Abstract

Implicit versus Explicit Self-Defense Instruction on Self-Efficacy, Affect, and Subjective Well-being

by

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December, 2014

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A rising concern that has been associated as a public health issue is violence and violent crimes. In an effort to counter issues associated with violence and violent crimes, communities and individuals will seek some form of self-defense training. Research conducted on self-defense has shown that such training can have a positive impact on a person’s self-efficacy and affect. As one of the greatest mediates of behavior, self-efficacy is essential to the success of promoting proper self-defense techniques. The training and instructional environment of a self-defense program is also key when it comes to acquisition of self-defense skills. Two learning types identified by motor learning has being beneficial to the learning of a new motor skill is implicit learning and explicit learning. Implicit learning is learning with unconscious awareness that is not easily verbalized, whereas explicit learning is learning derived from verbal instruction and rules. The purpose of this study was to evaluate the effects of an implicit versus explicit six-week self-defense training program on self-efficacy, affect, and subjective well-being. Thirty participants (28 women, 2 men), primarily identified as older adults, were randomly assigned to
an implicit or explicit group, with both groups participating in a six-week self-defense training program. Participants completed a Self-Defense Self-Efficacy scale, PANAS-X questionnaire, Personal Well-being Index-Adult, and Subjective Vitality scale before and after the intervention to assess each variable. A skills test was used to measure acquisition of skill and retention. A repeated measure of ANOVA, post hoc test, and an independent samples t-test were conducted to evaluate skill acquisition, self-efficacy, positive and negative affect, and subjective well-being. Data analysis showed that an implicit self-defense training program lead to greater skill acquisition versus an explicit program. Participation in a six-week self-defense program also lead to an increase in self-efficacy, positive affect, and subjective well-being. No changes were experienced by either group when it came to decreasing negative affect. The findings of the study coincided with previous research on self-defense and self-efficacy. At the same time, the findings of the study filled a void within research, regarding the impact implicit/explicit learning has on self-defense, subjective well-being, and older adults. The findings of the study are unique for the older population, since minimal research has been done to examine this population when it comes to self-defense. Based on the findings, future research should focus further on investigating the effects of self-defense training and implicit/explicit learning on older adults. In addition, future research should continue to evaluate the impact of implicit/explicit learning and self-defense on self-efficacy and subjective well-being. As the US population grows older and violence remains a concern, it will be imperative for research to identify effective forms of self-defense and the ongoing benefits of such training.
IMPLICIT VERSUS EXPLICIT SELF-DEFENSE TRAINING ON SELF-EFFICACY, AFFECT, AND SUBJECTIVE WELL-BEING

A Thesis
Presented To
The Faculty of the Department of Kinesiology
East Carolina University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science of Exercise and Sport Science

by
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December, 2014
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ACKNOWLEDGEMENTS

The completion of this thesis could not have been achieved without the direction of Dr. Nicholas P. Murray, my thesis director, and thesis committee: Dr. Thomas Raedeke and Dr. Deirdre Dlugonski. I would like to thank the members of my committee, particularly Dr. Nicholas P. Murray, for the many contributions each made during the research process. The committee as well as the thesis director’s ongoing guidance, feedback, and support was invaluable in aiding me throughout the progression of this work. Additionally, I would like to thank my husband, David Sanders, for inspiring me to study the subject matter, and for all of the personal time, aid, and encouragement he provided. Lastly, I would like to thank my parents, Sherian Howard and Arlin Perry, and my martial arts instructors; Sigung David Sanders, Si-tai-gung Jack Sanders, and Sensei Dave Thomas Brewer for always believing in me and inspiring me to achieve my best. The strength and value of this research project was made achievable by the time and effort each person provided, and in doing so contributed to my overall success.
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CHAPTER 1: INTRODUCTION

Violence in the United States is identified by the Centers for Disease Control and Prevention (CDC) as a serious public health problem (CDC, 2014). In 2010, violent crimes were one of the top ten leading causes of preventable deaths, and violent crimes rose 0.7 percent in 2012 (CDC, 2014; Federal Bureau of Investigation, 2013). Of the violent crimes committed, 62.6% of those were aggravated assaults, 29.2% were robberies, 6.9% rape, and 1.2% were identified as murder (FBI, 2013). Over the years a steady increase in domestic violence and elder abuse has also been reported (CDC, 2014). Statistics on violence show that it can impact a person at all stages of life, male and female, both young and old (CDC, 2014). Violence is one of the leading causes of premature death, and leads to reduced productivity within the community and an overall disruption of social services (CDC, 2014).

One of the methods for addressing the issue associated with violence is by learning self-defense skills. Fear of assault, robbery, and rape are some of the reasons that a person might choose to engage in self-defense training (Weitlauf, Smith, & Cervone, 2000; Angleman, Shinzato, Van Hasselt, & Russo, 2009; Anderson & Whitson, 2005). Organizations focused on reducing violence state that 12% of women that take self-defense have already experienced a form of victimization (University of Oregon, 2013). Training in self-defense can be attained through a variety of methods. These methods include aerobic activities, such as boxing and kickboxing, to various traditional martial arts and combat sports. Other modes for obtaining self-defense skills include specifically advertised programs focused solely on the teaching of self-defense skills.
Advocates of self-defense training programs maintain such training promotes self-awareness, prevention, assertiveness, and self-confidence (Brecklin, 2008). Self-defense training programs also provide individuals with the necessary skills to defend themselves should a violent situation arise. Individuals that engage in self-defense training often report an increase in psychological and emotional well-being (Brecklin, 2008; Weitlauf, Smith, & Cervone, 2000; Angleman, Shinzato, Van Hasselt, & Russo, 2009). Studies examining the benefits of self-defense training have further shown that participants experience an increase in self-confidence, self-esteem, and perceived control (Brecklin, 2008; Weitlauf, Smith, & Cervone, 2000; Angleman, Shinzato, Van Hasselt, & Russo, 2009; Ball & Martin, 2012). Participants also report a decrease in anxiety, hostility, aggression, and fear of victimization (Weitlauf, Smith, & Cervone, 2000; Ball & Martin, 2000; 2012, Bodin & Martinsen, 2004).

Individuals with self-defense training are found to be more apt to deal with a dangerous situation, compared to those that have not received any training (Ozer & Bandura, 1990; Weitlauf, Smith, & Cervone, 2000; Brecklin & Ulman, 2005; Brecklin, 2008). To prepare a person to deal with a dangerous situation, a self-defense program must promote successful skill building and enhancement of a person’s coping mechanisms, such as arousal control and stress management. This builds a person’s ability to physically, psychologically, and emotionally deal with a violent situation and any after-effects associated with that experience.

To develop proper skill building, a self-defense program should also enhance a person’s belief system regarding his or her ability to perform the skill (Weitlauf, Smith, & Cervone, 2000; Angleman, Shinzato, Van Hasselt, & Russo, 2009). One way to promote skill performance and
enhance a person’s belief system is by increasing self-efficacy. The mechanisms that can influence a person’s behavior and belief systems have been identified as a person’s thought patterns, mood, and self-efficacy beliefs (Bandura, 1990; Bandura, 2004). The last mechanism, self-efficacy, is noted to have the strongest impact upon individual behavior (Bandura, 1990). Self-efficacy centers on a person’s perceived confidence to successfully perform a behavior, in order to achieve a specific outcome or goal (Bandura, 2004; Williams, 2010, p. 573). Albert Bandura’s Social Cognitive Theory (SCT) states that in order to strengthen a person’s confidence about performing a particular task, building self-efficacy is key (Bandura, 1990).

SCT contends that there four ways in which a person’s self-efficacy can be increased. Those four methods are mastery experiences, vicarious experiences, verbal persuasion, and interpretation of psychological states (Bandura, 1990). Verbal persuasion are those positive statements used by a reliable source to raise an individual’s perceived self-efficacy (Bandura, 1990; Bandura, 2004). Interpretation of psychological states allows a person to rely on somatic and emotional states to evaluate behavior, with positive affect leading to higher self-efficacy than negative affect (Bandura, 1990; Bandura, 2004). The second strongest origin of self-efficacy is vicarious experiences in which learning occurs by watching a person successfully perform a behavior (Bandura, 1990; Bandura, 2004). The method that has the greatest influence upon perceived self-efficacy is mastery experiences (Ball, & Martin, 2012; Bandura 1990; Bandura, 2004).

Mastery experiences are derived from an individual’s personal experiences of successfully performing a behavior or achieving a goal that was previously unattainable (Bandura, 1990; Ozer & Bandura, 1990). These types of experiences influence a person’s beliefs regarding his or her capability to achieve more difficult tasks, and are experienced as rewarding.
success (Bandura, 1990; Ozer & Bandura, 1990). An example of a mastery experience can simply be a person learning a new set of skills or achieving a certain goal, like learning to paint a picture or fix a car, where there is little experience of failure during the process. The success of such experiences can strengthen a person’s self-belief that he or she can take on more challenging skills or attain new goals. Through these mastery experiences, a person’s perceived self-efficacy is increased, and the person seeks out situations that provide ongoing mastery experiences (Bandura, 1990).

One of the key roles of self-defense training is to empower a person; mentally, emotionally, and physically to successfully deal with a potentially violent situation. SCT maintains that mastery experiences are central to personal empowerment, which instills an enduring sense of self-efficacy (Bandura, 1990; Ozer & Bandura, 1994; Bandura, 2004). In applying SCT to self-defense training, one of the ways to promote mastery experiences is through acquisition of a motor skill. Studies have shown that providing self-defense training in a structured manner that adheres to a skill-challenge balance provides ongoing experiences of success (Ozer & Bandura, 1990; Bandura, 2004; Ousely, Shurfor, & Roberts, 2013).

The successful learning of self-defense skills, fostered in a positive learning environment, will be creating mastery experiences that promote ongoing learning. Previous research has also shown that motor learning is also key to increasing a person’s performance and attainment of a new skill (Abernathy, Schorer, Jackson, & Hagemann, 2012; Gabbett & Masters, 2011; Masters, Poolton, Maxwell, & Raab, 2008). Providing a person with a set of motor skills and abilities that lead to increased self-efficacy promotes greater perceived control. Ensuring that the learning environment a self-defense
training program employees can enhance a person’s belief about learning a new set of motor
skills.

The field of motor learning and control has identified two forms of learning that can
influence a person’s ability to learn a new skill. Those two learning types are implicit learning
and explicit learning. Explicit learning is defined as the acquisition of knowledge in a conscious
and intentional manner (Dienes & Perner, 1999). In an explicit learning environment a person’s
acquisition of new skills is based upon a set of rules or regularities linked to the task (Stadler,
1997; Rendell, Farrow, Masters, & Plummer, 2011; Stevens, Anderson, O’Dwyer, & Williams,
2012). Explicit learning is described as declarative knowledge, where a person learns ‘what to
do’ when performing a skill (Magill, 2007, p. 229; Dienes & Perner, 1999; Stadler, 1997;
Rendell, Farrow, Masters, & Plummer, 2011). Sports environments where a coach provides
athletes with a lot of verbal instruction and rules for playing the sport is an example of an explicit
learning environment.

In a self-defense program, such as a martial arts class or standardized self-defense
program, instructors will often provide instruction in an explicit manner. It is not uncommon for
a self-defense instructor to provide verbal instruction that directs a novice learner in how to
perform a skill, and the rules associated with that skill. The information provided to a novice
learner, in a self-defense program, is normally very direct and specific to achieve the goal of that
person learning how to defend themselves. Nonetheless, research focused on the nature of
learning has provided sufficient evidence to indicate that not all knowledge is acquired explicitly.

Research has shown that providing instruction in an implicit versus explicit manner can
create an environment that promotes successful learning of new skills (Mattar & Gribble, 2005;
Implicit learning is essentially the opposite of explicit learning. Implicit learning is defined as learning with unconscious awareness that is absent of explicit rules and cues (Stadler, 1997; Seger, 1994; Reber, 1992). Research shows that when a person learns implicitly, he or she may not be able to verbalize how, but would be able to demonstrate the learned skill (Stadler, 1997; Seger, 1994; Dienes & Berry, 1997).

An example of implicit learning is teaching a child how to ride a bike. During the instructional phase, the parental figure may have difficulty telling the child on how to ride a bike. The parental figure may tell the child to pedal and assist with balance. Still, the parental figure will encourage the child to get on the bike and feel-out how to work the mechanics of riding a bike. Through the experience of being on the bike the child learns how to ride the bike through doing and feeling what it means to balance. Feeling and learning without specific instruction is learning in an implicit manner how to ride a bike. Although the child may not be able to verbalize how he or she rode the bike, the child can demonstrate the skill successfully.

Implicit learning is based on procedural knowledge, where a person learns ‘how’ to perform a skill or movement (Magill, 2007, p. 229; Poolton & Zachry, 2007). In an effort to promote a successful self-defense training program the use of implicit versus explicit learning styles might be beneficial. Initially, research conducted on implicit versus explicit learning, argued that explicit learning led to greater skill acquisition, compared to implicit learning (Gabbett & Masters, 2011; Masters et al., 2008; Poolton & Zachry, 2007). The little research that has been done on the application of an implicit versus explicit learning environment has applied both learning styles to coaching (Poolton & Zachry, 2007; Gabbett & Masters, 2011).
Gabbett & Masters (2011) demonstrated that an implicit learning environment facilitated a role in higher-performance and skill acquisition.

Gabbett & Masters (2011) argued that implicit learning lead to retention in skill acquisition and performance. The researchers ascertained that an implicit learning environment led to more consistent performance over time, and better management of fatigue and psychological distress (Gabbett & Masters, 2011). Gabbett & Masters (2011) also maintained that athletes coached in an implicit manner were able to multi-task better during performance, compared to those taught in an explicit manner. Gabbett & Masters (2011) found that using an implicit coaching style had a positive impact on an athlete’s performance and ability to respond to psychological stress. The study also indicated that implicit learning can assist in improving a person or athlete’s performance. Other studies examining explicit learning have demonstrated that emphasizing this learning type can give rise to self-awareness and rule association or willed-action (Dienes & Perner, 1999). Willed-action is when a person consciously pays attention to the selections associated with that action. Research indicates that implicit as well as explicit motor learning can impact a person’s actions and behaviors to learn and perform a new skill, or engage in a new behavior.

Utilizing implicit learning in a martial arts and self-defense program requires the instructor to provide physical demonstration, cues that promote imagery of the task, and the use of analogies (Angleman, Shinzato, Hasselt, & Russo, 2009; Liu, 2003). An instructor will use these implicit tactics to promote kinematic learning of the skill. The cues that promote kinematic learning and imagery are usually action words that prompt a learner to act intuitively. This prevents a learner from overthinking his or her actions, and does not place too many attentional demands on performing the task (Gabbett & Masters, 2011). The use of such tactics promote
learning with little awareness, and teach the learner to adapt in a variety of situations (Liu, 2003; Angleman, Shinzato, Hasselt, & Russo, 2009; Gabbett & Masters, 2011). It also provides the learner with a sense of competency and ability to learn from errors made, and correct those errors in the moment (Liu, 2003; Shireman, 2010; Gabbett & Masters, 2011).

An example of some of the action-oriented cue words used in martial arts are ‘fighting stance,’ ‘rising or high block,’ ‘knife-hand strike,’ ‘hammer-fist strike,’ ‘hook or hooking punch,’ ‘flying side kick,’ and ‘snapping kick (Oyama, 1970; Stanford Jujitsu Club, 2011).’ The terminology used in self-defense and martial arts classes are not just technical terms for the techniques, but are meant to initiate the action. Where an explicit environment would primarily use detailed attack scenarios and technical use of the terminology, an implicit environment would not. Analogies used in an implicit manner are also meant to promote visualization and imagery of an attack scenario, just not as detailed.

The analogy also allows the learner to use imagery to visualize an attack from a kinematic viewpoint and react appropriately to imagined event. An explicit analogy will provide explicit details about the attack situation, and steps on how a person should respond appropriately to the attack. An implicit analogy will encourage a person to imagine an attack situation, and then allow the person to respond based on the skills he or she has been taught. For instance, a self-defense or martial arts instructor might use the following analogy for blocking a punch: “to imagine your arm is an iron bar, rising high to stop the oncoming blow.” The use of analogies, again, allows for the person to focus more on responding naturally, rather than on each step needed to perform the task (Gabbett & Masters, 2011).
Therefore, promoting an implicit versus explicit motor learning environment could have a marked influence on a self-defense training programs, and enhance performance. In addition, a participant’s perceived self-efficacy could be enhanced through an implicit versus explicit learning style. Thus, leading to a greater increase in positive affect and subjective well-being for the participant involved (Ozer & Bandura, 1990; Bodin & Martinsen, 2004; Laureano, Grobbelaar, & Nienaber, 2014).

The present study builds upon previous research by examining the effects of self-defense training on self-efficacy, affect, and subjective well-being. In addition, the study takes previous research further by examining the role of implicit versus explicit learning and its effects on self-efficacy, affect, and subjective well-being. By combining implicit and explicit motor learning with a self-defense intervention, the present study has worked to fill a void within research and contribute to the knowledge base. At the present, very little research has been conducted on the benefits of self-defense using two different types of motor learning. This allows the current study to evaluate the two learning types, benefits each have on self-defense instruction, and on those participating in a self-defense program.

