external

⁸⁰ Michael T. Charles, and Anne G. Copay, "Acquisition of Marksmanship and Gun Handling Skills through Basic Law Enforcement Training in an American Police Department," *International Journal of Police Science & Management* 5, no.1 (2003): 17, <https://doi.org/10.1350/ijps.5.1.16.11245>.

⁸¹ Tobias and Fletcher, *Training & Retraining*, 58.

⁸² Tobias and Fletcher, *Training & Retraining*, 58.

⁸³ Savion-Lemieux and Penhune, "The Effects of Practice and Delay on Motor Skill Learning and Retention," 423.

sources; (3) distribute the amount of information to be trained over the instructional time; (4) clear working memory with frequent practice exercises; (5) incorporate more cognitive work into the instruction via worked examples; and (6) train to automaticity.”⁸⁴

Quantitative research builds upon these general rules to reduce overload and create sufficient conditions that specifically call out best training practices for information delivery. First, “In general, a session of 2h seems to be too long for efficient training. One hour appears to be a more satisfactory length. One session per day is slightly more effective than two.”⁸⁵ Second, if one must conduct two training sessions a day, “Training sessions ought to be spaced in order to reduce mental fatigue during training and increase consolidation, resulting in enhanced skill acquisition and retention.”⁸⁶ Research conducted to determine how long a rest period should be found, “the rest period of 20 minutes was significantly more effective in the amount of reminiscence obtained than the other rest periods.”⁸⁷ Furthermore, longer rest periods than 20 minutes produced longer lasting effects on retention of information and relearning of lost information was faster.⁸⁸ Third, “Related to the notion of spaced practice, studies of consolidation have consistently shown that a period of rest or a night of sleep significantly enhances learning on a recently acquired motor skill.”⁸⁹

⁸⁴ Tobias and Fletcher, *Training & Retraining*, 59.

⁸⁵ A. D. Baddeley and D. J. A. Longman, “The Influence of Length and Frequency of Training Session on the Rate of Learning to Type,” *Ergonomics* 21, no. 8 (August 1, 1978): 634, <https://doi.org/10.1080/00140137808931764>.

⁸⁶ Edward N. Spruit, Guido Band, Jaap Hamming, and Richard K. Ridderinkhof, “Optimal Training Design for Procedural Motor Skills: A Review and Application to Laparoscopic Surgery,” *Psychological Research* 78, no. 6 (November 2014): 888, <https://doi.org/10.1007/s00426-013-0525-5>.

⁸⁷ Jodean Moore, “Relationships Among Rest, Reminiscence and Retention In Two Types Of Skill Learning,” (PhD diss, University of Southern California, 1973), 16, <https://doi.org/10.25549/USCTHESES-C18-756850>.

⁸⁸ Moore, “Relationships Among Rest, Reminiscence And Retention,” 16.

⁸⁹ Savion-Lemieux and Penhune, “The Effects of Practice and Delay on Motor Skill Learning and Retention,” 429.

C. CONCLUSION

The Marines, the Army, Police, and FBI all have a SOP and a training timeline for their small arms training evolution that exemplifies their importance. By having a standardized process, research can be conducted to determine training proficiency to be discussed in Chapter IV. The absence of a SOP and timeline produces a scenario by which we cannot conduct research to determine the effectiveness of the naval small arms training program.

OPNAVINST 3591.1F does not have a mechanism such as an SOP or training timeline to ensure that small arms students are able to absorb and retain the information. It is critical that instruction be given in a manner that does not overload the students working memory and facilitates information being transferred into long term memory. Quantitative research has shown that the sufficient conditions that must be present in OPNAVINST 3591.1F is a training timeline to include sessions less than two hours with long breaks in-between sessions

The instruction is meant to train watchstanders to enter harm's way and eliminate the threat. Exactly how this training is taking place throughout the fleet looking through the lens of OPNAVINST 3591.1F, is unknown. The initial instruction section of OPNAVINST 3591.1F does not have the following sufficient conditions. The naval handgun qualification training does not have an SOP to standardize instruction delivery method nor a timeline to direct the length of the training.

III. SKILL RETENTION

Chapter II established that the naval small arms training program does not follow an SOP or follow a training timeline to sufficiently facilitate skill acquisition. This chapter will address practice in terms of skill retention post skill acquisition, the six to eight month no practice period, and sustainment training. This chapter will describe small arms required practice post qualification and the small arms sustainment evolution. Then it will present research findings on the effect of practice on motor skill retention, the effects of a no practice period, and sustainment training to develop sufficient conditions for a small arms training program. Finally, it will compare the naval small arms training program to research findings to determine if the instruction has the sufficient conditions present to produce watchstanders who can engage real-world threats. Chapter III will show that the naval small arms training program does not contain the sufficient conditions proven through research to produce a force protection watchstander capable of performing in real life shooting incidents.

A. NAVAL SMALL ARMS TRAINING PROGRAM POST QUALIFICATION

The naval small arms training program does mandate that, “All personnel must requalify with live fire annually, thus establishing the 365-day training cycle. All personnel are also required to undergo semi-annual sustainment training between qualification shoots, not to exceed 8 months after the last live fire qualification”:⁹⁰

7. Required Semi-Annual Sustainment Training

- a. Semi-annual sustainment training shall include the same marksmanship/safety/weapon familiarization training, as specified in paragraph 5 of this enclosure.
- b. In addition, the semi-annual sustainment training shall include either:

⁹⁰ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

(1) Live Fire – the Navy Handgun Qualification Course for all categories of personnel respectively using the sustainment scoring criteria (75 percent hits in scoring area of target silhouette); or

(2) Simulator Fire – shall include simulated Navy Handgun Qualification Course for all categories of personnel respectively using the scoring criteria (75 percent hits in the scoring area of the target silhouette). Additional proficiency training in simulated moving targets, shoot/no-shoot drills, simulated combat engagements, or marksmanship training aids are also highly encouraged. Every effort shall be made to utilize simulators for sustainment training.⁹¹

The naval small arms training program also states that the teaching of the psychomotor skill of small arms techniques requires numerous hours of post-qualification practice:

The goal is to have armed Naval Security Force (NSF) personnel, trainees, and students practice techniques until they have achieved the goal of being able to perform the same thing, the same way, every single time. It should be quick, smooth, and accurate. Once this level has been achieved, it is important to continue to practice those skills as often as possible so that they are not diminished. Small arms training is a perishable skill that will be lost in a short amount of time without regular training.⁹²

However, while the naval small arms training program on one hand acknowledges the benefits of small arms practice, it does not mandate practice through direct language such as shall. Due to the lack of mandated practice of small arms skills, it is reasonable to assume that watchstanders such as a POOW routinely have a no practice period up to eight months post skill acquisition. The following research discusses potential hazards of such a long no practice period on the procedural motor skill of small arms.