Purpose of the Study

The purpose of the study was two-fold. Purpose 1: To examine the effects of a six week self-defense training program on perceived self-efficacy, positive affect, negative affect, and subjective well-being. Purpose 2: Evaluate the effects of an implicit motor learning environment versus explicit motor learning environment on skill acquisition, perceived self-efficacy, affect, and subjective well-being.
Hypothesis

In conjunction with the studies overall purpose the study proposed four hypotheses. Hypothesis 1: Engaging in a six-week self-defense training program will lead to an increase in perceived self-efficacy. Hypothesis 2: Providing a self-defense training program in an implicit learning environment will lead to an increase self-efficacy and greater acquisition of self-defense skills compared to an explicit learning environment. Hypothesis 3: Engagement in a self-defense training program provided in an implicit versus explicit learning environment will lead to an increase in positive affect, and a decrease in negative affect. Hypothesis 4: An implicit self-defense learning environment will lead to an increase in subjective well-being, compared to an explicit self-defense learning environment.

Significance of the Study

Minimal research has examined the relationship between implicit/explicit motor learning and perceived self-efficacy. Additionally, no studies have examined the effectiveness of a self-defense training program that employed implicit versus explicit learning styles. Research that has been conducted on implicit learning versus explicit learning has primarily been focused on memory, grammar, or basic motor performance. Little research has been conducted to evaluate the effects implicit versus explicit learning have on mediators of behavior, such as self-efficacy and outcome expectations. It is for this reason that the present study seeks to examine the impact implicit/explicit has on self-efficacy.

The knowledge base regarding research on self-defense training and the benefits of self-defense training has grown over the years. Studies often examine the impact of self-defense training on a participant’s self-efficacy, trait anxiety, and on decreasing fear of sexual assault
(Weitlauf, Smith, & Cervone, 2000; Hollander, 2010; Ozer & Bandura, 1990). The current study takes previous research further by examining the impact of raising self-efficacy through a self-defense program on affect and subjective well-being. The study builds upon previous research regarding implicit and explicit motor learning.

Limitations & Delimitations

There are some identified limitations to the current study. The first limitation noted, is that the study consisted of a small sample size. In the recruitment process, the researcher had difficulty obtaining a larger sample size, which could impact the study’s overall significance. The current study tried to address this limitation by providing the self-defense program through the Vidant Wellness Center.

A second limitation was the participant’s viewpoint regarding self-defense training. Even though the researcher did not directly evaluate the participant’s perception of self-defense or self-defense training. The way that a participant perceives self-defense and the expectations upon learning self-defense could have impacted that participant’s learning of self-defense. A participant’s motivation level to engage in self-defense training could have hindered or facilitated the learning of new skills.

Therefore, the participant’s view of self-defense training could have influenced his or her response during the study and influenced the results. This would also depend on whether or not the participant had previous experience with the topics or techniques covered in the self-defense training program. It would also depend on if the participant’s previous experience had been one that was positive or negative. A third limitation noted was a participant’s previous experience with self-defense training in general. Similar to a person’s preconceived notions regarding self-
defense, a person with previous training might believe he or she already has the skills associated with self-defense. The previous self-defense training a person has could either facilitate or hinder, his or her willingness to learn or train.

Another limitation was the difference in the two self-defense skills tests provided mid and post the six week self-defense program. The first self-defense skills tests provided to both training groups was less complex, than the second self-defense skills tests. The first skills test focused on testing simple self-defense skills learned at the beginning of the self-defense program. The second skills test evaluated a participant’s abilities to perform more complex self-defense skills. This was noted to be a limitation, as the two skills tests were different and did not test the same skills at each time point. The fact that the two self-defense skills tests were different is not uncommon for evaluation purposes. Most self-defense programs start off teaching simple skills as the foundation for leading into more complex ones. Therefore, evaluating the participant’s ability to perform simple tasks first would allow the self-defense instructor to know if the participant could move forward with learning more complex skills.

Another limitation identified was that the self-defense program was provided by a single instructor. The single instructor taught both self-defense groups, providing a different style of instruction to two different training groups. Based on the instructor’s skills and teaching style, the instructor could have impacted the study. Lastly, the researcher did not conduct any pre-tests for baseline testing of a participant’s self-defense skills. The decision to not conduct pre-tests was due to the fact that without training, the participant’s baseline self-defense knowledge could not be evaluated. Therefore, the participants were only tested mid and post the six week program.
Several delimitations of the current study existed. First, the study was conducted at the Vidant Wellness Center, and offered at a time convenient for the facility. Secondly, the participants were required to be physically fit enough to complete the self-defense program, and not have any medical constraints that would prevent otherwise. Thirdly, participants had to complete the entire self-defense training program, and engage in all aspects of the self-defense training. Participants were also required to complete all of the testing measures assessing skill acquisition, self-efficacy, affect, and subjective well-being. Finally, participants were required to be mentally and emotionally stable enough to engage in the study. Although, the study did not assess the participants for mental and emotional stability, for the safety of the participants, this was a requirement.

**Definition of Terms**

To provide a clear understanding the following terms will be defined:

- **Affect**: A physiological response to a set of stimuli that evokes an expressed or observed emotional response and/or feeling state.

- **Elderly/Older Adult**: A person identified as being 60 years of age and older.

- **Explicit Motor Learning**: The acquiring of knowledge in a conscious manner, leading to skill acquisition based upon a set of rules or specified cues that can be easily verbalized. For example, learning to drive requires the use of rules and verbal instruction. Any knowledge obtained on how to drive would be explicit. Similar in sport, a novice athlete receives a lot of instruction on how to develop and learn a skill, like learning to hit a golf ball or baseball. The acquisition of motor skills would be obtained through explicit motor learning.
- Implicit Motor Learning: Is learning with little to no conscious awareness or the acquiring of knowledge in an unconscious manner, absent of explicit rules, is not easily verbalized, and places little to no demands on attentional processes. For example, a person learning to ride a bike or swim for the first time engages in implicit motor learning. Although some initial instruction may be given, the learner must engage in the activity to truly learn how to perform these motor activities successfully.

- Mastery Experience: Are personal experiences of successfully performing a behavior or achieving a goal that was previously unattainable, and incites a person to seek out more complex learning experiences.

- Rape: The unlawful compelling of an individual, either by pressure or force, to engage in sexual intercourse.

- Self-Defense: The legal definition is the use of reasonable force to protect one’s own person, family, or personal property against injury from another or a threatened attack.

- Self-Defense Training: Per the National Coalition Against Sexual Assault (2013), self-defense training is the gaining of certain verbal and physical skills, assertiveness skills, and awareness skills that include safety techniques and physical techniques. The training assist a person to successfully resist, prevent, survive, or escape a threatening situation or an attack by another.

- Self-Efficacy: A person’s perceived confidence to successfully perform a behavior or task, in order to achieve a specific outcome or goal.
• Sexual Assault: Where a person is forced, coerced, or threatened against their will to engage involuntarily in a sexual act.

• Social Cognitive Theory: A theory used in psychology that examined the factors and mechanism; such as perceived self-efficacy, outcome expectations, and social as well as perceived facilitators that mediate a person’s behaviors and actions to engage in an activity, learn a new skill, or attain a new goal. The theory conjectures that knowledge is based on a person’s observation, social interactions, personal experiences along with outside influences, and is often applied to goal setting and exercise behavior.

• Subjective Well-Being: A person’s perception regarding his or her quality of life; both physically as well as emotionally and mentally.

• Victimization: to make someone a victim, becoming a victim, or a person in the process of being victimized.
CHAPTER 2: REVIEW OF LITERATURE

A challenge faced by modern society is violence and violent situations that could lead to premature death. Identified as a public health concern by the Centers for Disease Control and Prevention, violence is an issue that has a profound impact on the individual and community. The issue that beset many communities in dealing with the issue of violence is how to address this successfully. Self-defense training programs have been shown to provide the knowledge and skills to handle situations of violence and violent crimes. Self-defense training can come in many forms, from physically structured programs to martial arts and kickboxing classes. The benefits of learning self-defense have been noted to have a positive impact on a participant as well as learning environment.

A large amount of research has shown that there are two ways in which a person can learn and obtain knowledge about performing a motor skill. The two ways identified by the field are explicit and implicit learning. Each learning style has been shown to benefit and enhance the performance of a motor skill. Understanding how these two learning types could compliment a self-defense program is beneficial to addressing the issue of violence. In addition, identifying the impact that implicit and explicit learning might have on a person’s self-efficacy, affect, and subjective well-being could assist in developing more effective advance in self-defense programs.

In upcoming sections, a review of literature will be conducted to further examine violence as a public health concern, and implicit versus explicit learning. The importance of raising a person’s self-efficacy, and how implicit/explicit learning can influence this will also be discussed. Additionally, the impact of self-defense on self-efficacy, and how each influence
affect and subjective well-being will be reviewed. Understanding the effects of implicit and explicit learning and self-defense on each variable, found in previous research, is the basis of this study that will be made evident.

Violence: A Public Health Concern

The Federal Bureau of Investigation (2013) reports that violent crimes have increased in the last two years, since 2012. Due to the impact violence has on communities and individuals, the Centers for Disease Control and Prevention (CDC) (2014) have declared violent crimes as a major concern of public health. Violent crimes are normally described in terms of homicide, sexual and physical assault, elder abuse, domestic violence, and even suicide (CDC, 2014). The CDC defines violent crimes as offenses that involve force or threat of force (FBI, 2013; CDC, 2014). Studies examining the impact of violent crimes on society often examine the psychopathology of criminals, and any trends within society contributing to violent crimes (Brown, 2001; Fajnzylber, Lederman, & Loayza; 2002). Research conducted on violent crimes look to examine how violent crimes can either be prevented or addressed, and any mediators that could decrease violence (Brown, 2001; Fajnzylber, Lederman, & Loayza; 2002).

A research article by Max Crowley (2013) evaluated crime prevention strategies that could be used to address violence and violent crimes. Crowley conducted a review of literature, focusing on current state of crime prevention programs and policies. The results of the investigation revealed these programs are not truly addressing the staggering burden crime places upon the public (Crowley, 2013). He also noted several trends among strategies being used to counter violent crimes. One was the growing trend of the use of and development of crime prevention programs focusing on youth (Crowley, 2013). He also noted that many prevention
programs were incorporating the use of public health services to address and deter violent crimes (Crowley, 2013). By addressing the needs of the youth and individuals in the community, crimes associated with violence can be effectively reduced. Crowley also maintains that implementation of public policies, additional education, and developing cost effective crime prevention programs will also assist in addressing the issue of violence (2013).

A type of crime prevention program commonly used to tackle violence and violent crimes is self-defense training programs (Smith, 1994; Thompson, 2014; Anderson & Whitson, 2005). Self-defense training is often used to empower communities and individuals to decrease fear of violence, and reduce anxiety towards assault (Weitlauf, Smith, & Cervone, 2000; Bodin & Martinsen, 2004; Angleman, Shinzato, Van Hasselt, & Russo, 2009). However, specific methodology of how a self-defense training program is provided can impact the effectiveness of dealing with violence (Ozer & Bandura, 1990; Anderson & Whitson, 2005). Yet, before the discussion can go further, an examination of the two types of motor learning must be considered.

*Implicit Motor Learning*

Implicit learning and its role upon cognitive function has been a focus of research since 1967. The psychologist Authur S. Reber (1991, 1992, 2013) conducted some of the first studies and provided the first evidence for implicit learning. Implicit learning is defined as procedural knowledge that is absent of rules and instruction, difficult to verbalize (Reber, 1991; Reber 1992). Information gained from implicit learning is often through an unconscious awareness (Reber, 1992; Seger, 1994). The studies conducted by A. S. Reber (1992) determined that behaviors or skills gained through implicit learning were evident in individuals diagnosed with
Autism or suffering from a traumatic brain injury (TBI). Individuals suffering from Autism or a TBI would demonstrate the ability to perform a tasked learned, without being to identify or verbalize how. These studies conducted led to additional research involving implicit learning, and the role it plays in motor functioning and skill acquisition. Reber’s contribution to the study of implicit learning paved the way for future research, and identified the topic as a field of study.

Another psychologist, Carol Seger (1994) examined implicit learning by evaluating the role implicit learning plays within various learning tasks. Seger (1994) also defined implicit learning as a method for obtaining information in an incidental or unconscious manner. Seger (1994) maintained that implicit learning led to learning that was more robust and long-lasting. Seger came to this conclusion based upon a review of literature conducted on the subject matter. An example of implicit learning given by Seger (1994) is obtaining knowledge through a novel pattern, or through visual or visuospatial stimuli. The use of a serial reaction time (SRT) was commonly used to test whether or not subjects learned implicitly. The use of this testing measure was often utilized to evaluate the subject’s ability to verbalize what was learned. These SRT studies discovered that the reaction time for participants often decreased due to the lack of awareness associated with implicit learning (Seger, 1994).

Seger’s (1994) also examined the cognitive areas of the brain associated with implicit learning. The review of literature revealed that implicit learning was linked to procedural memory and non-declarative memory (Seger, 1994). This relationship between procedural memory and implicit learning seemed to have a direct impact on various motor learning tasks. The effects of procedural memory on motor learning tasks was found to be in habituation of the skill and in modalities that provoked a prediction response (Seger, 1994).
In regards to motor learning, Seger discovered evidence for implicit learning through studies that assessed amnesiacs. These studies demonstrated that amnesiacs were able to learn implicitly, regardless of the lack of prior skill or knowledge of the task; due to memory loss (Seger, 1994). This was evidenced by the amnesiac participant being able to track a pursuit rotor without prior knowledge of how to do so (Seger, 1994). Studies examining artificial grammar-learning and sequence-learning tasks also demonstrated that implicit learning occurred (Frensch and Runger, 2003). These studies found that even though a participant was unable to verbalize how or why such learning occurred the skill or knowledge was still evident (Frensch and Runger, 2003).

Implicit learning plays an important role in working memory and long-term memory (Seger, 1994). Knowledge obtained through implicit learning was shown to be retained longer, and could be recalled successfully, even after a period of time (Seger, 1994). Again, Seger (1994) noted that implicit learning occurred with little to no conscious awareness of the method. It was also determined that implicit learning placed very little demands to a person’s attentional processes (Seger, 1994). Seger concluded that implicit learning was a crucial component to learning, and was necessary to obtaining simple to complex forms of knowledge (1994).

A review of literature by Dienes & Perner (1999) on implicit learning provided similar findings. Dienes & Perner (1999) found, like Seger, that implicit learning was associated with lower forms of thought processes, such as procedural memory. An example provided by Dienes & Perner (1999) was a study that presented subjects with a series of trials. During these trials, stimuli was either presented or not. The study demonstrated that subjects responded to stimuli, even without knowing that they had done so (Dienes & Perner, 1999). Implicit learning was found to be automatic in action, and produced unintentionally by the learner (Dienes & Perner,
Dienes & Perner concluded that implicit learning occurred below a subjective threshold (1999). Again, this implied that implicit learning occurred through a lack of awareness by the learner, and did not require the use of rules or instruction.

To gain a better sense of how implicit leaning is achieved, the mechanisms associated with such learning and awareness must be further examined. Based on another literature review, Frensch & Runger (2003) discussed five different roles that existed between implicit learning and awareness. The first role was that a relationship existed between implicit and explicit learning and awareness (Frensch & Runger, 2003). The second role was that a singular learning mechanism, implicit or explicit, was responsible for the controlling of behavior (Frensch & Runger, 2003). The third role was that implicit and explicit learning as a singular mechanism led to memory representations (Frensch & Runger, 2003). The fourth role identified was that as awareness increased through implicit learning and memory representations, so did explicit knowledge of the task (Frensch & Runger, 2003).

Frensch & Runger (2003) stated that explicit knowledge led to further control of behavior, and input into the operations of implicit learning. However, the memory representations created by implicit learning ultimately lead to greater awareness (Frensch & Runger, 2003). The researchers noted that as memory representations continued to develop learners gained awareness of obtaining those memory representations, but not all (Frensch & Runger, 2003). Frensch & Runger concluded that all learning stemmed from both implicit and explicit learning mechanisms (2003). However, when it comes to the transfer of knowledge, stated that knowledge gained implicitly was not easily generalized to other tasks (Frensch & Runger, 2003). The researchers determined that what a participant might learn implicitly in one task, may not transfer to another (Frensch & Runger, 2003).
A study by Kaufman, DeYoung, Gray, Jimenez, Brown, & Mackintosh (2010) examined implicit learning as an ability that influenced person’s skills and behaviors. Specifically, Kaufman et al. (2010) aimed at investigating the individual cognitive and behavioral differences associated with implicit learning. Kaufman et al. proposed four different hypotheses. The first hypothesis was that psychometric intelligence was correlated to explicit associative learning (Kaufman et al, 2010). Secondly, that implicit learning was linked to processing speed and other measures of cognitive performance, rather than working memory or psychometric intelligence (Kaufman et al, 2010). Next, that implicit learning was associated with two behavioral components, openness and intuition (Kaufman et al, 2010). Lastly, that implicit learning was also positively correlated with impulsivity and a lack of premeditation (Kaufman et al, 2010).

Kaufman et al. (2010) conducted a serial reaction time (SRT) to test each of the hypotheses associated with the research question. The study examined 153 participants (106 females and 57 males) with a mean age of 16.9 (SD=.65). The design and methods of the study required participants to engage in three SRT tasks, with each session lasting 1.5 hours. The SRT task consisted of a series of four points presented to participants on a computer screen. Participants were then asked to touch a key on a key pad corresponding to the stimuli presented, as fast and quickly as possible. The sequence of stimuli, unknown to participants, was presented in a repeating manner 15 percent of the time, with sequences alternating. Participants completed 8-blocks of 120-trials each, for total of 960 trials.

The study measured a variety of factors: psychometric intelligence, elementary cognition abilities, explicit associative learning, processing speed, academic achievement, and personality. The results of the study by Kaufman et al. (2010) showed that explicit learning was linked to associative learning. The results also revealed that implicit learning was positively associated
with verbal reasoning, processing speed, and was linked to an individual openness and intuition (Kaufman et al, 2010). Based on the results, Kaufman et al. (2010) ascertained that implicit learning was not linked to associative learning, working memory, self-related memory, or psychometric intelligence. The researchers concluded that implicit learning was responsible for an individual’s openness to an experience, the construct of intuition, and decision-making absent of premeditation (Kaufman et al, 2010).

In a study by Shea, Wulf, Whitacre, & Park (2001) the importance of implicit learning on acquisition of complex motor skills was highlighted. Shea et al. (2001) conducted two different experiments in an effort to examine the link between complex motor skill learning and implicit learning. In Experiment 1 the researchers investigated whether implicit learning occurred during the learning of complex movement (Shea, Wulf, Whitacre, & Park, 2001). For the first study, the Shea et al. (2001) tested fifteen university students using a stabilometer for acquisition of the task.

The task for this experiment consisted of four practice days, a retention test, and a recognition test. During each of the four days of practice, participants completed two blocks, consisting of seven trials that lasted 75-seconds each. The practice trials required participants to stand on a platform facing a computer screen, where waveforms were presented. Participants were asked to view the waveforms and as the platform moved, keep the platform in sync with the waveforms. The retention test occurred 24-hours after the fourth day of practice, and consisted of four 75-s trials, same as the practice phase. Upon completing the retention test, participants were interviewed. The interview determined if they had become aware of certain repeated segments used in the task (Shea, Wulf, Whitacre, & Park, 2001). Immediately following the
interview, participants were asked to perform a recognition test. The recognition test was a five-trial test conducted the same as the practice and retention tests.

Results showed that participants increased in performance from the training phase to the recognition phase (Shea, Wulf, Whitacre, & Park, 2001). In addition, based upon the results of the interviews, the researchers discovered that participants were not aware of any increase in performance (Shea, Wulf, Whitacre, & Park, 2001). The researchers concluded that the results of the first experiment provided evidence in support of the fact that implicit learning had occurred (Shea, Wulf, Whitacre, & Park, 2001). In the second experiment, the researcher examined whether or not explicit instruction had had an impact on the participant’s learning (Shea, Wulf, Whitacre, & Park, 2001).

Repeating the test conditions of Experiment 1, Experiment 2 consisted of sixteen participants. The results from the final study found that explicit instruction actually had a negative effect on learning (Shea, Wulf, Whitacre, & Park, 2001). The researchers determined that providing prior explicit knowledge did not enhance performance, but rather hurt performance (Shea, Wulf, Whitacre, & Park, 2001). The researchers ascertained that implicit learning had to occur without true awareness or the involvement of too much explicit knowledge. A literature review by Gabbett & Masters (2011) provided additional insight into the role of implicit learning on performance.

The review examined the Australian National Rugby League (NRL), and the common issues that plague the league. In conducting the review, Gabbett & Masters (2011) evaluated the impact implicit learning had on an athlete’s overall performance in a high performance environment. Gabbett & Masters (2011) state that research has shown that an implicit learning
environment can decrease an athlete’s psychological stress and fatigue. The findings of previous research also revealed that an implicit learning environment could increase the athlete’s multi-tasking skills and decision-making abilities (Gabbett & Masters, 2011). Gabbett & Masters took their inquiry further by discussing implicit learning the various problems faced by coaches. The researchers proposed that providing an implicit learning environment could resolve common issues faced by coaches.

The first problem Gabbett & Masters (2011) identified was the superficial fixes utilized by a coach to address issues associated with a team’s performance. The researchers proposed that most coach’s use easy fixes to address problems with team performance (Gabbett & Masters, 2011). Many coaches do this in order to avoid blame for poor performance (Gabbett & Masters, 2011). The researchers assert that by focusing on long-term and short-term goals, a coach can promote the transfer of coping mechanisms and skills to a competitive environment (Gabbett & Masters, 2011). Yet to truly do this, Gabbett & Masters (2011) state that coaches must create an implicit learning environment that utilizes very little explicit or verbal instruction.

The second problem highlighted by Gabbett & Masters (2011) is that coaches are often quick to point out when an athlete fails at performing a trained skill. Gabbett & Masters (2011) argue that this undermines the athlete’s ability to learn from his or her mistake. Instead of providing immediate correction coaches should wait before saying anything (Gabbett & Masters, 2011). This allows the athlete to become unconsciously aware of his or her failed attempt, and gives the athlete an opportunity to independently correct those errors (Gabbett & Masters, 2011).

However, this does not mean that the coach should ignore an athlete’s failure to perform a trained skill properly. Rather, Gabbett & Masters (2011) state that the coach should wait to say
anything, while maintaining awareness of the athlete’s technical deficiencies. Allowing the athlete to trust his or her intuition regarding the failed skill attempt promotes an implicit learning environment (Gabbett & Masters, 2011). By using an implicit learning style of coaching, a coach is able to promote self-awareness within the athlete (Gabbett & Masters, 2011). Meaning, the athlete is able to learn in an implicit manner, which ultimately allows for better retention of the skill (Gabbett & Masters, 2011). To further promote an implicit learning environment, Gabbett & Masters (2011) encourage coaches to utilize the use of analogies. The researchers ascertain that by using analogies and invoking visualization or imagery the coach makes the skill less forgettable (Gabbett & Masters, 2011). Gabbett & Masters (2011) conclude that the use of an implicit coaching style and the creation of an implicit learning environment leads to greater performance in high-performance sport situations. Examination of the literature has shown that implicit learning can have an impact on a person’s cognition, behaviors, and physical performance. Studies involving implicit learning also demonstrate the benefits of an implicit learning environment. Similarly, studies examining explicit learning have purported the same. Researchers studying explicit learning maintain that explicit learning is a more effective method of learning than implicit learning. In the following section, the elements that constitute explicit learning and the benefits of this learning type will be discussed.

Explicit Motor Learning

Compared to implicit learning, a prolific amount of research has been done on explicit learning. Studies examining explicit learning has worked to understand how it influences and impacts learning behavior. Two researchers responsible for providing a thorough examination of explicit learning has been Dienes & Perner (1999). In a notable research article by Dienes & Perner, the researchers conducted a literature review, evaluating the explicit learning, starting
with its role on representational knowledge. Dienes & Perner (1999) indicate that just as implicit is associated with procedural knowledge, explicit knowledge is associated with declarative knowledge or higher forms of knowledge and processes. Again declarative knowledge is about ‘what to do’ when performing task (Dienes & Perner, 1999).

Studies also show that explicit learning is tied to hierarchal associations that lead to complex rule formation, whereas implicit learning is non-hierarchal in nature (Stadler, 1997; Dienes & Perner, 1999). Dienes & Perner (1999) further ascertain that explicit knowledge is indicative of short-term memory processes. Additionally, explicit learning is connected to goal-directed or willed action, and consciousness (Dienes & Perner, 1999). To further understand explicit learning, Yuh-Shiow Lee (1995) conducted four experiments manipulating the learning context of each to examine the role of explicit as well as implicit learning.

The four experiments conducted by Lee (1995) were identified as Experiment 1A, 1B, 2, 3, and 4. In Experiment 1A, Lee (1995) focused on determining when explicit/implicit learning occurred. The design of Experiment 1A consisted of four conditions: complex rule-line, complex rule-number, simple rule-line, and simple rule-number (Lee, 1995). Participants ($n=88$) were assigned to one of the four conditions, with each group consisting of 22-participants. Each group was asked to complete a performance test based on the condition. The performance test consisted of a learning phase and completion of a questionnaire. The learning phase had participant’s complete 30-trials of identifying correct input for each pair of outputs presented during each trial (Lee, 1995). Upon completion of the learning phase, participants completed a 12-item questionnaire that assessed what the participant had learned, explicit knowledge versus implicit, during that phase (Lee, 1995). After the questionnaire, the participant’s performance was assessed once more, followed by another questionnaire (Lee, 1995). The results of
Experiment 1A found that when the rules were complex implicit learning occurred, and when the rules were simple explicit learning took place (Lee, 1995). In Experiment 1B, Lee desired to confirm the validity of the questionnaires utilized in the complex task from Experiment 1A (Lee, 1995).

Lee (1995) questioned whether or not the questionnaires had somehow provided, explicit knowledge, and in doing so had influenced the results of the performance test. Experiment 1B consisted of 34-participants, which were randomly assigned to either an explicit-rule condition or a standard condition (Lee, 1995). The testing methods of Experiment 1B were similar to Experiment 1A; adding an explicit-rule condition. The standard condition was tested in the same manner as the complex rule-line condition used in Experiment 1A. The explicit-rule condition tested participants by providing instruction in the form of two formulas that participants used during the performance test (Lee, 1995). Again, participants of both conditions completed a learning phase of 30-trials, and were asked to provide input when presented with a pair of outputs. Two practice questions were provided at the beginning of each trial to the complex-rule condition. The same 12-item questionnaire used to assess learning of all the participants at the end of the learning phase. The results of Experiment 1B showed that the explicit-rule condition performed better than the standard condition (Lee, 1995).

For Experiment 2, Lee sought to determine if explicit learning along with implicit was influenced by rule instruction (Lee, 1995). The design of Experiment 2 consisted of four conditions; a complex task with rule-finding instruction, a simple task with rule-finding instruction, and two control groups with standard instruction (Lee, 1995). Participants (n=80) were assigned to one of three conditions, with 20-participants in each group. The design of Experiment 2 was the same as Experiment 1A, using the same methods to test each group. The
control groups was given only standard instruction during the experiment (Lee, 1995). The complex and simple task conditions were specific instruction on how to identify any patterns, between the input and output values (Lee, 1995). Each condition completed the same performance test as in Experiment 1A, and completing the questionnaires assessing learning. The results of Experiment 2 showed that providing rule-finding instructions caused participants to create explicit rules that produced inaccurate depiction of stimuli (Lee, 1995). In Experiment 3, Lee (1995) wanted to encourage participants to verbalize what they were thinking during the testing procedures. Lee (1995) predicted that the forced verbalization would increase a person’s explicit learning.

A total of 88-participants engaged in Experiment 3 that were assigned again to one of four groups: a silent group for complex task, silent group for simple task, a verbalization group for complex task, and a verbalization group for simple task (Lee, 1995). The verbalization groups were identified in Experiment 3 as explicit groups, and the silent groups were implicit groups (Lee, 1995). The design of Experiment 3 was similar to Experiment 2, with two primary differences. To control for a floor effect found in Experiment 2, participants in all four groups were told that a pattern existed between the input and output values (Lee, 1995). The verbalization groups were given additional instruction as opposed to the silent groups. First, the verbalization groups were instructed to think aloud when solving 10 of the 11-output questions. Secondly, the verbalization groups was asked to verbalize how he or she solved the output problems once completed. Analyzing of the data for Experiment 3, the results showed that the verbal group or explicit group demonstrated better performance at the task than the silent group or implicit group (Lee, 1995).
Experiment 4, the final experiment sought to investigate the impact of observational learning on both implicit and explicit learning (Lee, 1995). The final study consisted of 96-participants, which were again assigned to one of four groups. The groups consisted of the following: two standard groups for complex and simple tasks, and two observational learning groups for complex and simple tasks (Lee, 1995). Standard groups were explicit groups and observational groups were the implicit. The design of Experiment 4 for testing the standard group was the same as the procedures used in Experiment 3. The two standard groups were asked to complete 30-trials of 12-output questions each. The answers provided by the two standard groups were given to the two observational groups. The observational groups were tested in the same manner as the standard groups, 30-trials of 12-questions each, with the exception of two differences (Lee, 1995). The observational groups had the information from the standard groups, and were given a value to type in when responding to the output questions. The results of Experiment 4 showed that explicit learning was associated with simple-rule number and decision-making processes (Lee, 1995).

Lee (1995) concluded that explicit learning played a role in conscious representations of rules and manipulation of symbols. Yet, he also found implicit learning was linked to complex tasks, whereas explicit learning was linked to simple tasks (Lee, 1995). The research done on explicit learning demonstrates the complex nature of this learning type, in comparison to implicit learning. When it comes to motor learning, explicit learning has been linked to both egocentric and allocentric representations of spatial knowledge (Liu, Lungu, Waechter, Willingham, & Ashe, 2007).

Both egocentric and allocentric representations have been shown to support significant transfer for explicit knowledge to a spatial-oriented task (Liu, Lungu, Waechter, Willingham, &
Ashe, 2007). This is important, since egocentric and allocentric representations are related to spatial representations gained through explicit learning. The body of work regarding the research done on explicit learning is prolific. Yet, there is also a large body of work that examines the difference between explicit and implicit learning. A discussion of those differences will be emphasized in the upcoming section.

**Implicit versus Explicit Motor Learning**

The most recognized difference between explicit versus implicit learning is the different relationship each have with consciousness. As previously indicated researchers have linked explicit to conscious learning, and implicit to unconscious learning (Dienes & Perner, 1999). Another difference identified between the two learning types is the role implicit and explicit learning/knowledge plays on behavioral or propositional attitudes (Frensch & Runger, 2003). Research indicates that implicit learning is linked to a person’s behavioral responses to environmental stimuli, which generate specific knowledge representations (Frensch & Runger, 2003). Knowledge representations derived from statistical dependencies found within the environment then lead to propositional attitudes regarding the environment (Frensch & Runger, 2003). Evidence was provided that knowledge acquired through implicit learning can be acquired in an automatic or effortless manner (Frensch & Runger, 2003). Where explicit learning is derived from rule-based knowledge or instruction that is obtained in a very deliberate manner.

Studies have also demonstrated that the representations of attitude are explicit in nature, but the self from which the attitude derives is implicit (Frensch & Runger, 2003). Meaning implicit learning is the antecedent to behavior, and explicit learning is the demonstration of the
attitude that is the outcome. To take the subject further, recent studies have discovered that implicit knowledge can arise from a functional role that assists with the formation of explicit knowledge (Dienes & Perner, 1999). Researchers studying both implicit and explicit learning have also found that explicit instruction had a negative impact on a person’s overall learning (Shea, Wulf, Whitacre, & Park, 2001). Whereas promoting an implicit learning environment furthered the learning process (Shea, Wulf, Whitacre, & Park, 2001).

Research by Gasparini (2004) also provided evidence that learning could occur implicitly, rather than explicitly. The design of Gasparini’s study was a literature review, which focused primarily on studies that have examined second language (L2) learning. Gasparini (2004) maintained that during L2 learning, a person learned implicitly by deriving form information about the nature and structure of a material automatically. Meaning people can gain knowledge implicitly and impart that knowledge without knowing how one did so. Therefore, information obtained automatically eventually lead to explicit knowledge learning, particularly as L2 learning progressed (Gasparini, 2004). Implying that in order for explicit learning to arise implicit learning must initially take place. Gasparini concluded (2004) that after an initial exploratory phase, once implicit learning had occurred, explicit learning could then ensue. Operational differences between explicit and implicit learning have also been identified within various studies.

Jimenez & Mendez (2001) examined the difference between implicit and explicit learning by studying sequencing learning. The researcher’s hypothesized that explicit learning can have an inhibitory effect upon implicit sequence learning, which can override how a person acquires knowledge (Jimenez & Mendez, 2001). The study also hypothesized that unlike explicit learning, implicit learning would not have an inhibitory effect learning implicitly a set of
predictive contingencies (Jimenez & Mendez, 2001). To test each of these hypotheses, against their original theory, Jimenez & Mendez developed two experimental processes. The first experiment involved a serial reaction time task (SRT), a dual-task procedure (Jimenez & Mendez, 2001). Sixteen participants were recruited for the experiment and were assigned to implicit condition ($n=8$) and explicit condition ($n=8$). Each of the groups were run through eight sessions of a SRT task, made of 20 blocks of 155 trails. Once the SRT task was completed the study had participants complete a cued generation task (Jimenez & Mendez, 2001). The study also used a counting task to test the participants; which consisted of them counting and keeping track of particular trails (Jimenez & Mendez, 2001).

The results of the first experiment demonstrated that implicit sequence learning acted automatic in nature (Jimenez & Mendez, 2001). The analysis of the data showed that both conditions learned how to perform the SRT task, responding faster and more accurate over time. Yet, the implicit condition was shown to perform just as well as the explicit condition. The first experiment provided evidence for the fact that implicit learning was not affected by a participant’s explicit knowledge; regarding a competing cue (Jimenez & Mendez, 2001). Still, the researchers could not ascertain if the final results was skewed by the dual-task procedure. Or if implicit sequence learning was truly not hindered by explicit cues (Jimenez & Mendez, 2001).

Therefore, the researchers conducted the second experiment, using SRT task that consisted of a single-task procedure, to eliminate any doubt (Jimenez & Mendez, 2001). The second experiment consisted of the same number of participants ($n=16$), divided into the same two conditions: implicit ($n=8$) or explicit ($n=8$). All of the participants were tested through the SRT task (20 blocks of 155 trails), and a generation task (2001). The results of the second experiment supported the findings of the first experiment that implicit learning was not impacted.
by explicit knowledge (Jimenez & Mendez, 2001). The results of the second experiment showed a significant interaction between trial and condition (Jimenez & Mendez, 2001). Meaning that both conditions were influenced by the task, and experienced learning during performance. The findings of the second study indicated that the explicit condition used the information gained to respond more accurately to cues (Jimenez & Mendez, 2001). Whereas, even though the implicit condition had learned to respond to cues, this explicit knowledge did not impact the condition’s expression of implicit learning (Jimenez & Mendez, 2001).