B. MOTOR SKILL RETENTION OVER NO PRACTICE PERIOD

As previously stated, there is no required practice post small arms qualification. The next evolution required post small arms qualification is six to eight months post qualification to participate in small arms sustainment training. This creates a six to eight

⁹¹ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 4.

⁹² Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

month no practice period before sustainment training and a four to six months no practice period post sustainment. This section will present quantitative research finding on skill degradation and skill loss during a no practice period to show that the naval small arms no practice period is too long and is insufficient to ensure watchstanders can counter real-world threats throughout the entire training cycle.

It is important to note that naval small arms skill retention over the course of no practice period has not been studied. In 2012 Jensen and Woodson in their study of the naval small arms simulator wrote, “There has been very little research directed at Navy marksmanship training.”⁹³ The best analog to be able to predict the results of such an experiment was conducted by the U. S. Army Research Institute.

The U.S. Army Research Institute Special Report 39 states that “people forget and skills get rusty. A century of research on memory has shown that large amounts of forgetting can occur naturally over period as short as several hours.”⁹⁴ This is contradictory to the military ideology that military members, “will retain the knowledge and skills they acquire in training long enough to perform effectively in their career assignments.”⁹⁵ Research has shown, “Forgetting may occur over any period when knowledge is not applied and skills are not practiced.”⁹⁶ This fact was established in 1913 by Hermann Ebbinghaus. Ebbinghaus stated, “Left to itself every mental content gradually loses its capacity for being revived, or at least suffers loss in this regard under the influence of time. Facts crammed at examination time soon vanish, if they were not sufficiently grounded by other study and later subjected to a sufficient review. But even a thing so early and deeply founded as one’s mother tongue is noticeably impaired if not used for several years.”⁹⁷ The fact that knowledge and skills will diminish without practice or formal instruction has

⁹³ Jensen and Woodson, “A Naval Marksmanship Training Transfer Study,” 5.

⁹⁴ Robert A. Wisher, Robert A. Sabol, and John A. Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, ARI Special Report 39 (Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1999), 1.

⁹⁵ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 1.

⁹⁶ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 2.

⁹⁷ Ebbinghaus, “Memory: A Contribution to Experimental Psychology,” 156.

not changed in over one hundred years of research. The U.S. military has confirmed this fact through multiple research studies post WWII.

This idea of forgetting was reinforced for the U.S. Navy in a study conducted on information recall at the Navy training center at Great Lakes, information recall declined over 40 percent over the course of six months. Figure 1 depicts the finding of the recall study that averaged data from 40 studies on memory. Procedural motor skills such as the use of small arms “constitute a special class among tasks that rely heavily on knowledge retrieval. Because procedural tasks require the soldier to produce a set of actions, they tend to suffer from the degradation over time” seen in Figure 1.⁹⁸ A study conducted by the Air Force looked at procedural motor skills loss and concluded that after 18–24 months of no practice, only half of the participants were able to perform trained skills at an acceptable level.⁹⁹

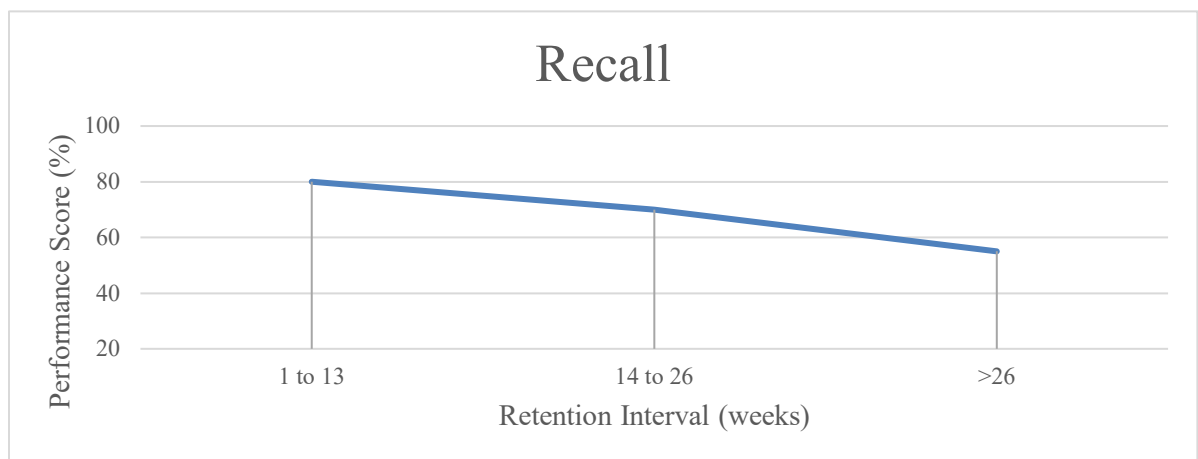


Figure 1. Recall of Procedural Tasks over a No Practice Period¹⁰⁰

Other studies have shown the rapid decline in performance of procedural tasks as a result from a lack of practice. A study on retention of cardiopulmonary resuscitation (CPR)

⁹⁸ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 6.

⁹⁹ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 6.

¹⁰⁰ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 6.

concluded that only 20 percent of CPR qualified personnel are able to perform CPR at qualification standards six months after post qualification. Figures 2 and 3 below show the actual measured retention of basic military skills over the course of an average 36 month no practice period and the theoretical skill retention curve to show how each skill declined throughout the no practice period. Each score in Figure 2 is an average of 197 Army volunteer's real-life performance level of each procedural skill after a prolonged no practice period.¹⁰¹ Figure three is the theoretical skill retention curve of each skill over the course of the no practice period.

The most important piece of information to extract from the figures below in regard to small arms training is the degradation of the M16 weapons systems skills below 80 percent around the four-month timeframe; see Figure 3. Clearing weapon malfunctions and performing weapons function checks are learning objectives during skill acquisition for the naval small arms training program. Research conducted motor skill retention has shown quantitative data, indicating that longer lengths of no practice “hinder retrieval of explicit aspects of the task.”¹⁰² This means that a percentage of steps of the learned task are forgotten not the entire skill set. In a military setting, most procedural tasks are lock step and cannot be completed unless all steps are performed appropriately and in sequence.

¹⁰¹ Wisner, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 9.

¹⁰² Savion-Lemieux and Penhune, “The Effects of Practice and Delay on Motor Skill Learning and Retention,” 423.

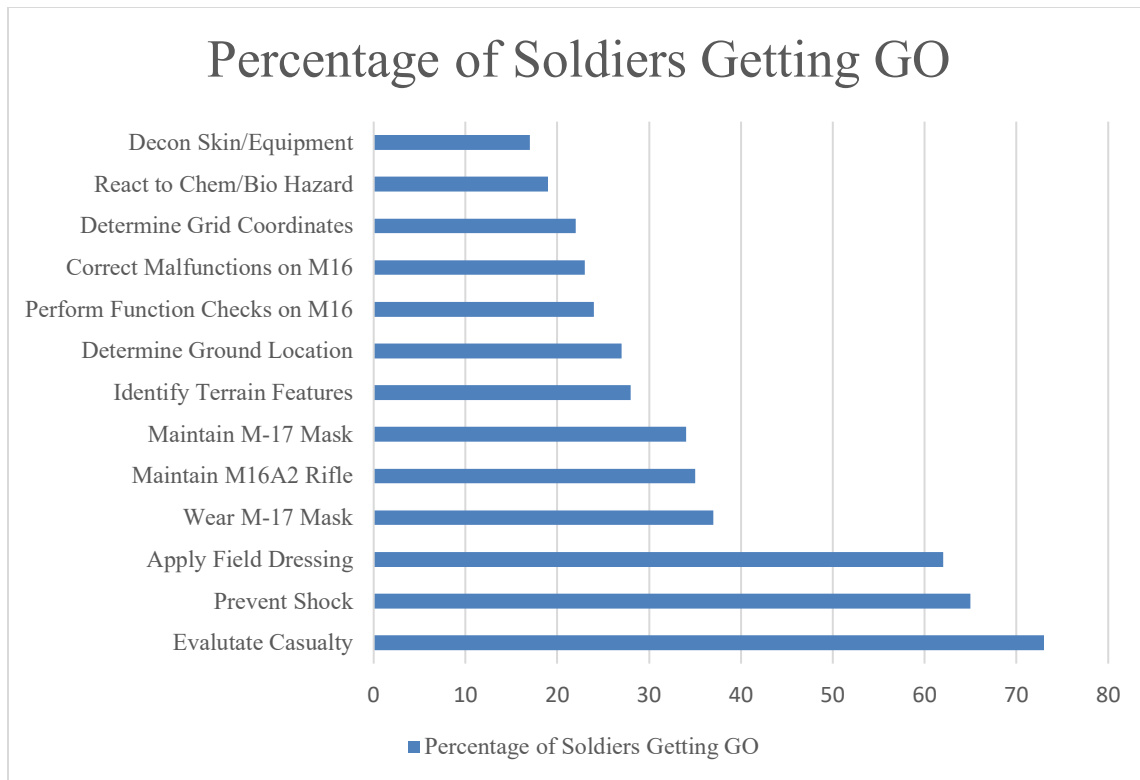


Figure 2. Percentage of Soldiers Getting GO after a No Practice Period¹⁰³

¹⁰³ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 9.

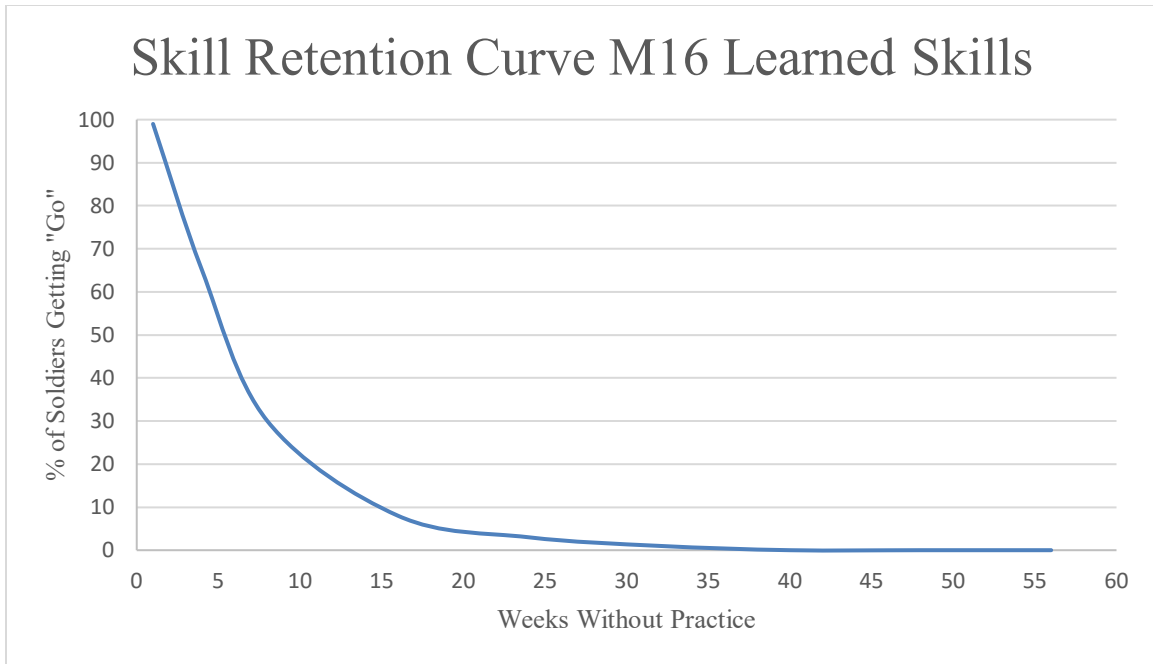


Figure 3. M16 Skills Retention Curve¹⁰⁴

C. OVERTRAINING

Skill retention over the no practice period, as the research above has shown, is not universal across all learned skills. Some skills degrade faster than others. Research on the retention of military skills has identified three factors that affect retention; original learning, aptitude, and overtraining.¹⁰⁵ Chapter II determined that the level of original learning (skill acquisition) of the naval small arms training program cannot be determined due to the lack of an SOP for small arms training. Individual aptitude is outside the scope of this study. The third factor, overtraining, is defined as “training that extends beyond the first successful performance.”¹⁰⁶ For example, if the qualifying marksmanship score for small arms training is 80%, overtraining would be to practice skills until 100% marksmanship performance is regularly obtained. This concept of overtraining can take

¹⁰⁴ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 9.

¹⁰⁵ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 17–18.

¹⁰⁶ Schendel and Hagman, “On Sustaining Procedural Skills,” 606.

place in original learning or in the skill retention time period between qualification and requalification.

As previously noted in Chapter II, the U.S. Marines in contrast to the U.S. Navy, do have a robust small arms training program with an SOP and training timeline that has been studied at the Naval Postgraduate School. The Marine small arms training program requires significantly more practice during skill acquisition to include live fire exercises. The Marine small arms training states, “Those Marines who are armed with the M1911A1 pistol or .38 revolver are required to fire the pistol ‘A’ course for requalification as described in Appendix A. The training spans a five-day period with one hour per day involving live fire exercises.”¹⁰⁷ The result of the study proves the concept of overtraining increases skill retention by showing no significant difference in small arms marksmanship scores over a no practice period up to twenty-four months post skill acquisition.¹⁰⁸

Another example of overtraining for small arms skill acquisition is the FBI training program. The FBI small training program ensures every trainee achieves skill mastery through overtraining for small arms: “With their pistol, they’re going to shoot approximately 4,000 rounds of ammunition through their pistol.”¹⁰⁹ As the above evidence shows, the naval small arms training program does not contain the sufficient condition of overtraining during skill acquisition to prevent skill degradation over the course of the no practice period. The naval small arms training does not facilitate live fire training nor does it mandate any type of practice that is standard in the Marine and FBI training programs previously described.