Jimenez & Mendez noted that the overall findings of both experiments ultimately negated the study’s hypothesis. The study had hypothesized that conscious use of explicit knowledge would lead to implicit learning (Jimenez & Mendez, 2001). However, the results of both studies did not support the researcher’s theories regarding the role of explicit knowledge on implicit learning. This indicated to the researchers that explicit knowledge did not impact nor hinder any expression of implicit learning (Jimenez & Mendez, 2001).

Jimenez & Mendez (2001) concluded that explicit learning was hindered by attentional load, while implicit learning was not. To further determine differences that exist between implicit versus explicit learning researchers employ the use grammar-learning or sequence learning tasks. Reber, Walkenfeld, & Hernstadt (1991) explored how implicit and explicit learning impacts individual differences in performance. The aim of the study was to provide further understanding into the cognitive processes that differentiate implicit from explicit learning (Reber, Walkenfeld, & Hernstadt, 1991).

To answer their research question, Reber, Walkenfeld, & Hrnstadt (1991) had twenty-seven subjects (8 males and 19 females; mean age 18.48) complete an implicit and an explicit
task. The implicit task involved a standard artificial grammar-learning task, whereas, the explicit task includes a series-completion problem-solving task (Reber, Walkenfeld, & Hernstadt, 1991). Once all of the participants had completed both tasks, they were asked to complete four subsets of the WAIS-R. The WAIS-R or Wechsler Adult Intelligence Scale-Revised is an IQ test, used to measure the relationship between intelligence and the performance tasks (Reber, Walkenfeld, & Hernstadt, 1991). The results showed that IQ correlated strongly with the explicit tasks, $r=.69$, $p<.01$, but not with the artificial grammar-learning task, $r=.25$, $p>.05$ (Reber, Walkenfeld, & Hernstadt, 1991). Analysis of the data showed that implicit learning occurred outside of a person’s knowledge base (Reber, Walkenfeld, & Hernstadt, 1991). In addition, those learning implicitly do so without awareness, while explicit learning occurs in a conscious manner; correlating with the results of the IQ tests (Reber, Walkenfeld, & Hernstadt, 1991).

Ziori & Dienes (2012) used concept learning to examine the development and relationship of implicit versus explicit learning and knowledge. To do so, the researchers examined the passage of time that is required for implicit and explicit learning (Ziori & Dienes, 2012). The overall goal of the study was to determine how concept learning developed implicitly and explicitly; through continued exposure to category paradigms (Ziori & Dienes, 2012). To conduct such an experiment, the researchers used a mixed model design (Ziori & Dienes, 2012). The mixed model design consisted of a $2 \times 2 \times 2 \times 8$ (prior knowledge [Coherent vs. Incoherent] by task load type [Single vs. Secondary] by stimulus set [salient stimuli vs. non-salient stimuli] by time [block A vs. block B vs. block C vs. block D vs. block E vs. block F vs. block G vs. block H]) (Ziori & Dienes, 2012). The stimulus part of the study was provided through the use of two categories, a salient category and non-salient category (Ziori & Dienes, 2012).
The study had a total of ninety-six participants, identified as undergraduate students, engaged in the study. Participants were randomly assigned to one of eight conditions: coherent salient stimuli, coherent non-salient stimuli, coherent single condition, coherent dual condition, incoherent salient stimuli, incoherent non-salient stimuli, incoherent single condition, and incoherent dual condition (Ziori & Dienes, 2012). The eight conditions were then used to test the implicit-explicit distinction when exposed to ongoing stimuli. Salient stimuli were provided a set of examples meant to activate prior knowledge (Ziori & Dienes, 2012). While, the non-salient conditions were not given any examples during the study, so as to not activate prior knowledge (Ziori & Dienes, 2012). In addition, the dual conditions required participants to complete a dual-task procedure, whereas the single condition was a single-task procedure. The design of the study had participants learn to distinguish between the different sets of paradigms, and categorize the exemplar into either category 1 (salient category) or category 2 (non-salient category) (Ziori & Dienes, 2012). There were a total of six sets of paradigms, although the participant was only exposed to one (Ziori & Dienes, 2012).

The results of the study revealed that the coherent conditions performed better (77% vs. 69%), than the incoherent conditions, F(1,88)=11.97, p=.001 (Ziori & Dienes, 2012). The results also showed that the dual-task procedures interfered more with accuracy of performing the task, F(1,99)=94.76, p<.001 (84% single-task condition vs. 62% dual-task condition); than the single-task condition (Ziori & Dienes, 2012). The participants in the salient conditions were also shown to respond more precisely (78% vs. 68%), than the non-salient conditions, F(1,88)=17.79, p<.001 (Ziori & Dienes, 2012).

At the end of the study, Ziori & Dienes (2012) concluded that implicit knowledge remained the same, and that explicit knowledge increased over time. The researchers maintained
that the results showed that implicit knowledge decreased over the course of a person’s training, while explicit learning increased (Ziori & Dienes, 2012). This is particularly concerning when considering the impact of implicit versus explicit learning on motor performance. However, as Ziori & Dienes indicated the results of the study were linked to category paradigms.

Masters, Poolton, Maxwell, & Raab (2008) examined whether implicit learning improves motor performance; in close temporal proximity. Masters et al. (2008) proposed that a novice learning implicitly may develop better decision-making and execution skills, than someone learning explicitly. The researchers hypothesized that those learning implicitly would show steady improvements in performance over time (Masters, Poolton, Maxwell, & Raab, 2008). Masters et al. (2008) also hypothesized that a person learning explicitly would demonstrate a decline in performance over time. Finally, Masters et al. (2008) claimed that the implicit group would show less explicit knowledge about what had been learned, than the explicit group. The study included 35 participants that were undergraduate students, with a mean age of 21.3 years.

The participant’s for the study were randomly assigned to either an analogy (n=17) or explicit (n=18) condition (Masters, Poolton, Maxwell, & Raab, 2008). The design of the study used tennis table task, involving the performance of a topspin forehand shot, to test the participants (Masters, Poolton, Maxwell, & Raab, 2008). In regards to learning how to perform the shot, the explicit group was provided with a specific set of instruction. The researchers gave the analogy group or implicit group a singular analogical piece of instruction regarding the task (Masters, Poolton, Maxwell, & Raab, 2008). During the testing procedures, a total of 300 trails in fifteen 20-trail blocks were completed by each participant (Masters, Poolton, Maxwell, & Raab, 2008). The study measured the participant’s motor performance, kinematic performance, and declarative knowledge (Masters, Poolton, Maxwell, & Raab, 2008). The results of the study
found that explicit learning provided more movement-related knowledge, than implicit learning through analogical instruction (Masters, Poolton, Maxwell, & Raab, 2008).

The study’s results also showed that implicit learning produced greater processing of information and decision-making, than explicit learning (Masters, Poolton, Maxwell, & Raab, 2008). The study’s findings further demonstrated that in regards to kinematic movement the explicit group increased in performance error (Masters, Poolton, Maxwell, & Raab, 2008). Yet the explicit learning group decreased in speed, from pre to post the intervention (Masters, Poolton, Maxwell, & Raab, 2008). Masters et al. (2008) concluded that implicit learning had a stronger impact on performance, allowing for greater motor control; than explicit learning. Harrington & Haaland (1992) evaluated implicit versus explicit learning in the elderly, when it came to memorization of a motor sequence. The aim of the study was to determine if there was a difference among the elderly when it came to implicit versus explicit learning and memory recall (Harrington & Haaland, 1992). The study also looked to see if explicit memory learning assisted with implicit memory, to assist the elderly with learning a specified sequence (Harrington & Haaland, 1992).

The study examined 24 women and 22 men (N=46) with a mean age of 20.9 years to 24 elderly women and 21 elderly men (N=25) with a mean age of 77.2 (Harrington & Haaland, 1992). The two groups, young and elderly groups, were both randomly assigned to one of two conditions: a random condition (n=15 young and n=15 elderly) or repeated condition (n=31 young and n=30 elderly). In the repeated condition participants performed four blocks of a serial reaction-time (RT) task, consisting of 100 trials each (Harrington & Haaland, 1992). The repeated condition was that the participant’s performed the same motor sequence, which occurred cyclically (Harrington & Haaland, 1992). The random condition required participants
to complete eight blocks of serial RT tasks, also consisting of 100 trials each. To measure the participant’s performance, movement times (MTs) were measured across the four to eight blocks completed, by either group (Harrington & Haaland, 1992).

The results of the study found that for both conditions, the elderly participants did not demonstrate any improvement, with regards to MT (Harrington & Haaland, 1992). Whereas the young participants of the repeated condition did better than the young participants of the random condition (Harrington & Haaland, 1992). The study also showed that for explicit memory learning, both age groups gained awareness of the repeating sequence (Harrington & Haaland, 1992). Although there was a high false-positive, this showed that the elderly group could explicitly learn the same as the younger group, even if the elderly person’s MTs were slower (Harrington & Haaland, 1992).

The study concluded, based on MTs that an elderly person’s implicit memory degraded overtime, and was slower than a younger persons (Harrington & Haaland, 1992). The study also determined that explicit memory was also impaired due to the diminished recall compared to the younger participants (Harrington & Haaland, 1992). Harrington & Haaland (1992) asserted that the elderly can experience deficiencies in both implicit as well as explicit memory of a motor sequence. The findings of this study are beneficial, since the participants of the present study was comprised primarily of older adults.

Understanding how implicit versus explicit learning environments affect an older adult will be important to consider, since the goal of the study is to build the participants self-efficacy implicitly and/or explicitly. Thus the next question that must be explored is how implicit and explicit learning relates to a person’s perceived self-efficacy. The next section of the literature review will evaluate the studies done on implicit/explicit learning and the impact each might
have on self-efficacy. This builds upon the overall purpose of the present study, and provides further justification for goals of the study.

Implicit/Explicit Motor Learning & Self-Efficacy

The aim of the current study is to evaluate which learning type, implicit versus explicit, has the greater impact on self-efficacy. Gorman & Farrow (2009) inspected the influence implicit and explicit instructional techniques had on an athlete’s perceived self-efficacy. The goal of the study was to see if the athlete’s perception-cognitive skills & decision-making could be enhanced through a video-based, perceptual-training intervention (Gorman & Farrow, 2009). Gorman & Farrow (2009) hypothesized that the use of a sport-specific video would increase the decision-making performance of two different learning groups, implicit and explicit, in comparison to the placebo group. Secondly, they hypothesized that the implicit group would demonstrate greater enhancement in decision-making, than the explicit group; by learning to perform in a more automatic manner (Gorman & Farrow, 2009). Thirty-nine males identified as skilled basketball players, with a mean age of 17.84, was recruited for the study (Gorman & Farrow, 2009). The researchers divided the participants into four groups, three training groups and one control group. The training group consisted of an explicit group (n=10), implicit group (n=10), and a placebo group (n=9) (Gorman & Farrow, 2009). The control group consisted of the remaining ten participants.

Participants in the explicit group were given five rules to follow (Gorman & Farrow, 2009). The rules provided to this group, provided detailed instruction regarding what was required of the group when presented with the videos (Gorman & Farrow, 2009). The explicit group watched 30 clips consisting of elite, male athlete’s basketball games that were 4 seconds in
duration (Gorman & Farrow, 2009). Upon viewing each clip, the explicit group was asked to pretend that they were the athlete in the video, and to think about they would do in a similar situation (Gorman & Farrow, 2009). Once the participant had identified how they would respond to the same situation, visual feedback was given to reinforce or correct the decision-making process (Gorman & Farrow, 2009). The intervention for the implicit training group consisted of listening to different tones, one at 440 Hz and the other 660 Hz, while also watching the video based clips (Gorman & Farrow, 2009).

The implicit group was not provided with any set of rules provided or instruction, and were asked to respond, only when they heard the tone (Gorman & Farrow, 2009). For the placebo group, the researchers asked participants to recall a pattern displayed on an Acuvision electronic light board, and the control group was tested but didn’t receive any training (Gorman & Farrow, 2009). The results of the study showed that no significant difference existed between any of the training groups (Gorman & Farrow, 2009). The reason for the lack of interaction provided by the researchers was that a ceiling effect had occurred, among the participants, impacting the results of the study (Gorman & Farrow, 2009). Gorman & Farrow concluded that such issues arise, when it comes to providing a perceptual-training intervention to highly skilled athletes (Gorman & Farrow, 2009).

Mortiz, Feltz, Fahrbach, & Mack (2000) conducted a meta-analysis on the connection between sport performance and an athlete’s perceived self-efficacy. The researcher’s made five specific predictions, regarding the forty-five studies examined. The first hypothesis was that higher self-efficacy would be found in studies that employed task-specific efficacy measures (Mortiz, Feltz, Fahrbach, & Mack, 2000). Secondly, issues of assessment effected objective performance measures. The study also hypothesized that when the measures were in agreement...
a higher correlation between self-efficacy and sport performance would be found (Mortiz, Feltz, Fahrbach, & Mack, 2000). Next, the study predicted that greater self-efficacy and performance was linked to a person’s familiarity of the task being performed (Mortiz, Feltz, Fahrbach, & Mack, 2000). Lastly, the study hypothesized that an athlete’s self-efficacy would be greater post-performance than pre-performance (Mortiz, Feltz, Fahrbach, & Mack, 2000). The results of the meta-analysis revealed a relationship between self-efficacy and sport performance. The results also demonstrated a correlation existed between self-efficacy and sport performance (M=.38, 95% confidence interval: .35-.41) that was significant, z=25.80, p<.001 (Mortiz, Feltz, Fahrbach, & Mack, 2000).

The researchers concluded that self-efficacy was a key moderator of sport performance (Mortiz, Feltz, Fahrbach, & Mack, 2000). Similarly in a study by Stevens, Anderson, O’Dwyer, & Williams (2012) the goal was to examine the effects of self-efficacy on implicit learning of easier versus more difficult motor skills. Stevens and fellow researchers (2012) had four specific hypothesis. Stevens et al. (2012) hypothesized that the transfer of learning would be greater for those going from the easy task to the test version, rather than the difficult task to the test version. Secondly, that during the transfer test, the control group would perform the same as the easy group (Stevens, Anderson, O’Dwyer, & Williams, 2012). Next that the changes experienced in performance would match the changes experienced in self-efficacy (Stevens, Anderson, O’Dwyer, & Williams, 2012). Lastly, that self-efficacy would be a predictor of the participant’s performance, following the transfer test (Stevens, Anderson, O’Dwyer, & Williams, 2012).

Stevens et al. (2012) randomly assigned 36 participants (19 females and 17 males) to one of three groups: Easy group (balancing a 103 cm stick), Same group (balancing a 52 cm stick), and Difficult group (balancing a 33 cm stick). The design of the study consisted of a stick
balancing task, which was used to measure implicit versus explicit learning. Data collection occurred at each phase of the stick balancing task; at pre-test, each of the four practice blocks, and at post-test (Stevens, Anderson, O’Dwyer, & Williams, 2012). During the pre and post-testing of the stick balancing tasks, participants were encouraged to re-balance the stick, if they should drop it. Yet, if the subject should drop the stick, 5 seconds were added the testing period. Self-efficacy was measured pre and post the stick balancing tasks, and after each of the four practice blocks (Stevens, Anderson, O’Dwyer, & Williams, 2012). The researchers measured the participant’s self-efficacy through the use of a general questionnaire that rated confidence; at pre-test, before each practice block, and at post-test (Stevens, Anderson, O’Dwyer, & Williams, 2012).

Explicit and implicit learning was also measured at the end of each practice block (Stevens, Anderson, O’Dwyer, & Williams, 2012). Participants were asked to describe any rules that were used to perform the balancing task (Stevens, Anderson, O’Dwyer, & Williams, 2012). The study used ANOVA to analyze the data obtained for each measure. The results showed that the easy condition demonstrated a greater increase in self-efficacy over time, $F(2,33)=3.4, p<.05$, than the difficult condition (Stevens, Anderson, O’Dwyer, & Williams, 2012). Self-efficacy for the same condition did not change from pre to post the stick balancing task.

The results of the study also showed that the difficult condition performed worse at the stick balancing task, $F(6,99)=4.7, p<.05$, than the same or easy condition. In regards to implicit versus explicit learning, the results revealed that the easy condition reported the use of more kinematic-based rules (Stevens, Anderson, O’Dwyer, & Williams, 2012). Whereas the difficult condition reporting the least use of rules, and the same group the most use of rules (Stevens, Anderson, O’Dwyer, & Williams, 2012). Based on the results, Stevens et al. (2012) concluded
that self-efficacy was a major predictor of performance, based on the changes across the study; from pre to post-test. Furthermore, that self-efficacy was a predictor of transfer effects of easy to difficult and difficult to easy tasks (Stevens, Anderson, O’Dwyer, & Williams, 2012).

Stevens, Anderson, O’Dwyer, & Williams (2012) also maintained that practicing easy tasks first and then more difficult task as skill was obtained could then lead to greater self-efficacy. The studies highlighted in this section demonstrate the impact both motor learning types, implicit versus explicit, can have on a person’s perceived self-efficacy. In addition, the studies in this literature review highlight the importance of increasing a person’s self-efficacy, when it comes to performance. Therefore, increasing a person’s self-efficacy will be key to him or her performing successfully in a self-defense program.