Overtraining is not a tool that can only be used during skill acquisition, it has also been researched and proven an effective tool to enhance skill retention over the course of the training cycle. Ebbinghaus in 1885 wrote, “By a sufficient number of repetitions their

¹⁰⁷ Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification,” 16.

¹⁰⁸ Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification,” 44.

¹⁰⁹ Federal Bureau of Investigation. “Becoming an Agent: Firearms Training.” Accessed June 6, 2019. <https://www.fbi.gov/video-repository/becoming-an-agent-series-firearms-training.mp4/view>.

final mastery is ensured, and by additional later reproductions gain in assurance and ease is secured.”¹¹⁰ Overtraining used as a training tool to increase skill retention post qualification works in the following manner. “In military courses, original learning can range from just a passing score with a grade of 65 or 70 percent, to continuing to practice and learn even after reaching criterion of 100 percent.”¹¹¹ In essence, one must continue to train small arms skill post qualification to achieve skill mastery and increase skill retention.

Schendel and Hagman conducted numerous quantitative research studies on military procedural skill retention for with the U.S. Army Research Institute for the Behavioral and Social Sciences. In one study, an experimental group (OT) was trained to criterion for a procedural skill and then received 100% overtraining. The (OT) experimental group was compared to the control group for retention and retraining performance. The control group received only initial training and met the training objective, no follow-on training was administered. The experimental group outperformed the control group during retention testing and the amount of time it took to retrain learned skill to criterion.¹¹² “These findings suggest that overtraining may be a potent avenue for reducing costs and increasing effectiveness, at least when sustaining procedural skills over a fixed retention interval.”¹¹³

In a follow on study on overtraining for military procedural skills, Hagman concluded “Retention scores collected eight weeks after training showed that the mastery group committed fewer errors than the proficiency group on the initial trail of retraining, and needed fewer trials and committed fewer error in relearning the task back to proficiency.”¹¹⁴ This study shows that by achieving skill mastery during skill acquisition

¹¹⁰ Ebbinghaus, “Memory: A Contribution to Experimental Psychology,” 156.

¹¹¹ Wisher, Sabol, and Ellis, *Staying Sharp: Retention of Military Knowledge and Skills*, 17.

¹¹² Schendel and Hagman, “On Sustaining Procedural Skills,” 609–610.

¹¹³ Schendel and Hagman, “On Sustaining Procedural Skills,” 610.

¹¹⁴ Joseph D. Hagman and Andrew M. Rose, “Retention of Military Tasks: A Review,” *Human Factors: The Journal of Human Factors and Ergonomics Society* 25, no. 2 (April 1983): 201, <https://doi.org/10.1177/001872088302500207>.

reduces the length of time required to retrain a skill after a no practice period where skill degradation occurs, back to the skill mastery level. The following section on skill sustainment will discuss how to prevent skill loss over the no practice period with skill sustainment training inserted in the training program as a refresher of skills learned during skill acquisition.

D. SKILL SUSTAINMENT TRAINING

Overtraining during skill acquisition deters forgetting, but it cannot prevent it.¹¹⁵ Skill sustainment is any action that is conducted to maintain knowledge or skill at a predetermined level of functionality. An example would be a professional baseball player going to the batting cage in the off season. Another example from the U.S. Navy is, “Basic, but required, medical skills are practiced on a daily basis, which leads to Corpsman becoming proficient and confident in their abilities to provide routine and emergency care.”¹¹⁶ This chapter has established so far that a long no practice period decreases skill retention and the naval small arms training program does not mandate any form of overtraining to counteract skill degradation/skill loss over the course of the no practice period. In place of a practice routine over the training cycle, the naval small arms training program does mandate that the required semiannual sustainment training must be completed to extend the small arms qualification time period from six to eight months to one year. This section will define the characteristics of a sufficient skill sustainment program and compare the naval small arms sustainment evolution to quantitative research conducted on skill sustainment to determine if the naval small arms sustainment training is sufficient.

For a sustainment training to be considered sufficient it must first be timed correctly in the training cycle, it must have an SOP to standardize the training, and it must have an appropriate timeline.

¹¹⁵ W. C. Krueger, “The Effect of Overlearning on Retention,” *Journal of Experimental Psychology* 12, no. 1 (February 1929): 71, <https://doi.org/10.1037/h0072036>.

¹¹⁶ Fletcher, “Verification of the Need,” 8.

Skills must be refreshed to be sustained. A problem is determining how frequently refresher training needs to occur to ensure continued sustainment. “If time intervals between training sessions are too long, then performance may fall below acceptable levels and entail considerable risk. Emergencies can arise, requiring correct performance, before an individual has had an opportunity to retrain.”¹¹⁷

The timing is for sustainment training is critical. In the case of the USS *Mahon* shooting incident, all that is known from the after-action report is that the POOW’s small arms qualification was within standards and that when an emergency arose, the drawn weapon was taken by the assailant denoting a small arms training failure to use the weapon. Based on the research on skill degradation previously in this chapter, if the length of the no practice period was more than three months, then it is possible that skill loss occurred thus resulting in the incident. The FBI currently is in the process of updating their small arms training program based on analysis of an abundance of gunfight data collected from law enforcement. In contrast to the naval small arms training program that has a no practice period of up to eight months: “The FBI pistol-qualification course required agents to participate in quarterly exercise in which they fired 50 rounds.”¹¹⁸ Quarterly sustainment trainings are more in line with skill retention curves presented earlier in this chapter and a sufficient condition for a small arms training program.

The second critique of naval small arms sustainment training is that it has the same inherent flaws as the small arm skill acquisition portion of the training program. The sustainment training has the same training objectives, no SOP to standardize instruction, and no established timeline for execution. The actual sustainment qualification event in contrast to the training is again a well-organized step by step procedure with clear instruction and performance guidelines for trainees and instructors. The major different between the sustainment qualification exercise and the skill acquisition qualification is that the sustainment qualification is not a live fire event, it utilizes the ISMT.

¹¹⁷ Schendel and Hagman, “On Sustaining Procedural Skills,” 606.

¹¹⁸ Johnson, “FBI Changes Its Firearms Training Focus.”

The importance of an SOP for small arms training was established in Chapter II. The research findings on a timeline for sustainment training, on the other hand, is significantly different than research conducted on a skill acquisition timeline. “Time to retrain individuals to original performance levels is generally rapid, that is, consistently less than 50% of the original training time. However, length of retraining time is much longer for (a) longer retention intervals, (b) more difficult tasks, (c) for procedural tasks.”¹¹⁹ To answer the question on how long should naval small arms sustainment training should be, the small arms skills retention study is the only study that can directly correlate to the naval small arms training. Charles Walters observed that the Marine Corps small arms training timeline was five days and demonstrated twenty four months of sustained skill retention due to the level of master obtained through overtraining during skill acquisition.¹²⁰ Fifty percent of the skill acquisition timeframe, research above has shown, is a sufficient training timeline for the naval small arms training program.

The naval small arm sustainment training highly recommends the use of a simulator in place of a live fire exercise to reduce training costs.¹²¹ Research conducted on the ISMT has concluded that, “Simulators can be used for training, but at some point, the real object must be handled.”¹²² “If the command had a simulator onboard that could allow personnel to practice marksmanship skills on a regular basis, while in port or underway, then it is reasonable to believe that personnel can and will protect the ship during an attack.”¹²³ “By providing the means to practice a perishable skill like marksmanship, the Navy may have less incidents or casualties.”¹²⁴

¹¹⁹ Schendel, Shields, and Katz, *Retention of Motor Skills*, 16.

¹²⁰ Walters, “Analysis of Marine Corps Small Arms Proficiency with Emphasis on Requalification,” 44.

¹²¹ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 1.

¹²² Getty, “A Comparison of Current Naval Marksmanship Training,” 54.

¹²³ Getty, “A Comparison of Current Naval Marksmanship Training,” 55.

¹²⁴ Getty, “A Comparison of Current Naval Marksmanship Training,” 55.

E. CONCLUSION

The research findings on the effect of practice on motor skill retention, the effects of the naval small arms training program no practice period, and sustainment training developed sufficient conditions for a small arms training program. The sufficient conditions that must be present for small arms training according to the quantitative research are skill mastery during skill acquisition, regularly scheduled practice throughout the training cycle, and a well-structured small arms sustainment training event. Chapter III has shown that the naval small arms training program does not contain the sufficient conditions proven through research to produce a force protection watchstander capable of performing in real life shooting incidents.

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IV. SKILL PROFICIENCY

The previous chapters have established that the naval small arms training program does not have an SOP to standardize the training and has an extended no practice period during the training cycle that produces skill degradation to the point of skill loss. The Marine small arms training program through the use of an SOP, training timeline, and overtraining is able to overcome an extended no practice period. However, merely implementing the Marine small-arms training model will not completely address the insufficiencies of naval small arms training: both the Navy and Marines employ a marksmanship based training model that utilizes stationary paper targets, but “Military training must prepare individuals to enter into harm’s way and perform physically and mentally demanding tasks at the highest levels of proficiency.”¹²⁵ The standard marksmanship training such as the method prescribed by the naval small arms training program “offers little resemblance to scenarios that would likely be experienced during the course of day-to-day duties for a law enforcement officer and, thus, does not prepare law enforcement officers for the extreme levels of stress inherent in deadly combat.”¹²⁶ This chapter will show that the marksmanship proficiency standard endorsed by the Navy is only the second step of a four step process to produce a force protection watchstander capable of engaging real-world threats.

A. MARKSMANSHIP SMALL ARMS TRAINING MODEL

The marksmanship-based training for law enforcement in America was developed in the mid nineteenth century as result of police standard issue or authorization to carry small arms. A need for small arms training was identified by Theodore Roosevelt that recognized that “few policies and procedural guidelines existed, not even with regard to matters as basic as handgun and cartridge selection or safety and familiarization training.”¹²⁷ In 1895 Roosevelt, as the New York City Police Commissioner, “convinced

¹²⁵ Tobias and Fletcher, *Training & Retraining*, 267.

¹²⁶ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226

¹²⁷ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 514.

by his inquiry into accidents and miserable gunfighting performances that regular training was needed.”¹²⁸ His training initiative was strikingly similar to the naval small arms training today. Roosevelt mandated semi-annual trips to the firing range that included weapons familiarization, dry firing, and a live fire marksmanship event.¹²⁹

In the early twentieth century in response to poor gunfighting performance, police turned to the U.S. Army to bolster their small arms training programs, “Thus, military expectations about handgun marksmanship and handling provided a convenient way for police to begin training large numbers of officers to a standard. Nevertheless, this misguided adoption lulled the police into a false sense of security.”¹³⁰ The “bullseye” marksmanship-based training continued until efforts from the Military, NRA, and FBI introduced the practical pistol course (PPC).

The PPC is the current model developed in the 1940s and still utilized today by police, military and law enforcement. PPC is a marksmanship based small arms training that utilizes weapons familiarization and marksmanship training to develop the skill to perform basic handgun mechanics and remediation techniques while firing live rounds at stationary targets at fixed distances.¹³¹ “Handgun qualification for the police, something originally conceived as a test of marksmanship proficiency for soldiers and competitive shooters, still consists of shooting at fixed numbers of clearly defined targets at well-known distances, standard firing elements and sequences, liberal time limits and arbitrary threshold scores.”¹³² The naval small arms training program contains numerous elements of the PPC training model.

The naval small arms training program is a marksmanship-based training. The classroom instruction and practice for skill acquisition states that “before each qualification fire event, small arms instructors shall provide marksmanship, safety and weapons

¹²⁸ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 514.

¹²⁹ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 514–515.

¹³⁰ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 514.

¹³¹ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 518.

¹³² Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 529.

familiarization instruction.”¹³³ At the conclusion of the standard naval marksmanship training, the trainees perform a marksmanship live fire qualification in accordance with instruction with passing scores that range from 180 to 240. A marksman qualification is the minimum requirement for a force protection watchstander with a score ranging from 180–203 out of a possible 240.¹³⁴ The sustainment training required at the six to eight-month period after initial qualification is conducted at the Indoor Simulated Marksmanship Trainer and qualification is based on a marksmanship score.

B. SUFFICIENCY OF MARKSMANSHIP MODEL

As previously stated, the U.S. Navy does not have an adequate sample size for shooting incidents to be able to study the proficiency of its force protection watchstanders and evaluate the naval small arms training program. This chapter has established that both law enforcement and the military share a marksmanship based small arms training model. Therefore, FBI gunfight statistics collected over the past fifty years is the best analog to determine and evaluate the sufficiency of the naval small arms training model. The data will show that the marksmanship model of small arms training, since development has not significantly increased the combat proficiency for law enforcement officers.

True data collection in reference to law enforcement gunfight proficiency began in the nineteenth century. Dennis Rousey was one of the first scholars to collect gunfight data that could be used to determine the proficiency of law enforcement officers small arms skills. Rousey found that “only 42 percent of the policeman who fired their guns struck their antagonist. No more than 22 per cent of the shots fired found their intended targets, and the figure was probably closer to 15 per cent or even less”¹³⁵ Police during this period “were no more skilled in marksmanship than their opponents.”¹³⁶ The nineteenth century

¹³³ Department of the Navy, *Small Arms Training and Qualification*, 3

¹³⁴ Department of the Navy, *Small Arms Training and Qualification*, Encl 3, 8.

¹³⁵ Dennis C. Rousey, “Cops and Guns: Police Use of Deadly Force in Nineteenth-Century New Orleans,” *American Journal of Legal History* 28, no. 2 (April 1, 1984): 57, <https://doi.org/10.2307/845068>.