*Self-Efficacy*

To understand the role that implicit and explicit learning on performance, a researcher must first examine the mediators that influence behavior. Some of the variables that have been identified in influencing behavior have been a person’s motivation, cognition, affective states, and belief in abilities (Bandura, 1990). Social Cognitive Theory maintains that these mediators; consisting of thoughts, attitudes, and mood impact a persons’s willingness to engage in a behavior or activity. At the same time, social cognitive theorists argue that these internal factors influence external factors that play a reciprocal role when it comes to any change in behavior. Meaning, as internal factors; thoughts, attitudes, ect., influence a person’s behavior, then that person’s behavior has an impact on the external, physical and social environment.

Albert Bandura (1990) one of the founder of Social Cognitive Theory, maintained that self-efficacy was the primary factor influencing behavior; above all other mediators. Bandura
evaluated the causality of self-efficacy by examining the effects of self-efficacy upon the mechanisms that function as a source for behavior (Bandura, 1990). The mechanisms evaluated were cognitive processes, motivational processes, and affective processes. Self-efficacy is defined as the beliefs regarding his or her capabilities to successfully complete a particular task in order to solicit a particular outcome (Bandura, 1990). Bandura (1990; 2004) maintained that self-belief centered on efficacy greatly impacted the choice of actions a person makes, and how that person feels. He further states that perceived self-efficacy had less to do with a person’s actual capabilities or performance, but how that person perceived his or her abilities (Bandura, 1990).

Self-efficacy is then identified as a mechanism that regulates human action and behavior (Bandura, 1990; Bandura, 2004). Raising self-efficacy then increases likelihood that a person’s beliefs about setting more challenging goals and willingness to try new activities will also increase (Bandura, 1990; Bandura, 2004). By raising perceived self-efficacy, a person is able to exert control over certain events, on a cognitive level. A person’s thought patterns are then linked to self-efficacy, and play a role in a person’s belief regarding personal achievements (Bandura, 1990; Bandura, 2004). The beliefs internalized by a person are influenced by the person’s self-efficacy and ability to follow through with desired goals (Bandura, 1990; Bandura, 2004). Bandura asserts (1990) that cognitive process are also linked motivational processes, which can be increased or decreased based on perceived self-efficacy. Self-efficacy acts as a mechanism that guides a person’s motivation to solicit a set of actions or new actions (Bandura, 1990; Bandura, 2004). In order for a person to be motivated towards attaining a certain goal, self-efficacy must be raised (Bandura, 1990; Bandura, 2004).
Bandura (1990; 2004) argues that perceived self-efficacy is linked to human attainment, and one’s overall positive well-being; including adherence to exercise. This leads Bandura (1990; 2004) to assert that self-beliefs, stemming from personal self-efficacy, can have a negative or positive effect upon states of affect or mood. Thus indicating the level of self-efficacy an individual possesses, provides them with the ability to manage taxing situations. Bandura (1990) maintains that if a person’s perceived self-efficacy is low, then that person is unable to effectively deal with events deemed stressful or threatening. Low perceived self-efficacy can influence a person’s affect, making the individual more susceptible to an increased negative state (Bandura, 1990; Bandura, 2004). If not dealt with properly, the more self-efficacy is lowered the more a person’s affect can be confounded; which may lead to more serious clinical issues (Bandura, 1990; Bandura, 2004).

The way in which self-efficacy can be increased, on a cognitive as well as skill level, is identified by Bandura to be through mastery experiences (Bandura, 1990; Bandura, 2004). Such experiences, if deemed successful, will lead a person to seek out more challenging experiences, and thus continue manifest a greater self-efficacy (Bandura, 1990; Bandura, 2004). The person’s self-efficacy then has a positive mediating effect upon motivational processes, through the engagement of mastery experiences (Bandura, 1990; Bandura, 2004). This ultimately has a positive influence on a person’s affective processes and subjective well-being (Bandura, 1990; Bandura, 2004). Social Cognitive Theory maintains that self-efficacy is central to a person’s physiological and psychological well-being. Bandura (1990) concludes that human functioning and cognition is interconnected with his or her perceived self-efficacy. Human attainment and well-being is achieved as a person’s physical and mental perceived self-efficacy is increased (Bandura, 1990).
Cervone (2000) takes the discussion of self-efficacy further by discussing the role of perceived control. This is important to the current review of literature, since self-defense training focuses upon increasing a person’s control over threatening situations. Cervone (2000) states that perceived control is essential to attaining positive health outcomes. Cervone argues that a person’s perceptions, regarding his or her abilities and performance, are key to changes in that person’s behavior (2000). The crucial cognitive component that is needed to promote behavioral change and enhance a person’s perception is perceived self-efficacy (Cervone, 2000).

In the study by Cervone three specific research questions are presented. The first question he asks is does a person’s perceived self-efficacy generalize to all situations he or she might experiences (Cervone, 2000). Secondly, is a person’s self-efficacy influenced by affective states (Cervone, 2000). Lastly, is there multiple facets to perceived self-efficacy (Cervone, 2000). Cervone works to answer these research questions by conducting a review of literature on self-efficacy.

Cervone (2000) concludes that self-efficacy can be generalized to various circumstances. Cervone also concluded that there is not a singular state of self-efficacy, but multiple levels by which a person utilizes, both conceptually and behaviorally (2000). He further states that a person’s mood does not impact that person’s perceived self-efficacy (Cervone, 2000). Yet, Cervone’s statement regarding self-efficacy and affect has not been supported by other studies regarding the subject matter. Research has shown the opposite that a person’s perceived self-efficacy can influence his or her mood/ affective states. Grembowski, Patrick, Dieher, Durham, Beresford, Kay, & Hecht (1993) examined the self-efficacy of older adults when it came to health behaviors.
Grembowski et al. (1993) asserted that due to physical decline older adults tended to possess a lower perceived self-efficacy, which had an impact on health-promoting behaviors. The researchers ascertained that increasing an older person’s perceived self-efficacy could have a marked impact on engaging in positive health behaviors (Grembowski et al., 1993). Grembowski et al. (1993) outlined three hypotheses in reference to the research study. First hypothesis that self-efficacy and outcome expectations of one health behavior would correlate positively to other health behaviors (Grembowski et al., 1993). Secondly, self-efficacy to perform a behavior and positive outcomes expectations would have a negative association with health risk (Grembowski et al., 1993). Third hypothesis, self-efficacy and outcome expectations would positively correlate with health and negatively correlate with age and gender (Grembowski et al., 1993).

To test the hypotheses the study conducted a telephone interview and survey of senior citizens (61% female and 39% male) aged 65 to 74 years old. A 30-minute telephone interview was conducted with 2,524 senior citizens (Grembowski et al., 1993). In addition a questionnaire was mailed to the same senior citizens (N=2,524) interviewed that had consented to being surveyed. The questionnaire measured the senior citizen’s health risk, self-efficacy, perceived health status, socio-demographic information, and quality of life. The results of the study conclude that the self-efficacy of one health behavior was positively correlated to outcome expectations of specific health behaviors, such as exercise (Grembowski et al., 1993). The results found that efficacy expectations for a health behavior were positively correlated with outcome expectations for a specific behavior, r=.40 or higher (Grembowski et al., 1993). This finding supported the study’s first hypothesis. For the second hypothesis, the results showed greater efficacy and outcome expectations for participants not at risk in each health behavior;
such as weight, smoking, or alcohol, p<.001 (Grembowski et al., 1993). Lastly, the study determined that older adults, who had a high perceived self-efficacy also had a greater health status and perceived quality of well-being, p<.05 (Grembowski et al., 1993). Grembowski et al. (1993) ascertained that perceived self-efficacy as well as outcome expectations in older adults was positively associated with health-promoting behaviors.

Studies by such researchers as Cervone and Grembowski et al., are central to the present study; justifying the generalization of self-efficacy to both implicit and explicit groups and to older adults. Still, the relationship between self-defense training and self-efficacy as well as the role self-efficacy plays on affect and well-being needs to be ascertained. The following sections in the final portion of this literature review evaluate the relationship between self-efficacy and each of the variables identified.

*Self-Efficacy & Self-Defense Training*

A pivotal study by Ozer & Bandura (1990) examined the mechanisms governing a person’s self-efficacy over perceived physical threats of sexual assault. The study hypothesized that participation in a self-defense program would increase perceived self-efficacy (Ozer & Bandura, 1990). In addition, the increase in self-efficacy would lead to an increase in control and coping cognitions, and a decrease anxiety arousal (Ozer & Bandura, 1990). Specifically, the study claimed that participation in a five week mastery modeling program, would increase the subject’s perceived cognitive control and coping self-efficacy; in response to anxiety prone situations (Ozer & Bandura, 1990).

The participants consisted of 43 women, with a mean age of 34 (Ozer & Bandura, 1990). All of the subjects had been previously enrolled in a self-defense program, in a community-based
setting. There were three phases to the study; a control phase, treatment phase, and follow-up phase. The actual treatment was the mastery modeling program, which took place in the treatment phase. In the Control Phase, 23 of the 43 participants were given a Pretest 1, prior to treatment, and a follow up Pretest 2, five weeks after the initial pretest (Ozer & Bandura, 1990). The purpose of the control phase and both pretests was to determine if there were any confounding variables that might affect the study (Ozer & Bandura, 1990). Additionally, the researchers looked to examine if any significant changes occurred during the control phase (Ozer & Bandura, 1990). The design of the study ensured that control phase was the same duration as the treatment phase.

The Treatment Phase had subjects participating in five sessions of a Mastery Modeling Program that was 4.5 hours long, over a five week period (Ozer & Bandura, 1990). The mastery modeling program consisted of the 43 participants mastering several sequences of self-defense techniques that were meant to counter varying assaultive situations (Ozer & Bandura, 1990). The self-defense techniques were gradually taught to the participants to promote mastering of those techniques. Throughout the treatment phase, the participants were assessed for the following: Perceived Self-Efficacy, Thinking Patterns, Anxiety Arousal, Avoidant Behavior, and Behavioral Test for Self-Protective Skills. After five weeks a Posttest was provided to gain the final data for the study. The Follow-Up Phase was conducted six months after the end of the treatment phase, in which the participants were retested. This follow-up assessment retested the participants to determine if the skills mastered and self-efficacy initially gained had been maintained six months later (Ozer & Bandura, 1990).

Perceived Self-Efficacy was measured through a self-efficacy scale that evaluated three domains: interpersonal self-efficacy, activities self-efficacy, and self-defense self-efficacy (Ozer
Interpersonal Self-Efficacy was assessed by eight scales that evaluated the participant’s efficacy in addressing threatening situations; both in social as well as personal settings. The results of the study revealed a significant increase in perceived self-efficacy, in self-defense, control of interpersonal situations involving assault, and willingness to engage in activities previously avoided (Ozer & Bandura, 1990). The perceived self-efficacy gained in the treatment phase was shown to be maintained six months later in the follow-up phase.

Significance was primarily found in the posttest of the treatment phase, with self-defense being the highest (Ozer & Bandura, 1990). Cognitive Control Self-Efficacy was positively related to Perceived Self-Efficacy, with the greatest significance demonstrated during the treatment phase.

For Thinking Patterns, significance was found between the treatment and follow-up phase, for negative thoughts (Ozer & Bandura, 1990). With the follow-up phase demonstrating the greatest perceived cognitive control over negative thoughts (Ozer & Bandura, 1990).

In regards to Personal Vulnerability the study demonstrated that the level of perceived self-efficacy in affected the participant’s sense of personal vulnerability (Ozer & Bandura, 1990). After completing the treatment phase and/or mastery modeling program, the study noted a reduction in personal vulnerability (Ozer & Bandura, 1990). The results of Risk Estimate Discernment further demonstrated that high perceived self-efficacy, in all of its facets, resulted in increased discernment and perception of risk; on the part of the participant. For Anxiety Arousal, Ozer & Bandura (1990) found that as with personal vulnerability, the varying facets of perceived self-efficacy correlated with the level of anxiety a participant experienced. The study demonstrated after the varying facets of self-efficacy scales were merged into a composite index that high self-efficacy resulted in low anxiety arousal.
The study’s results also determined for Avoidant Behavior that after completion of the mastery modeling program participants were more sociable, and more willing to participate in varying recreational activities (Ozer & Bandura, 1990). This is especially true for coping self-efficacy, which led to higher involvement in activities and low avoidant behavior. In addition, the results for Self-Protective Skills, indicated that none of the self-efficacy measures correlated with execution of skillful movement. Yet, the Ozer & Bandura (1990) noted that personal vulnerability was lessened as the participant’s skill was increased. In conclusion, the study demonstrated that a mastery modeling program gradually increased the participant’s perceived self-efficacy (Ozer & Bandura, 1990).

Ball & Martin (2012) also examined the effects of self-defense training on self-efficacy. Specifically, the two researchers compared modern self-defense training (MSDT) against traditional martial arts (TMA); examining for self-efficacy and affect. Ball & Martin (2012) hypothesized that engaging in MSDT, versus TMA, would result in an increase three types of self-efficacy as well as five types of fear. The study maintained that a MSDT would have a more positive effect on a participant’s psychological construct, than a TMA program (Ball & Martin, 2012). The three types of self-efficacy evaluated by the study were self-defense self-efficacy, interpersonal self-efficacy, and activities self-efficacy. More specifically, the study hypothesized that MSDT would see the greatest increase in interpersonal self-efficacy (Ball & Martin, 2012). While self-defense self-efficacy would be high for both TMA and MSDT (Ball & Martin, 2012).

Ball and Martin (2012) also claimed that participants of the MSDT program would experience a decrease in life-threatening fear; fear of being alone, fear of stranger vulnerability, and general fear would also decrease; in comparison to the TMA program. The researchers maintained that an MSDT program had comparative outcomes to a stress management program;
which had similar effects in reducing fear and increasing perceived self-efficacy (Ball & Martin, 2012). Additionally, the researchers justified comparing MSDT to TMA, arguing that both promote learning preventive techniques for the purpose of self-defense (Ball & Martin, 2012).

The participants consisted of 69 women, with a mean age of 26.3 years (ages ranging from 18 to 61). The procedures employed by the study compared MSDT and TMA, with a Stress Management (SM) program acting as the control group, over an eight week period (Ball & Martin, 2012). Of the 69 female participants, 32 participated in MSDT, 10 engaged in TMA, and 27 were in the SM control group (Ball & Martin, 2012). The duration of each group, over the eight week period, consisted of 2 hours per session, once a week; resulting in 16 contact hours (Ball & Martin, 2012).

The following measures were used to evaluate perceived self-efficacy and feelings of fear for each of the groups. The study used a multidimensional self-efficacy scale (SES) was used to evaluate the three different types of self-efficacy (Ball & Martin, 2012). The three types being evaluated are Self-Defense Self-Efficacy, Interpersonal Self-Efficacy, and Activities Self-Efficacy (Ball & Martin, 2012). A multidimensional fear scale or PDSS (Perception of Dangerous Situations Scale), was used to evaluate the five types of fear (Ball & Martin, 2012). In addition to fear, the study assessed sexual victimization, assault, and social desirability of the participants. Sexual victimization and assault was estimated through a SES (Sexual Experience Survey), while social desirability was determined through the use of the Maslowe Crowne Social Desirability Scale (Ball & Martin, 2012).

The study’s initial results of the study, through a MANOVA, found no significance amongst the groups (Ball & Martin, 2012). A second MANOVA was conducted to compare the pre and post-tests, finding that significance was found for self-defense self-efficacy and life-
threatening fear (Ball & Martin, 2012). Upon conducting a pair-wise comparison significance for the MSDT group was found, in comparison to the TMA and SM groups. As hypothesized, the results indicated an increase in self-defense self-efficacy, for both the MSDT and TMA groups, with MSDT demonstrating the greatest gain (Ball & Martin, 2012). In regards to the five types of fear, only two types of fear seemed decrease from pre to post testing, which was life-threatening fear and stranger vulnerability. Both, MSDT and TMA demonstrated a decrease in life-threatening fear, while only TMA demonstrated a reduction in fear of stranger vulnerability (Ball & Martin, 2012).

Studies by Ozer & Bandura and Ball & Martin provide evidence in support of the positive impact of self-defense training can have on a participant’s self-efficacy. Both studies demonstrated the effect self-defense training programs have on a participant’s psychological and emotional well-being. The current study took previous research further, by examining the effects of a self-defense program on self-efficacy, and the impact of self-efficacy on positive and negative affect and subject well-being. Research has shown that raising self-efficacy can lead to influence a person’s affect and subjective well-being (Ozer & Bandura, 1990; Bodin & Martinsen, 2004; Tong & Song, 2004; Laureano, Grobbelaar, & Nienaber, 2014). This leads to the next discussion, regarding the relationship between self-efficacy and a person’s affect and subjective well-being.

**Self-Defense & Self-Efficacy on Affect & Subjective Well-Being**

In the previous section a study by Ball & Martin (2012) was discussed regarding the relationship between self-defense and self-efficacy. Ball & Martin (2012) provide evidence that self-defense training had a positive impact on a person’s self-efficacy, from pre to post intervention. The researchers also examined the impact self-efficacy from self-defense training
had on the participant’s affect. In a similar study, Bodin & Martinsen (2004) demonstrated the influence of self-defense on self-efficacy and affect. Bodin & Martinsen (2004) examined two different exercise modalities, and the effects each modality has upon overall self-efficacy as well as affect.

The two exercise sessions consisted of a martial arts program that starts off with low self-efficacy, and stationary cycling that held initial high self-efficacy. Objective of the study was to determine if two different exercise conditions and self-efficacy significantly impacted the participant’s affect and diagnosed depression. The participants for Bodin & Martinsen’s study (2004) consisted of 12 participants (4 males and 8 female), with 9 being from an inpatient clinic and 3 from outpatient with a mean age of 36.6. Each of the 12 participants were provided with a Beck Depression Inventory (BDI) survey, to determine the level of depression, and all of the inpatient participants had a DSM-IV diagnosis. Self-Efficacy was measured through a SSE (Specific Self-Efficacy), and a Positive and Negative Affect Scale (PANAS) was used to determine the positive and negative effects of each exercise session (Bodin & Martinsen, 2004). Anxiety and mood or affect was assessed through the use of a State Anxiety Index (SAI) (Bodin & Martinsen, 2004). Finally the study measured the participant’s perceived physical exertion, for each exercise, using the Borge RPE (Bodin & Martinsen, 2004).

The exercise sessions were provided in 2 group sessions, with each session lasting 45 minutes for a total of four sessions. There was also a 30 minute wait control condition before each session. Participants were randomly divided into Group A & Group B, with each group participating in both exercise sessions. Study maintained that there was no statistical difference between either of the groups (Bodin & Martinsen, 2004). Group A started off participating in the martial arts session, and three days later in the stationary bike exercise. Group B started off with
the stationary bike exercise, and three days later with the martial arts session. Each of the
sessions started off with the 30 minute wait control condition, at which time the participants
completed the SAI and PANAS (Bodin & Martinsen, 2004). After the initial wait control time
period, each group engaged in either the stationary bike exercise or martial arts session that
consisted of a sequence of Tae Kwon Do shadowboxing (Bodin & Martinsen, 2004). There were
three levels within each session, regardless of the exercise session, and the SSE was completed
prior to each level starting.

In addition, at the end of each of the three levels, the participant’s completed the SAI and
PANAS again, and heart rate and RPE were recorded (Bodin & Martinsen, 2004). Paired t-tests
were used to determine the differences between the martial arts program and stationary bike
exercise program; in regards to heart rate, RPE, and SSE (Bodin & Martinsen, 2004). The study
demonstrated that as the intensity of each session increased, so did the participant’s SSE scores
(Bodin & Martinsen, 2004). Initially, the stationary bike exercise held a higher SSE score of
61.7 (p < .001), than the martial arts program’s initials SSE score of 10.9 (Bodin & Martinsen,
2004). Yet, as the martial arts sessions progressed, SSE scores increased by 28.8 points (Bodin
& Martinsen, 2004). The progression noted within the martial arts sessions was deemed
significant, in comparison to the stationary bike exercise sessions; which only increased by 5.1, p
> 0.05 (Bodin & Martinsen, 2004).

In regards to the participant’s mood or positive affect, study found significance in the
martial arts session (from 22 to 29.3) with an increase of 7.3 (Bodin & Martinsen, 2004).
Whereas the positive affect decreased (from 24.2 to 23.9) for the stationary bike exercise by –0.3
(Bodin & Martinsen, 2004). Date for the martial arts session also demonstrated significance in
positive affect versus the wait control condition. The study’s analysis of negative affect found
no significance between each group or condition/exercise session. For SAI, martial arts demonstrated a decrease in anxiety by 9.9 (50.8 to 40.9), and stationary bike exercise (42.6 to 41) by only 1.6 (Bodin & Martinsen, 2004). Results of the data showed that martial arts had a greater significance in SAI compared to the wait control condition (Bodin & Martinsen, 2004). Evaluation of heart rate and RPE, the study found that the stationary bike exercise session held a higher mean for maximum heart rate at 63.7%, than the martial arts session at 51.3% (Bodin & Martinsen, 2004).

As for RPE, there was no statistical significance found between either form of exercise sessions, martial arts or stationary bike exercise (Bodin & Martinsen, 2004). Lastly, there was no statistical significance found between the initial BDI and Positive Affect, SAI, or Negative Affect (Bodin & Martinsen, 2004). Bodin & Martinsen (2004) concluded that an increase in self-efficacy correlated with participation in the martial arts. Whereas, a statistical significance was not found for self-efficacy in correlation with the stationary bike or wait control condition (Bodin & Martinsen, 2004). The martial arts group also demonstrated an increase in positive affect, and a decrease in state anxiety; in comparison to the stationary bike and wait control condition (Bodin & Martinsen, 2004). The study, by Bodin & Martinsen (2004), identified that as self-efficacy increased a person’s positive affect also increased, and negative affect decreased. Yet, the study also demonstrated the influence a martial arts program, a form of self-defense training, had on self-efficacy.

Currently there are little to no studies that have examined the impact of self-defense training on subjective well-being. However, there have been a few studies that have evaluated the correlation between self-efficacy and subjective well-being. A study by Tong & Song (2004) evaluated the role of self-efficacy on subjective well-being. The goal of the study was to
examine the relationship between self-efficacy and subjective well-being among university students of low socio-economic status (Tong & Song, 2004). The study by Tong & Song surveyed 266 college students (133 males and 133 females), with 102 of the participants being identified as of low socioeconomic status (SES) (Tong & Song, 2004). The participants were measured using a Generalized Self-Efficacy Scale (GSE), an Index of Wellbeing, an Index of General Affect, and a demographic questionnaire (Tong & Song, 2004). The results of the study showed that participants, who reported a high GSE score (M=2.61, SD=.49, p=.026) also reported a higher Index of well-being (M=10.03, SD=2.23, p=.001). A Parson’s correlations showed that the GSE was positively correlated to the Index of Wellbeing, r=.489, p<.01 (Tong & Song, 2004).

Tong & Song concluded that self-efficacy was key to a person’s subject well-being (2004). A study conducted by Laureano, Grobbelaar, & Nienaber (2014) examined the effects of coping self-efficacy on the psychological well-being of rugby players. The study examined a total of 76 University students, who all played rugby (Laureano, Grobbelaar, & Nienaber, 2014). The participants were then assigned to either an experiential-learning program (ELP) (n=20, M=18.85 years, SD=.56) or a non-experiential-learning program (non-ELP) (n=21, M=18.95 years, SD=.22) (Laureano, Grobbelaar, & Nienaber, 2014). Both groups were measured using the Coping Self-Efficacy Scale (CSE), Fortitude Questionnaire (FORQ) to assess the participant’s coping mechanisms, and the Affectometer-2 (AFM-2) to examine psychological well-being. The ELP group participated in six 1-hour sessions, over a two week period which worked to enhance self-awareness and personal insight (Laureano, Grobbelaar, & Nienaber, 2014).
The study conducted an ANCOVA on all data obtained, controlling for pre-test differences between the groups (Laureano, Grobbelaar, & Nienaber, 2014). The results of the study showed that ELP reported a higher coping self-efficacy ($M=199.70$, $SD=25.00$, $p<.01$), than the non-ELP ($M=182.91$, $SD=18.61$, $p<.05$). The results also revealed that ELP demonstrated a higher psychological well-being ($M=19.30$, $SD=8.82$, $p<.01$), than the non-ELP ($M=18.72$, $SD=6.71$, $p=.92$). Laureano, Grobbelaar, & Nienaber (2014) concluded that participation in an experimental learning program led to greater coping self-efficacy, which increased the participant’s psychological well-being.

The conclusion made by the Tong & Song and Laureano, Grobbelaar, & Nienaber coincides with Bandura’s beliefs regarding self-efficacy and subjective well-being. Bandura (1990) maintained increasing a person’s self-efficacy would enhance his or her subjective well-being; along with improving other psychological factors. As indicated in the introduction, various types of martial arts are defined as a type of self-defense training (Ball & Martin, 2012; Angleman et al., 2009). The study by both Tong & Song and Bodin & Martinsen provide evidence that self-defense training not only impacts a person’s self-efficacy, but his or her affect and/or subjective well-being. These studies provide evidence that raising self-efficacy is essential to a self-defense training program. While also providing evidence that self-efficacy does have an impact a person’s affect and perceived subjective well-being. Justifying present study’s endeavors with measuring the relationship between self-defense training and the participant’s self-efficacy, affect, and well-being.
Conclusion

The literature review identified the mediating effects of motor learning on self-efficacy, highlighting the importance and difference of both implicit and explicit learning. In addition, the review of literature provided evidence for the influential factors both motor learning types might have on a person’s self-efficacy. Finally, the review outlined the role self-defense and self-efficacy plays on affect and subjective well-being, and the mediating effects self-efficacy has on individual behavior. Social Cognitive Theory supports this notion, indicating that the lower an individual’s perceived self-efficacy the more a person’s performance or ability to attain a goal is impacted. Through the literature review, the present study provided evidence for the role self-defense training program plays on perceived self-efficacy. The goal of the present study is to ascertain if acquiring self-defense skills, implicitly or explicitly, invokes a positive change in the participant’s self-efficacy, affect, and well-being. Thus, the present study works to contribute to the current knowledge base, and fill a void within research.
CHAPTER 3: METHODS

Participants

Participants of the study consisted of 30 adults (n=28 women and n=2 men), with a mean age of 66.1 (SD=15.72). All of the participants were recruited through the Vidant Wellness Center located in Greenville, North Carolina, and were members of that facility. Initially, a total of thirty-six participants were recruited, but over the course of the six week program six dropped out. The six participants that dropped out completed only the first set of baseline measurements for self-efficacy, affect, and subjective well-being. The participants did not complete the self-defense course. Therefore, any data received from these six was excluded from the final analysis. For the purpose of the study, participants were required to be physically fit enough to engage in the self-defense training, and attend at least fifty percent of the scheduled self-defense sessions. Participants were also required to complete all aspects of the assessments used to evaluate implicit/explicit, self-efficacy, affect, and subjective well-being. Consent was gained prior to the first self-defense training session. A brief description of the purpose and aim of the current study was also provided at that time. All procedures employed by the study were approved by the University Internal Review Board (IRB).

Study Design

The design of the study was an experimental design absent of a control group. All of the participants engaged in a six week self-defense training program. Participants were randomized into one of two groups, an implicit self-defense training group (n=15; 14 females and 1 male) and an explicit self-defense training group (n=15; 14 females and 1 male). The program took place over a 6 week period, 2 times a week. The implicit self-defense group was taught
implicitly, and the explicit self-defense group was taught explicitly. Both groups were provided the same self-defense techniques during the six week program. The self-defense instructor was required to meet the qualification requirements to provide services at the Vidant Wellness Center, and adhered to the center’s policies and procedures at all times. Skill acquisition of both groups was assessed at Time 2 and Time 3. Self-efficacy, affect, and subjective well-being were measured at Time 1, Time 2, and Time 3.

*Self-Defense Training Program*

The study occurred at the Vidant Wellness Center for the six week duration. Self-defense training took place twice a week, 30-minutes each session, at the same time for the entire six week program. Both the implicit and explicit groups were taught separately. The self-defense training program promoted self-efficacy to both groups by providing mastery experiences. Mastery experiences were provided by having the participants learn self-defense techniques in a gradual manner. At the same time, as each group learned a self-defense technique a new technique was introduced, which built off of the participant’s previous knowledge.

Participants were required to engage in both mental and physical self-defense activities that promoted acquisition of self-defense skills. This was done through individual practice and partner practice of the skill in class. Practicing with a partner allowed for the participant to test the skills being learned. The self-defense techniques taught emphasized proper punching and blocking, proper attacking, elbow strikes, a knee strike, defense against a choke hold, and defense against being grabbed. The instructor of both self-defense training groups encouraged participants to learn proper placement of the hands and feet to execute the defense skills.
accurately and safely. Again, the self-defense curriculum taught over the six-week period was the same for both groups (see Appendix D: Table 1).

Throughout the first week of the self-defense training program, both the implicit and explicit groups learned how to block against three different types of punches. During the first week participants were also taught how to perform three different strikes on an attacker. To promote learning the self-defense instructor would explain to each group the attack scenario, and what technique the participants were going to learn. Then participants would practice techniques individually, in the air, and later with partner simulation. The instructor ensured that mastery experiences were provided by allowing for gradual introduction of the self-defense skills, and building off previous skills learned to introduce new or more complex skills.

The second week of the self-defense program was used to introduce participants to elbow and knee strikes. Participants learned how to defend against an attacker throwing a single elbow to face, or to the groin. Participants also learned how to execute and throw a proper elbow strike and knee strikes at an attacker. During the partner drills, both participants got the chance to act as an attacker, throwing a punch, elbow or knee as well as the person defending. In the third week of the program, participants were taught proper execution of technique combination. At the end of the third week, the participant’s acquisition of the self-defense skills was tested.

Participants in the fourth week were shown how to defend against four basic grabs, by an attacker. The fifth week of the self-defense program familiarized participants with how to defend against three basic choke holds by an attacker. The final week of the program was used to summarize everything that had been learned over the six-week period. The instructor also allowed participants to practice in an autonomous manner what he or she learned.
The instructor also used safety equipment to demonstrate certain techniques and prevent injury. Both groups were monitored during individual and partner drills for safety. The safety and well-being of the participants was a top priority by the self-defense instructor, and was maintained at all times. A short review was conducted each week, covering what had been learned during previous sessions. Again, this was a way to offer mastery experiences to the participants and ease participants into learning more complex self-defense skills. In addition to learning the self-defense skills, the self-defense instructor encourage participants of both groups to learn how to address a violent situation in a non-violent manner. The self-defense training program did this by providing both groups with spatial awareness regarding an attack situation, verbal self-defense skills, and body language tips.

The implicit group was taught spatial awareness and body language tips through the use of analogies and physical demonstration by the self-defense instructor. The explicit group was given verbal instruction regarding spatial awareness, proper verbal defense, and body language defense. Non-physical forms of self-defense techniques can help a person respond effectively to a threatening situation, through the proper use of body awareness, mindfulness, and attention to surroundings. An independent inter-rater, an experiment in implicit and explicit learning, monitored that the self-defense instructor taught both group in an implicit or explicit manner as specified. The qualified moderator observed each group to see if the implicit group was being taught implicitly and the explicit group was taught explicitly. The moderator witnessed one out of the twelve self-defense classes, for both the implicit and explicit groups. The moderator observed that the implicit group was given little to no instruction, and that the instructor used action-related cue words and analogies appropriately. The moderator also monitored that the explicit group was provided the ruled-based, verbal instruction. An inter-rater reliability (IRR)
of both groups being taught in the implicit or explicit manner was calculated at 0.90. Ultimately, the goal of the self-defense training program was to provide mastery experiences that fostered self-efficacy, positive affect, and subjective well-being.

*Implicit Self-Defense Instruction*

The implicit group was given little to no verbal guidance regarding the self-defense techniques being taught. Instead, the self-defense instructor would demonstrate one or two physical examples of a technique being taught, and use action-oriented cue words to identify the technique. Pre-determined cue words were used to help the implicit group identify and learn sequences of techniques, without the instructor giving explicit commands. An example of the cue words used for the implicit group was ‘arc or arcing block,’ ‘palm thrust or punch,’ ‘sword hand’ for a knife-hand strike, and ‘crane knee’ for a knee strike. The instructor used cue words to prompt the implicit group to physically practice and demonstrate the self-defense training technique being learned. To ensure that the self-defense instructor did not provide explicit rules to the implicit group, feedback or correction was provided in a reinforcing manner. This was done by giving physical prompts or corrections, and through the use of analogies and cue words as suggested by previous studies; regarding implicit learning (Gabbett & Masters, 2011).

The implicit group was also given information in an analogy fashion. Analogies were used to invoke an image of an assault scenario and introduce self-defense topics. An example of an analogy given to the implicit group for block a punch was “imagine your arm is like a strong whip that arcs up and fast” or “imagine someone is trying to reach for your shoulder or purse strap.” Another example is when the self-defense instructor had participants learn and practice a finger or knife-hand strike. The instructor used the analogy of “imagine your fingers are like a
leopard’s paw that reaches out and claws your attacker’s face” for the finger strike, and “imagine you’re hand is like a sword that quickly cuts the attacker’s face/neck” for the knife-hand strike.

Once the analogy was given to the implicit group, then the self-defense instructor would physically demonstrate the self-defense technique being taught using the cue words. Through the use of visualization, the self-defense instructor was promoting an implicit learning environment, allowing the implicit group to visualize and imagine being attacked. This was also a way to demonstrate the skill being learned without providing explicit instruction to the implicit self-defense training group. The use of analogies and action-related cue words to create an implicit learning environment was supported by Gabbett & Masters (2011). The implicit instructional matrix can be viewed in Appendix E.

Explicit Self-Defense Instruction

The explicit group was provided the same self-defense curriculum and taught the same self-defense techniques as the implicit group. The only difference between the two groups was the way in which both groups were instructed. The explicit group was given more verbal and rule-based instruction (see Appendix F). The use of technical names for each of the techniques taught was also provided to the explicit group. Feedback and corrections were provided in a direct and verbal manner, promoting the development of rule association. The self-defense scenarios provided to the explicit group were very detailed, and differed from the analogies used for the implicit group. The self-defense scenarios were followed with rule-based instructions and technical terminology of how the participants should respond successfully to the attack situation.
Procedures

Prior to starting the study, the researcher conducted an internal inquiry, regarding the self-defense study, among members at the Vidant Wellness Center. The researcher did this by emailing members of the facility and inquiring in person, during group fitness classes. The purpose of the inquiry was to identify whether or not members would be interested in participating the six week self-defense program. The days and time for the program was established after speaking with management at the wellness center and gaining feedback from the members. The feedback received indicated that the majority of members interested could attend a morning self-defense class. Majority of the participants that signed up to participate were identified as older adults, sixty years of age and older.