¹³⁶ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 510.

data sets the baseline for later iterations of marksmanship training to be detailed next but the key takeaway is the 15 percent hit rate during real-world engagements

If we skip forward a century to the 1970s, the modern age of marksmanship small arms training, the perpetrator hit rate for law enforcement officers in New York City was 11 percent.¹³⁷ This trend continued through the 1980s and 1990s with New York law enforcement peaking at a 27 percent hit rate of shots fired.¹³⁸ Not all law enforcement suffered the same hit rates due to marksmanship training. The Metro – Dade Police Department boasted a 52 percent hit rate during the 1980s along with Dallas and Philadelphia law enforcement.¹³⁹

It thus appears that the firearms training adequately prepares police recruits to qualify as police officers but it is also clear that an actual shooting situation on the street will place more demands on the officer. The fact that the recruits are able to hit a static target about 95% of the time while police officers reach their target about 50% of the time in actual confrontations indicates that more skills are required to master confrontational shooting incidents which produce stressful shooting situations.¹⁴⁰

The data shows a steady trend of a lack of small arms proficiency during real-world engagements over the course of a century, but the data is observed and the conclusion that marksmanship training is not sufficient is an observation based on gunfight statistics. In 2014, a study was conducted that scientifically proved the observation through qualitative research methods. Research conducted at Henderson State University concluded that the average hit rate of law enforcement officers that participated in a simulated real-world scenario was 53.67 %.¹⁴¹ This hit rate was after the participants performed a static marksmanship course with an average hit rate of 97% and a run and shoot marksmanship test with a hit rate of 93%.¹⁴² This data confirms the observation that static marksmanship training is not sufficient to produce small arms proficiency to counter real-world threats.

¹³⁷ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 523.

¹³⁸ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 523.

¹³⁹ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 524.

¹⁴⁰ Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 29–30.

¹⁴¹ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 231.

¹⁴² Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 232.

Now that law enforcement real-world accuracy during small arms engagements has been established, the other side of the coin is the data that shows how criminals utilize small arms against law enforcement. The next data sets are of the current era and show the prevalence of felonious killings by small arms of security personnel that went through marksmanship training similar to those involved in the USS Mahan shooting incident. “Between 1987 and 1996, 696 law enforcement officers were feloniously killed in the United States. Of these 91.5 were killed by firearms.”¹⁴³ In 2010 the FBI reported fifty-six felonious deaths of law enforcement officers with fifty five killed by small arms.¹⁴⁴ In 2015 the FBI reported forty one law enforcement officers to include DoD personnel were feloniously killed and all forty one were killed by small arms with thirty that wore body armor.¹⁴⁵ In 2016, two years after the USS Mahan incident sixty-six law enforcement officers to include DoD were feloniously killed. Sixty-two were killed by small arms and fifty-two were wearing body armor.¹⁴⁶ The data above shows that even with body armor being a standard issue for most law enforcement officers, the number of felonious deaths has remained relatively the same since 1987.

The number of law enforcement officers feloniously killed is one indicator that the law enforcement community, trained via the static marksmanship method and highly trained in comparison to nineteenth century law enforcement, may not be sufficiently trained to counter real-world threats. The second indicator that the marksmanship model is not sufficient is that assailants are training via the marksmanship model as well. Charles and Copay discovered:

When the FBI interviewed a sample of the individuals who had killed a police officer, 64% reported being familiar with handguns during their childhood and teenage years, and 54% reported practicing with their weapon at least once a month. ... These statistics dramatically underline the

¹⁴³ Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 16–17.

¹⁴⁴ Federal Bureau of Investigation, “Law Enforcement Officers Killed and Assaulted in 2010. (Crime Data).” *The FBI Law Enforcement Bulletin* 81, no. 2 (February 1, 2012): 21, ProQuest.

¹⁴⁵ “Law Enforcement Officers Killed and Assaulted Report Released 41 Officers Feloniously Killed in 2015,” *States News Service*, October 18, 2016, LexisNexis Academic.

¹⁴⁶ “Law Enforcement Officers Killed and Assaulted Report Released 66 Officers Feloniously Killed in 2016,” *States News Service*, October 16, 2017. LexisNexis Academic.

fact that handgun proficiency is crucial for officer safety and survival. However, firearms proficiency appears to be lacking in U.S. law enforcement.¹⁴⁷

The key take away is that 64 percent of individuals who have killed a police officer report practicing monthly which is drastically more than the naval small arms training program requirement of live fire once a year.

The purpose of a marksmanship based small arms training program is for the trainee to demonstrate the ability to deploy a weapon and shoot accurately. Accuracy is measured by the number of bullet hits on a stationary target at a predetermined distance. Most small arms training programs determine that somewhere in the ballpark of 80 percent accuracy is sufficient to be small arms qualified and proficient to counter real-world threats. The data above has shown that the 80 percent accuracy at qualification is reduced to 10 to 50 percent in real-world engagements. “When police resort to their handguns, research suggests that they are quite limited in their ability to shoot accurately and that these levels are far similar to that of their opponents than one might think at first surmise, this despite lacking the police officer’s extensive training in marksmanship and gun handling.”¹⁴⁸ The marksmanship model is not representative of real-world engagements.

This is not a new revelation; scholars have been studying this from the early 20th century to today. Even court cases have solidified this fact in law. “The perceived necessity of realistic training is so great that multiple court rulings have decided that, for law enforcement firearms training to be sufficient, officers must take part in realistic training.”¹⁴⁹ The sad truth of the matter is, “Despite the legal requirements for training to be more practical to constitute validity, it is common for a law enforcement firearms qualifications course and training to consist of static shooting exercises utilizing paper targets rather than realistic, dynamic methods.”¹⁵⁰ The following section will show how

¹⁴⁷ Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 17.

¹⁴⁸ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 513.

¹⁴⁹ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 255.

¹⁵⁰ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226.

law enforcement is changing its training methodology through research based training methods in order to improve small arms proficiency.

C. SUFFICIENT SMALL ARMS TRAINING

The most important fact that the previous section highlighted is that the marksmanship based naval small arms training does not translate to real-world small arms proficiency. The inaccurate real-world performance when compared to the high level of accuracy measured at qualification leads to the conclusion that the marksmanship training has left law enforcement officers ill prepared. The main problem is that “Functional similarity is a necessary condition and sufficient condition for learning procedural skills.”¹⁵¹ As mentioned in the introduction of this chapter, marksmanship is the second step of a four-step small arms training process.

The PTI firearms course consisted mainly of shooting at an immobile, which is a familiar and predictable environment. This training allowed police recruits to acquire and develop the basic skills of marksmanship and gun handling, as has been demonstrated in this study. These skills are necessary but not sufficient for good performance in an actual shooting situation. A real life shooting incident requires four major skills: (1) the ability to handle a ‘shoot/don’t shoot’ decision, (2) marksmanship and gun handling skills, (3) the ability to shoot at an unpredictable and moving target, and (4) the ability to perform those skills in a potentially life-threatening, high stress, situation.¹⁵²

The additional steps, three and four, address two key missing elements: 1) in the real-world targets and the situation are unpredictable, 2) The psychological component of a gunfight.