Random assignment of participants was conducted by the researcher on the same day that consents were signed and participants were provided information on the study. Participants assigned to the implicit or explicit group met every Monday and Friday morning, for approximately 30 minutes each session, for a total of six weeks. Again, both groups were provided the same self-defense instruction, with one being instructed implicitly and the other explicitly. The same self-defense instructor taught both the implicit and explicit self-defense training programs. The instructor taught both groups differently, but provided both with the same self-defense information. Again, an outside observer monitored that the instructor was teaching each group differently. The Self-efficacy, affect, and subjective well-being of both groups was measured at Time 1, Time 2, and Time 3 by the researcher. Skill acquisition of both groups was conducted at Time 2 and Time 3. An outside tester measured the skill acquisition of both groups. Demographic information was obtained during the first training session, at the time
when informed consent was gained. This occurred only once, and was not repeated at any other time.

**Measures**

The aim of the study was to evaluate participant’s implicit/explicit skill acquisition, self-efficacy, affect, and subjective well-being. This was done at different time points over the course of the six week self-defense training program. Four measuring tools were used to assess each variable. These four assessments consisted of the PANAS-X, gauging positive and negative affect; the Personal Well-being Index-Adults scale, Subject Vitality scale, and a Self-Defense Self-Efficacy scale. Again, self-efficacy, affect, and subjective well-being was measured at three times: Time 1, Time 2, and Time 3. Whereas, skill acquisition and performance was assessed through two different skills tests at Time 2 and Time 3.

*Implicit/Explicit Skills Test*

Studies evaluating implicit versus explicit learning on a complex motor task often employee the use of a dynamic balancing task (Shea, Wulf, Whitacre, & Park, 2001; Stevens, Anderson, O’Dwyer, & Williams, 2012). Studies using this design and method look to ensure that the intervention was provided in an implicit or explicit manner. These studies usually entailed a series of practice blocks, followed by several testing trails, ending with a retention phase (Shea, Wulf, Whitacre, & Park, 2001). Additionally, studies examining implicit learning give the implicit group very little guidance or verbal instruction, while the explicit group is often given a set of rule to follow (Shea, Wulf, Whitacre, & Park, 2001).

In an effort to build upon previous research, the present study employed a similar design and methods for examining implicit versus explicit self-defense training. Both the implicit and
explicit groups were tested at a mid-way point three weeks into the training program, and again at the end of the program. The testing measures for skill acquisition entailed a skills test that examined the participant’s speed, accuracy, and skill efficiency for the skill being tested.

During the skills test, the speed of the participant’s performance was recorded; in seconds. Each participant was given 10-seconds to demonstrate the skill being tested. The number of seconds it took for the participant to perform the task was the number of seconds recorded for speed. The lower the score for speed the better the participant’s performance, while greater score for speed indicated a worse performance. Accuracy was rated on a 4-point likert scale, and the lower the accuracy score indicated better performance, whereas a higher score indicated lower performance. Like accuracy, skill efficiency was also rated on a 4-point likert scale. Again, higher performance correlated with a lower score, and poor performance was correlated to a higher score.

Each skills test consisted of a practice phase, followed by the testing phase. The purpose of the practice phase will allow participants of both groups to review the techniques that were to be examined. The testing phase consisted of three testing trials made of three combinations of techniques that the participants were tested on. During the testing phase participants were asked to demonstrate a series of skills or combo of skills; previously practiced. The self-defense instructor did not test the participants from either group. Instead, an alternate tester, a person with an extensive background in self-defense and martial training, tested each group.

The alternate tester was used to ensure that no bias occurred during the testing phase of either group. The tester of both the implicit and explicit groups was a sixth degree black sash (belt) martial artist in Bak-Mei Kung Fu as well as a third degree black belt in Okinawan Gensei-
ryu karate. The tester was also familiar with the self-defense techniques being taught to both the implicit and explicit groups. As the participants were being tested, the identified tester would record the participant’s speed in seconds and rate accuracy and skill efficiency of the techniques. The tester was responsible for maintaining the time and rating the participant’s time. The self-defense instructor provided no guidance or instruction to either the implicit or explicit group, but merely acted as the attacker. Allowing participants to demonstrate the techniques being tested on the self-defense instructor.

The first skills test provided had participants block a specified punch, knee, or elbow, and then follow-up with two strikes. The exact combos participants were tested on entailed the following: (1) block a cross or hook punch-palm heel strike to the face-and end with a finger/gauging strike down the face or into the eyes; (2) block a cross or hook punch-elbow to the face/head-and follow-up with a knife-hand strike to the face/throat from the same arm used to throw the elbow; and (3) block an elbow to the face-and block a knee to the groin.

The second skills test had participants block a punch, defend against a choke hold or grab, and follow-up with three different strikes. Specifically participants were tested on the following: (1) block a cross or hook punch-followed by a palm heel strike or finger/claw strike-and end with an elbow; (2) defend against a one or two arm graph-finish with a palm heel strike/finger or claw strike/ or elbow; (3) defend against a one or two hand choke hold-followed by a palm heel strike/finger or claw strike/ or elbow.

Each participant was given a maximum of ten seconds to demonstrate the skill or combo he or she is being tested on. This time frame corresponds with previous research that has tested the speed and accuracy of participants engaged in a self-defense training program (Yu, Liu, &
Chen, 2012). Participants will also be given two additional opportunities, for a total of three, to perform the skill/combo of skills being tested within the ten second time frame; if it was not performed correctly the first time. Again, the skills test measured the participant’s speed in the number of seconds it took for the participant to perform the self-defense technique being tested. Accuracy was rated on a 4-point likert scale, with a lower score indicating better performance, compared to a high score. Skill efficiency was also rated on a 4-point likert scale. Again, for speed, accuracy, and skill efficiency; a lower score denoted better performance of the skill. Whereas, a higher score indicated poorer performance of the skill being tested.

To ensure that testing of the implicit group differed from the explicit group, the self-defense instructor did not provide the implicit group with any specific instructions. Rather, the self-defense instructor would physically demonstrate the skill combo being tested, and then have the implicit group practice with a participant what had been observed. Cue words were also used to identify further the techniques being practiced and tested during the skills test. For example, the implicit group was asked to “arc block” (roll or upper block) as a punch came at them, and then encouraged to “palm punch” (palm heel strike) and finish with a “leopard claw” (finger strike to the eyes).

During the actual skills test the self-defense instructor did not provide the implicit group with any direct instruction. Instead, the alternate tester was asked to use only the cue words and ask the participants of the implicit group to demonstrate what had been practiced, given the specified cue words. Again, the implicit group was given little to no verbal instruction or rules for the skills tests. Whereas the explicit group was given specific instructions and rules of what to do and expect when it came to the skills test.
The explicit group was told specifically what was going to be tested, and the sequence of techniques for each combo. As with the implicit group, the self-defense instructor demonstrated the combination techniques to be tested, and then had the explicit group practice those combos with a partner. Then, after a brief practice phase, participants of the explicit group were tested by the alternate tester. The self-defense instructor again acted as the attacker during each skills test, and had participants demonstrate the techniques on the instructor. The testing phase for the explicit group was conducted the same as the implicit group, and both groups were tested on the same three combination of techniques.

The second skills test provided to both groups differed in difficulty from the first skills test. This was due to the fact that self-defense information provided at the end of the six week program was more complex that information at the beginning. Therefore, the self-defense instructor differed the two skills tests to ensure that participants learned all the self-defense techniques covered, during the six-week period. The common skill tested at Time 2 and Time 3, were the combination techniques of blocking a punch followed by at least two complex striking techniques. The uncommon skill tested during the first skills test was the less complex combination of just a block, strike to face, and eye gauge strike. The uncommon skills tested during the second skills test was the grab and choke defense. To gain an average for the uncommon skills for the second skills test, the scores were summed and divided by two. The only skill not evaluated was the elbow and knee block, which differed greatly from any of the other skills tested.
Self-Efficacy Scale

The study used a sub-section of the Perceived Self-Efficacy Instrument developed by Ozer & Bandura (1990) to measure self-defense self-efficacy (see Appendix G). The Perceived Self-Efficacy Instrument utilized by Ozer & Bandura (1990) evaluated four domains: Interpersonal Self-Efficacy, Activities Self-Efficacy, and Self-Defense Efficacy. For the purpose of the present study, only the Self-Defense Efficacy scale was used to measure the participant’s perceived self-efficacy. The Self-Defense Efficacy scale consists of 12-items, with each item containing three to eleven sub-items each, and is rated on a 10-point Likert scale. The questions used by the scale assess the person’s perceived ability to respond to potential threatening situations by both strangers and acquaintances. The overall goal of this particular self-efficacy scale is to evaluate the person’s perceived efficacy to perform a desired action. The Cronbach’s coefficient alpha of this self-efficacy instrument developed by Ozer & Bandura (1990), ranges from 0.88 to 0.97. Participants were asked to complete the Self-Defense Efficacy scale prior to engaging in the self-defense intervention. Self-Defense self-efficacy was measured Time 1, Time 2, and Time 3 the six week self-defense program. To gain an overall score for each participant, each of the sub-items for each question was summed. Then that sum was divided by the total number of times completed to obtain an average score. The final self-efficacy score was the score used in data analysis to examine self-defense self-efficacy.

Affect Scale

A Positive Affect Negative Affect Scale-X (PANAS-X) was utilized to assess the participant’s positive and negative affect (see Appendix H). The PANAS-X is an expanded version of the PANAS, consisting of 60-items, rated on a 4-point Likert scale. The PANAS-X was developed from the PANAS by Watson & Clark (1994). The PANAS-X expounds upon the
PANAS by assessing specific affective states derived from the broader positive/negative emotional states experienced (Watson & Clark, 1994). The Cronbach’s coefficient alpha for the PANAS-X has been identified as 0.83. The PANAS-X was used to evaluate the participant’s positive and negative affect over the course of the six week self-defense program. Participants were asked to complete the PANAS-X pre and post the training session at Time 1, Time 2, Time 3. To gain an overall score for positive affect, pre and post-training session, scores for items associated with 3-sub scales within the PANAS-X, were summed. The 3-sub scales making up basic positive affect scores were joviality (8-items), self-assurance (6-items), and attentiveness (4-items); for a total of 18-items. After the pre and post-training scores for these 18-items were summed, the summed score were divided by the total number items for that sub scale. Again, this was done for each time point to gain a pre and post positive affect score for Time 1, Time 2, and Time 3. To gain an overall average for basic positive affect, at each time point, the pre-training scores for positive affect were subtracted from the post-training scores. Again, subtracting pre from post-training session scores provided an overall score for Time 1, Time 2, and Time 3. The same steps taken to obtain a score for basic positive affect at each time point was done to obtain a score for basic negative. Basic negative affect is made up of 4-sub scales that assessed the following: sadness (5-items), guilt (6-items), hostility (6-items), and fear (6-items); for a total of 23-items. Items of the four subscales, at each time point for pre and post-training, was summed, and divided by the total number of items. Once an average had been obtained for both pre and post-training session, an overall score was gained by subtracting pre-training scores from post-training scores at each time point.
Two different scales were used to assess the participant’s subjective well-being. The first was the Personal Well-being Index-Adult (PWI-A) scale used to assess the participant’s quality of life in accordance with his or her well-being (see Appendix I). The PWI-A was developed from the Comprehensive Quality of Life Scale (ComQol) by the International Wellbeing Group of Australia (International Wellbeing Group, 2013). The PWI-A contains 7-items, rated on an 11-point Likert scale, assessing a person’s well-being in accordance with his or her quality of life and even personal safety (2013). The Cronbach alpha for the PWI-A, in Australia and overseas, is stated to be between 0.70 and 0.85 (2013). An average score of each participant’s PWI-A score was gained by adding the PWI-A’s 7-items and dividing by seven. The final score was used to obtain a conversion score. The conversion score was gained by taking the average raw score of a participant’s PWI-A, and moving the decimal point over twice (e.g. 6.5 becomes 65.0). The PWI-A manual suggests converting the raw scores to a standard 0-100 point format for the final analysis of the data (International Wellbeing Group, 2013). The manual also assures that conversion of the raw data scores does not degrade the statistical properties of that data (2013). This is because the process outlined by the manual is a simple linear conversion. The manual maintains that by converting the raw data, analysis can be conducted properly (2013).

The second scale subjective well-being scale used to measure participants was the Subjective Vitality (SV) scale (see Appendix J). The Subjective Vitality scale examines the participant’s feelings of being alive, alert, and having energy (Ryan & Fredrick, 1997). The scale was developed by Ryan & Fredrick (1997) as a tool for measuring an individual person’s subjective well-being and overall vitality. The Subjective Vitality (SV) scale consists of 7-items, rated on a 6-point Likert scale. The Cronbach alpha of the Subjective Vitality scale is 0.84.
(Ryan & Fredrick, 1997). An average score of each participant’s SV was obtained by summing the SV scales’ 7-items and dividing by seven.

**Demographic Survey**

The study used a basic demographic questionnaire that gained information on the following participant’s age, gender, race, marital status, education, employment status, occupation, hours/years worked in occupation, annual income, and previous experience with martial arts and/or self-defense training (see Appendix K). The demographic questionnaire was provided only once, at Time 1 of the study. The study used SPSS (Statistical Packages for Social Sciences) to analyze the demographic data gained on the participants of each implicit and explicit group. As previously indicated preapproval for all the measuring tools were acquired through the University Internal Review Board (IRB).

**Data Analysis**

The data gained during the 6 week self-defense program examined the self-efficacy, affect, subjective well-being, and skill acquisition of the implicit versus explicit groups. Data on skill acquisition was gathered at Time 2 and Time 3 during the six week self-defense program. Due to portions of the skills test being different at Time 2 compared to Time 3, two different analysis were used to analyze the data. A 2 (Group) by 2 (Time) repeated measures of ANOVA was used to analyze the ‘common’ skill, tested for speed in seconds, accuracy, and skill efficiency; at Time 2 and Time 3. An independent t-test was conducted to analyze the two ‘uncommon’ skills tested during the skills test at Time 2 and Time 3. To analyze the data for self-efficacy, positive and negative affect, and the two subjective well-being scales, a 2 (Group) by 3 (Time) repeated measures of ANOVA was utilized. The repeated measures of ANOVA
were used to see if any relationship existed among groups, and to compare two or more means to see if there was any significance between the groups. The use of the repeated measures of ANOVA allowed the study to control for the dependent variables, two training groups, and the independent variables testing; skill acquisition, self-efficacy, affect, and subjective well-being. A post hoc comparisons test using Bonferroni corrected was conducted for the common skills tests, self-efficacy, affect, and subjective well-being. The post hoc test evaluated the significance between Time 1, Time 2, and Time 3 for each variable. The method of using a post hoc test provided the study with a $p$-value that determines if there are any statistical differences among the groups. A post hoc test also reduced the study’s chances of committing a Type I error. Descriptive analysis was conducted on the demographic information and exploratory analysis was conducted on all data prior to SPSS analysis. Lastly, SPSS (Statistical Packages for Social Sciences) statistical analysis was used to conducted the data analysis and calculate the demographic information gathered on participants.
CHAPTER 4: RESULTS

Demographic Information

Thirty participants engaged in a six-week self-defense program consisting of two training conditions: the implicit self-defense training group and explicit self-defense training group. The implicit self-defense group had a mean age of 68.8 years of age \((SD=15.97)\), and predominately female \((n=14)\). For race and education, the majority identified as African-American \((n=10)\) and as having a College/University degree \((n=8)\). On marital status and profession, most of the implicit subjects reported being married \((n=11)\) as well as retired \((n=14)\). The average household income for the participants in the implicit group was between $30,001-40,000 \((M=7.20, SD=1.82)\). Regarding previous self-defense experience, most of the group \((n=14)\) had never had self-defense training prior to the study.

The mean age of the explicit group was 63.4 years \((SD=15.54)\), with the majority of participants being female \((n=14)\). Regarding race and marital status, most of the group identified as Caucasian \((n=9)\) and as being currently married \((n=11)\). Less than half reported having a College/University degree \((n=6)\) or higher, with most either having some college or High School diploma. The majority of the group also identified as being retired \((n=13)\). The annual household income of the group was between $30,001-40,000 \((M=6.67, SD=1.54)\), same as the implicit group. Out of the fifteen participants in the explicit group, four reported having engaged in some form of self-defense training.

Attendance was assessed based on the total 12 self-defense classes provided to participants. The results regarding attendance indicated that the implicit group \((M=8.67; SD=1.82)\)
$SD=1.40$) demonstrated lower adherence, than the explicit group ($M=9.53; SD=2.07$).

Descriptive statistics showed that both groups were similar at baseline, the exception being the explicit group having more participants with previous self-defense experience, than the implicit group. Details of the descriptive statistics can be found in Table 2.
### Table 2

Demographic information and participation levels of both self-defense groups

<table>
<thead>
<tr>
<th></th>
<th>Implicit Group (n=15)</th>
<th>Explicit Group (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (M+SD)</strong></td>
<td>68.8 (15.97)</td>
<td>63.4 (15.54)</td>
</tr>
<tr>
<td><strong>Race (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Caucasian</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Gender (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Marital status (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Widowed</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Divorced</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Never married</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Education level (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Some College</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>College degree</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Occupation status (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Not retired</td>
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<td>2</td>
</tr>
<tr>
<td><strong>Annual household income (n)</strong></td>
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</tr>
<tr>
<td>Below $25,000</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>$25,000-$30,000</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>$30,001-$40,000</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Above $40,000</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td><strong>Previous self-defense (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td><strong>Class attendance (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50% - 74%</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>75% - 99%</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>100%</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Implicit/Explicit Skills Test

Speed

The speed in which a participant performed a skill was tested through the two different skills tests. The speed of the common skill for both groups was evaluated using a 2 (Group) x 2 (Time) repeated measures of ANOVA was performed. Common skill results indicated a significant main effect for time, F(1,28)=8.85, p=.006, partial $\eta^2$=.24. The results also revealed a significant interaction for time by group, F(1,28)=6.04, p=.02, partial $\eta^2$=.177. No significant main effect for group was found, F(1,28)=1.24, p=.275, partial $\eta^2$=.04. The results indicated for the common skill that although both groups demonstrated similar speed at baseline, the implicit group’s speed improved over time compared to the explicit group (see Figure 1).