1. Dynamic Shooting Environment

There is a difference between range training and real-world engagements that “ostensibly might have led to handgun qualified officers missing their opponents during gunfights.”¹⁵³ The dynamic shooting environment that training must replicate incorporates real-world scenarios encountered by officers. The FBI is the leading organization that is

¹⁵¹ Schendel, Shields, and Katz, *Retention of Motor Skills*, 24.

¹⁵² Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 27.

¹⁵³ Morrison and Vila, “Police Handgun Qualification: Practical Measure or Aimless Activity?” 513.

adapting new research proven small arms training methods into their small arms training program to address an unpredictable target or situation. The previous FBI pistol qualification course, “required agents to participate in quarterly exercises in which they fired 50 rounds, more than half of them from between 15 and 25 yards. The new course involves 60 rounds, with 40 of those fired from between 3 and 7 yards.”¹⁵⁴ This is a result of shooting incident research that concluded “that if we’re not preparing agents to get off three to four rounds at a target between 0 and 3 yards, then we’re not preparing them for what is likely to happen in the real world.”¹⁵⁵ Other methods that have been adopted include new exercises that require “that agents draw their weapons from concealed positions, usually from holsters shielded by jackets or blazers, to mimic their traditional plainclothes dress in the field.”¹⁵⁶

One similarity that the naval small arms training program has in common with many law enforcement departments across America is to facilitate more realistic training is the use of a firearms simulator. The simulator provides an organization a low cost option for real-world scenario based training that familiarizes the trainee with a variety of gunfight scenarios based on real engagement data. Although the U.S. Navy owns and operates small arms simulators, without a SOP mandating simulator training, naval personnel are by in large are not gaining experience in dynamic real-world scenarios. The simulator even though it is used to:

Provide more realistic officer training, it is insufficient. While this system is useful in assisting officers in making ‘shoot/don’t shoot’ decisions and acquiring basic handgun skills, the system does not produce a sufficiently realistic environment for armed confrontations. Certainly, such a system has its place in firearms training, but it lacks the realism that can be produced by more realistic, and adaptable training systems.¹⁵⁷

¹⁵⁴ Johnson, “FBI Changes Its Firearms Training focus.”

¹⁵⁵ Johnson, “FBI Changes Its Firearms Training focus.”

¹⁵⁶ Johnson, “FBI Changes Its Firearms Training Focus.”

¹⁵⁷ Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 28.

The research reinforces the fact that even a comprehensive training program that includes steps one through three is not sufficient to counter real-world threats. The psychological component must be addressed in training.

2. Psychological Component

In response to poor gunfight performance and the widely accepted fact that marksmanship training does not replicate the real world, multiple attempts have been made to simulate the stress of a real-world engagement during small arms training. Due to the high cost of real-world scenario small arms training, studies have been conducted to determine if through physical exertion, before live fire training, stress can be elevated to simulate a real-world engagement stress. A study was conducted that compared the small arms performance of individuals that had an elevated heart rate before live fire exercise and individuals that experience real world-based stressors during live fire exercise.

Significant differences were found between exercises in both performance and heart rate, showing that training that is more similar to actual force-on-force situations resulted in decreased performance and increased heart rate levels. Based on these findings, it can be determined that there are differences between less realistic firearms exercises with some stress introduced and exercises that attempt to simulate combat situations. Departments should include real-life training to increase hit-rate accuracy during stressful situations.¹⁵⁸

The research is conclusive that the psychological stress of a real-world engagement must be incorporated into small arms training programs. “Training programs should incorporate a greater proportion of training time devoted to combat situations involving high-stress exercises.”¹⁵⁹ A sufficient small arms training program must include “practice conditions that resemble expected performance characteristics in areas such as perception, performance context, and cognitive processes that are necessary to perform adequately.”¹⁶⁰ Although no data is currently available specific to the combat effectiveness

¹⁵⁸ John Thomasson, Dean R. Gorman, Cathy D. Lirgg, and Douglas J. Adams, “An Analysis of Firearms Training Performance Among Active Law Enforcement Officers in the USA,” *Research Quarterly for Exercise and Sport* 85, no. S1 (March 1, 2014): A21. <https://doi.org/10.1080/02701367.2014.930647>.

¹⁵⁹ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 225.

¹⁶⁰ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226.

of law enforcement personnel that have participated in small arms training that replicates real-world scenarios and real-world stress, the sufficient condition of real-world training has been utilized in both sport and human performance in a range of tasks from fighting to flying aircraft.¹⁶¹ A golfer that only practices at a driving range will never be successful in real-world competition. Likewise, for a force protection watchstander to be proficient employing a small arm, static marksmanship training with no real-world stress is insufficient. Training must be conducted that prepares watchstander for real-world engagements.

D. CONCLUSION

The analysis of gunfight data over the course of a century has undeniably shown that the static marksmanship small arms training model has never produced individuals proficient enough in small arms to counter real-world threats sufficiently. Poor performance has not only been recorded since the nineteenth century, but the consensus that marksmanship training is insufficient is at least fifty years old.

It is no secret that, “Many firearms trainers and law enforcement officers believe that more realistic training techniques involving various scenarios and force-on-force, non-lethal weapons would better prepare officers for the demands placed on an officer during a high-stress deadly conflict.”¹⁶² The current problem is that there is not a research based training method that is cost effective enough to simulate real-world engagements and financially viable for the military and law enforcement to incorporate into small arms training. Present day research has shown that, “Both paint-ball and laser training provide a low injury risk environment to the participants, but have the potential to add a relatively high level of realism to the practical exercise.”¹⁶³ The conundrum for small arms training is that the marksmanship model does not produce small arms proficiency but a modern model for small arms training is currently not available.

¹⁶¹ Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226.

¹⁶² Thomasson, Gorman, Lirgg, and Adams, “An Analysis of Firearms Training,” 226.

¹⁶³ Charles and Copay, “Acquisition of Marksmanship and Gun Handling Skills,” 29.

V. CONCLUSION

A. RESEARCH FINDINGS

The purpose of this thesis was to determine the sufficiency of naval small arms training to combat real-world threats in response to the USS Mahan shooting incident. The sufficient conditions developed by this thesis were derived from quantitative research studies on skill acquisition, retention, and proficiency. The sufficient conditions identified for the naval small arms training program are as follows:

- 1) The training program must have an SOP.
- 2) The training program must have a training timeline sufficient to support skill retention and storage of skills in long term memory.
- 3) The training program must have overtraining of all small arms skills.
- 4) The training program must not have a prolonged no practice period.
- 5) The training program must simulate real-world scenarios and replicate a dynamic shooting environment.
- 6) The training program must simulate real-world stress.

The above sufficient conditions are go/no-go criteria for small arms training. All-sufficient conditions must be present for the naval small arms training program to be determined sufficient. The qualitative comparison of the naval small arms training program to the research derived sufficient conditions show that the naval small arms training program does not contain any of the six sufficient conditions indented and therefore the naval small arms training program, in the context of this thesis, has been determined insufficient to produce watchstanders capable of counteracting real-world threats.

1. Hypothesis One

Hypothesis one is that the nature of the initial training does not represent the demands of real-world engagements. Hypothesis one was found to be true. The naval small arms training program is focused on developing the marksmanship skill measured by

shooting stationary targets at distances outside the average gunfight envelope. Due to emerging research in the field of small arms training for FBI and police, the effectiveness of shooting stationary targets, the marksmanship model, is insufficient since stationary targets do not replicate real-world threats. In the real world, law enforcement and the suspect are rarely stationary. Naval security personnel must be prepared to engage a moving target while moving as well. Training must also prepare naval personnel for the psychological stress of an engagement as it was shown that stress reduces marksmanship ability.

2. Hypothesis Two

Hypothesis two is that the length of the no-practice period, up to 365 days post qualification, negatively impacts the ability to use a handgun in response to a real-world threat effectively. Hypothesis two is true. The naval small arms training program assumes that the learned handgun skill will be retained for six to eight months before simulator sustainment training and up to a year before reacquisition/initial training is repeated. Research on skill acquisition and skill retention showed: 1) The lack of overtraining during skill acquisition does not promote skill retention over the course of the no practice period and is subject to the standard forgetting curve; 2) The insufficient initial training combined with a lack of any mandatory practice during the no practice period, 365 days, theoretically produces small arms skills that will be degraded to the point of ineffectiveness during the training cycle.

B. POLICY RECOMMENDATIONS

As a result of the findings of this thesis, three policy recommendations stand out to be considered by the Department of the Navy and the Naval Education and Training Command. The first policy recommendation is to model the naval small arms training program after the Marine small arms training program that has been quantitatively tested and proven effective to produce small arms skill retention over a prolonged no practice period. Improved marksmanship and marksmanship skill retention, although not sufficient as a standalone improvement, is a critical step that must be accomplished before

progressing to steps three and four of sufficient small arms training identified in Chapter IV.

The second recommendation is that all naval force protection watch standers attend the Navy Security Reaction Forces Advanced course offered by NETC. The course has components of real-world scenarios combined with the psychological stress of simulated real-world engagements. This added training would better prepare category I watchstanders for a real-world scenario as experienced by those involved in the USS Mahan incident.

The third policy recommendation would be to reinstate the Marine security contingencies onboard naval ships. This change would provide a dedicated security force to naval assets with a primary focus on force protection. As it stands now in the fleet as an example, a culinary specialist could theoretically arrive at work, cook breakfast for the crew, participate in a damage control drill as a firefighter, and then go on watch as part of the ship's security force. The bottom line is that force protection is not the primary duty for sailors and thus the need for a dedicated security force could be a great benefit.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

The common theme amongst authors that have conducted research on small arms training is that more research is needed due to the limited number of studies conducted on the subject. As previously stated in Chapter I, the naval small arms training program has never been studied as a whole. Due to the research design of this thesis, the major question that needs to be answered next is, what is the current state of small arms skill retention amongst naval force protection watchstanders?

A quantitative study should be conducted that takes a population of naval force protection watchstanders at various points in their one-year training cycle. Without any training, conduct the NHQC and compare the marksmanship scores to their scores at qualification to determine if skill degradation occurred as a result of the no practice period. Once a baseline performance standard has been established for the current small arms training program, follow on research can be conducted to measure the effect of any small arms training program changes.

Another key piece of information that is missing that would advance our knowledge of small arms training would be to measure the proficiency of security personnel that have participated in sufficient small arms training that includes the psychological component of a real-world engagement. What we know is that marksmanship scores decrease when the psychological component of an engagement is introduced, but we do not know if marksmanship scores decrease with security personnel that have been through training that involves psychological stress. This information is critical to advance small arms training to counter real-world threats.

D. CONCLUSION

This thesis answers the research question: Does naval small arms training ensure the acquisition, retention, and proficiency of small arms skills necessary to counter real-world threats? The current naval small arms training required for naval force protection watchstanders when compared to quantitative research conducted on skill acquisition, retention, and proficiency shows that the small arms level of training does not have the research proven sufficient conditions present to counter real-world threats over the length of the one year training cycle. Moreover, any security personnel or law enforcement should ask the same questions.

As this thesis illustrated, the marksmanship training model is pervasive not just in the USN. The U.S. military, local police, and federal agencies have all used and may still be using this flawed model of small arms training. Even if a small arms training program produced perfect marksmanship with long term retention over a no practice period and simulated a dynamic shooting environment, without preparing trainees for the psychological stress of and engagement, we are no better statistically than an armed assailant. We owe it to those who protect to develop and implement a better training program that for the first time, will give the advantage in real-world engagements to the security personnel. We owe it to Petty Officer Mayo.

APPENDIX. OPNAVINST 3951.1F REFERENCES¹⁶⁴

OPNAVINST 5530.14E	Naval Physical Security and Law Enforcement Program
SECNAVINST S8126.1	Weapons Security Policy
SECNAVINST 5500.29C	Use of Deadly Force and the Carrying of Firearms by Personnel of the Department of the Navy in Conjunction with Law Enforcement, Security Duties and Personal Protection
CJCSI 3121.01B	Standing Rules of Engagement/Standing Rules for the Use of Force for U.S. Forces
OPNAVINST 5530.13C	Department of the Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives (AA&E)
MILPERSMAN	The Naval Military Personnel Manual
SECNAVINST 1650.1H	Navy and Marine Corps Awards Manual
OPNAVINST 5100.27B	Navy Laser Hazards Control Program
NAVSUP P-724	Conventional Ordinance Stockpile Management
US CODE Sections 40701 through 40733 of Title 36	Patriotic and National Observances, Ceremonies, and Organizations
DoD Directive 5500. 7-R	Joint Ethics Regulation
OPNAVINST F3100.6H	Special Incident Reporting (OPREP-3PINNACLE, OPREP-3NAVY BLUE, AND OPREP-3 NAVY UNIT SITREP) Procedures
NTRP 3-07.2.2	Weapons Handling Standard Procedures and Guidelines
SW300-BC-SAF-010	Gun Operation and Misfire Procedures
Marine Corps Reference Publication 3-01B	Pistol Marksmanship
Marine Corps Reference Publication 3-01A	Rifle Marksmanship
Army Field Manual 3-23.35	Pistol Marksmanship
Army Field Manual 3-22.9	Rifle Marksmanship

¹⁶⁴ Source: Department of the Navy, *Small Arms Training and Qualification*, 1.

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