![Common Skill: Speed (seconds)](image)

**Figure 1:** The mean score for the speed of the common skill of each self-defense training group. Note: A lower mean score demonstrates greater speed in performing the skill, while a higher mean indicates a decrease in performance. *p=.006
An independent t-test was used to analyze the uncommon skills tested at Time 2 and Time 3. The results revealed significant effect for group, t(28)=5.56, p=.026. The results for the uncommon skill at Time 2 showed that the implicit group was performed faster than the explicit group. The t-test conducted on the uncommon skill at Time 3 also demonstrated a significant effect for group, t(28)=2.91, p=.001. Analysis revealed that both groups experienced a decrease in speed when performing the uncommon skill. Further examination showed that although the implicit group’s speed decreased, from Time 2 to Time 3, the implicit group did perform faster compared to the explicit group (see Figure 2).

![Uncommon Skill: Speed (seconds)](image)

**Figure 2:** Mean score for the speed of the uncommon skill for each self-defense training group.

Note: A lower mean score demonstrates greater speed in performing the skill, while a higher mean indicates a decrease in performance. *p=.026 **p=.001
Accuracy

To examine the difference between each training group for accuracy on the common skill a repeated measures of ANOVA was also performed. The results on the common skill showed a significant main effect for time, $F(1,28)=15.17$, $p=.001$, partial $\eta^2=.35$, and a significant main effect for group, $F(1,28)=4.17$, $p=.05$, partial $\eta^2=.13$. No significant interaction was found for time-by-group, $F(1,28)=.94$, $p=.33$, partial $\eta^2=.03$. The results indicated that for the common skill, the implicit group had better accuracy than the explicit group. Even though the implicit group’s accuracy score decreased, from Time 2 to Time 3 (see Figure 3).

![Common Skill: Accuracy](image)

Figure 3: Mean scores for accuracy of the common skill for each self-defense training group.

Note: The lower the mean score the greater the accuracy, whereas, a higher mean score indicates a decrease in accuracy. *$p=.001$
The independent t-test for the uncommon skill tested at Time 2 showed a significant effect for group, $t(28)=.00$, $p=.02$. The results indicated that the implicit group demonstrated better accuracy at Time 2, compared to the explicit group. For Time 3, the t-test conducted on the uncommon skill showed significant effect for group, $t(28)=1.41$, $p=.011$. Results revealed that implicit group had better accuracy at Time 3, compared to the explicit group. Evaluating the results of the common and uncommon skills showed that, although the implicit group demonstrated better accuracy than the explicit group, the implicit group’s accuracy score did not improve from Time 2 to Time 3 but became less accurate over time (see Figure 4).

![Uncommon Skill: Accuracy](image)

*Figure 4:* Mean scores for accuracy of the uncommon skill for each self-defense training group.

Note: The lower the mean score the greater the accuracy, whereas, a higher mean score indicates a decrease in accuracy. *$p=.02$ **$p=.011$*
Skill Efficiency

A 2 (Group) x 2 (Time) repeated measures of ANOVA was conducted to examine the difference between the two groups for the common skill. Results showed a significant main effect for time, $F(1,28)=19.68$, $p=.000$, partial $\eta^2=.41$ along with a significant main effect group, $F(1,28)=10.09$, $p=.004$, partial $\eta^2=.26$. The results showed no significant interaction for time by group, $F(1,28)=2.18$, $p=.15$, partial $\eta^2=.07$. The results show that even though the explicit group demonstrated greater self-efficacy than the implicit group, from Time 2 to Time 3. Further examination showed that the explicit group’s skill efficiency was shown to decrease across time (see Figure 5).

![Common Skill: Skill Efficiency](image)

**Figure 5:** Mean scores for skill efficiency of common skill for each self-defense training group.

Note: The lower the mean score indicates greater skill efficiency, and a higher mean score shows a decrease in skill efficiency. *$p=.000$
For the uncommon skill tested at Time 2, the independent t-test showed no significant effect for group, $t(28)=2.94$, $p=.097$. Meaning the explicit group’s skill efficiency and implicit group’s skill efficiency were similar at Time 2. The independent t-test for uncommon skills at Time 3 did reveal a significant effect for group, $t(28)=.02$, $p=.000$. Analysis of the uncommon skill revealed that the explicit group did improve in skill efficiency, from Time 2 to Time 3 (see Figure 6), while the implicit group demonstrated a decrease in skill efficiency.

*Figure 6: Mean scores for skill efficiency of uncommon skill for each self-defense training group. Note: The lower the mean score indicates greater skill efficiency, and a higher mean score shows a decrease in skill efficiency. *$p=.000$, n.s. = no significant findings*
Self-Efficacy

To evaluate the difference in self-defense self-efficacy of the two training groups a 2 (Group) x 3 (Time) repeated measures of ANOVA was performed. The results revealed a significant main effect for time, $F(2,56)=36.82$, $p=.000$, partial $\eta^2=.56$, but no significant main effect for group, $F(1,28)=1.25$, $p = .27$, partial $\eta^2=.04$. The results also found no significant interaction for time-by-group for self-efficacy, $F(2,56)=1.97$, $p = .148$, partial $\eta^2=.06$. Analysis of the data showed that although one learning group did not experience a greater increase in self-efficacy than another. The self-defense training program did lead to improvements in perceived self-efficacy for both the implicit and explicit groups. The mean statistics can be found in Table 3. A post hoc test with Bonferroni correction ($p=.0167$) revealed that Time 1 and Time 2 ($p=.000$) and Time 1 and Time 3 ($p=.000$) were significantly different, but not Time 2 and Time 3 ($p=.118$). Further revealing that from pre to post the intervention the self-efficacy of both groups was raised.

Table 3

<table>
<thead>
<tr>
<th>Measure</th>
<th>Implicit Group</th>
<th>Explicit Group</th>
<th>Time 1 $p$-value</th>
<th>Time 2 $p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>32.21 12.13</td>
<td>33.15 11.12</td>
<td>------</td>
<td>$p=.001$</td>
</tr>
<tr>
<td>Time 2</td>
<td>47.95 6.68</td>
<td>41.38 10.97</td>
<td>$p=.001$</td>
<td>------</td>
</tr>
<tr>
<td>Time 3</td>
<td>50.32 6.74</td>
<td>46.44 9.91</td>
<td>$p=.001$</td>
<td>$p=.118$</td>
</tr>
</tbody>
</table>
Affect

Positive Affect

Examining the differences in the two groups for positive affect, a 2 (Group) by 3 (Time) repeated measures of ANOVA was performed. The results indicated no significant main effect for time, F(2,56)=2.13, p=.13, partial $\eta^2=.07$. A significant main effect for group was found, F(1,28)=6.51, p=.016, partial $\eta^2=.18$, but no significant interaction for time by group, F(2,56)=.55, p=.57, partial $\eta^2=.01$. The lack of significance among the three time points was confirmed through a post hoc test using Bonferroni correction (p=.0167). The data showed no significant difference between Time 1 and Time 2 (p=.597), Time 1 and Time 3 (p=.137), or Time 2 and Time 3 (p=1.00). Therefore, both groups showed improvements in positive affect, with the implicit group showing more of a positive affect than the explicit group; regardless of the six week intervention. The mean statistics can be found in Table 4.

Table 4

Positive affect (PA) for each self-defense group

<table>
<thead>
<tr>
<th>Measure</th>
<th>Implicit Group</th>
<th>Explicit Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M  SD</td>
<td>M  SD</td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>0.63 0.67</td>
<td>0.20 0.35</td>
<td>n.s.</td>
</tr>
<tr>
<td>Time 2</td>
<td>0.68 0.61</td>
<td>0.50 0.61</td>
<td>n.s</td>
</tr>
<tr>
<td>Time 3</td>
<td>0.87 0.39</td>
<td>0.50 0.50</td>
<td>n.s</td>
</tr>
<tr>
<td>Total Group Mean</td>
<td>0.73 0.09</td>
<td>0.40 0.09</td>
<td>p=.016</td>
</tr>
</tbody>
</table>

Note: n.s. = non-significant findings between time points
Negative Affect

Results showed no significant main effect for time, $F(2,56)=.26$, $p=.767$, partial $\eta^2=.009$, or for group was found, $F(1,28)=.01$, $p=.91$, partial $\eta^2=.00$. No significant interaction was found for time by group, $F(2,56)=1.18$, $p=.31$, partial $\eta^2=.04$. Analysis of the findings of the showed that regardless of the learning environment, the participants did not experience any decrease in negative affect. A post hoc test with Bonferroni adjusted confirmed that no significant difference existed between the three time points ($p=1.00$). The mean statistics can be found in Table 5.

Table 5

Negative affect (NA) mean for each self-defense group

<table>
<thead>
<tr>
<th>Measure</th>
<th>Implicit Group</th>
<th></th>
<th>Explicit Group</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td>-0.17</td>
<td>0.37</td>
<td>-0.17</td>
<td>0.76</td>
<td>$p=1.00$</td>
</tr>
<tr>
<td>Time 2</td>
<td>-0.005</td>
<td>0.45</td>
<td>-0.20</td>
<td>0.40</td>
<td>$p=1.00$</td>
</tr>
<tr>
<td>Time 3</td>
<td>-0.18</td>
<td>0.24</td>
<td>-0.02</td>
<td>0.26</td>
<td>$p=1.00$</td>
</tr>
</tbody>
</table>
Subjective Well-being

Personal Well-being Index

A 2 (Group) x 3 (Time) repeated measure of ANOVA was performed to examine the differences of the personal well-being of the two training groups. Results showed a significant main effect for time, F(2,56)=25.84, p=.000, partial $\eta^2$.48, but no significant main effect for group, F(1,28)=2.19, p=.15, partial $\eta^2$.07. The results also revealed no significant interaction for time by group, F(2,56)=.50, p=.60, partial $\eta^2$.018. The analysis revealed that both groups showed an increase in personal well-being. Mean statistics can be found in Table 6. Inspection of time through a post hoc comparison test, with Bonferroni correction (p=.0167), revealed a significant difference for Time 1 and Time 2 (p=.000) as well as for Time 1 and Time 3 (p=.000). A significant difference was also shown between Time 2 and Time 3 (p=.015). The analysis confirmed that the implicit and explicit groups showed improvement in personal well-being, pre to post the self-defense study.

Table 6

<table>
<thead>
<tr>
<th>Measure</th>
<th>Implicit Group</th>
<th>Explicit Group</th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Time 1</td>
<td>79.50</td>
<td>6.56</td>
<td>75.00</td>
<td>10.36</td>
</tr>
<tr>
<td>Time 2</td>
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<td>8.69</td>
<td>82.25</td>
<td>5.55</td>
</tr>
<tr>
<td>Time 3</td>
<td>88.91</td>
<td>5.25</td>
<td>85.83</td>
<td>5.52</td>
</tr>
</tbody>
</table>
Subjective Vitality Scale

The differences between the two groups for subjective vitality were examined using the 2 (Group) x 3 (Time) repeated measures of ANOVA. Results showed a significant main effect for time, $F(2,56)=8.33$, $p=.000$, partial $\eta^2=.22$, but no significant main effect for group, $F(1,28)=0.15$, $p=.695$, partial $\eta^2=.006$. Results also indicated no significant interaction for time by group, $F(2,56)=1.72$, $p=.187$, partial $\eta^2=.058$. The findings of the study revealed that from pre to post the self-defense study, both the implicit and explicit groups increased in subjective vitality. Mean statistics can be viewed in Table 7. Further analysis, using a post hoc comparison test, with Bonferroni correction ($p=.0167$), revealed a significant difference between Time 1 and Time 3 ($p=.000$) and between Time 2 and Time 3 ($p=.04$). However no significant difference was found between Time 1 and Time 2 ($p=.76$). Analysis among the three time points confirmed that pre to post the intervention the subjective vitality of both learning groups improved.

Table 7

Subjective vitality mean for each self-defense group

| Measure | Implicit Group | | | Explicit Group | | | | | Time 1 | Time 2 |
|---------|---------------|---------|---------|---------------|---------|---------|---------|---------|
|         | M  SD         | M  SD   | | p-value       | | | p-value |
| Time 1  | 5.26 0.49     | 5.44 0.73 | | -------       | | | p=.76   |
| Time 2  | 5.56 0.64     | 5.45 0.81 | | $p=.76$       | | | ------- |
| Time 3  | 6.02 0.55     | 5.72 0.72 | | $p=.000$      | | | $p=.04$ |
CHAPTER 5: DISCUSSION

In the past several decades focus on effective solutions to counter violence and violent crimes have increased. A variety of methods have been developed to deal with violence, from educational programs to self-defense programs. Self-defense training has emerged as a notable method for empowering the social construct to deal with violent crime. Much of the research that exists regarding self-defense training has examined the application, benefits, and effectiveness of such training. Expounding upon previous research involving self-defense, this present study examined the impact of a six-week self-defense training program on a participant’s self-efficacy, affect, and subjective well-being. The present study also worked to expound upon previous research by examining if one type of motor learning style had a greater impact on participants, than another learning style. The study accomplished this by providing two different self-defense learning environments, implicit versus explicit.

The study found that engaging in a six-week self-defense program, did increase a participant’s perceived self-efficacy. The findings supported the study’s first hypothesis, indicating that self-defense can be used to raise self-efficacy; specifically in regards to self-defense. The outcome of the results demonstrate a relationship between self-defense training and perceived self-efficacy that coincides with previous research. Previous research examining the effects of self-defense training have found that such training has a positive influence on perceived self-efficacy (Ozer & Bandura, 1990; Weitlauf et al., 2000; Ball & Martin, 2012). This is even more evident when self-defense training programs are structured in such as manner as to provide mastery experiences to participants (Ozer & Bandura, 1990). Programs that promote that allow for personal experiences of success through mastery experiences to be achieved have
shown to increase self-efficacy to the greatest degree (Ozer & Bandura, 1990; Bandura, 1990; Bandura, 1993).

Weitlauf, Smith, & Cervone (2000) examined the impact of self-defense training on self-defense self-efficacy, assertiveness, and aggression. The study recruited female participants, to engage in a six-week self-defense training program (Weitlauf, Smith, & Cervone, 2000). The results of the study found that the experimental group experienced an increase in aggression and assertiveness, and a decrease in hostility; compared to the control group (Weitlauf, Smith, & Cervone, 2000). Most importantly, both groups experienced an increase in self-defense self-efficacy, from pre to post six-week program conclusion (Weitlauf, Smith, & Cervone, 2000). The findings of the present study correspond to the results of the study by Weitlauf, Smith, & Cervone, in regards to self-defense self-efficacy. The present study demonstrated that participation in a six-week self-defense program raised the self-efficacy of the participants.

The findings of the current study, did not show that implicit instruction lead to greater self-efficacy, compared to explicit instruction. The results of the study provided only partial support for the study’s second hypothesis. The study stated that providing training in an implicit manner would lead to greater self-efficacy and skill acquisition, compared to an explicit training environment. The findings demonstrated that regardless of the instruction, participants of both groups increased in self-efficacy. The fact that both the implicit and explicit self-defense groups increased in self-efficacy was appropriate. The design of the study had provided both groups with mastery experiences which lead to greater self-efficacy. Findings by this study, regarding self-efficacy and implicit versus explicit instruction coincides with previous research. The study by Gorman & Farrow (2009) found that regardless of the learning being implicit or explicit, both groups experienced an increase in self-efficacy over time. The results of the study by Gorman &
Farrow as well as the present study provide evidence that both implicit learning and explicit learning can have a marked impact on self-efficacy. Moreover, the findings of the present study strengthen the idea that both styles of learning can be employed for the purpose of increasing perceived self-efficacy.

Even though implicit self-defense instruction alone did not raise self-efficacy, findings of the study did show a link between implicit learning and skill performance. The study’s findings revealed that participants who learned a skill implicitly performed faster and more accurately compared to those who were provided explicit self-defense instruction. The only time that the explicit group demonstrated greater skill performance was for skill efficiency. Participants provided explicit self-defense instruction were found to perform skill more proficiently, but less accurately than the implicit group. The findings regarding implicit learning enhancing skill performance coincide with previous studies comparing implicit to explicit learning environments. Studies examining the benefits of implicit versus explicit learning have argued that an implicit learning environment fosters and enhances skill performance in both athlete and non-athletes (Shea, Wulf, Whitacre, & Park, 2001; Poolton & Zachry, 2007; Gabbett & Masters, 2011). The promotion of implicit learning in physical activity programs have been shown to enhance coping mechanisms for handling high pressure situations (Gabbett & Masters, 2011). Compared to an explicit learning environment, implicit learning also demonstrated greater retention of skill over time (Gabbett & Masters, 2011). The findings of the current study coincided with the findings of previous studies showing that participants in the implicit self-defense program demonstrated greater accuracy and speed in performing the skills learned.

Rendell, Farrow, Masters, & Plummer (2011) examined the use of implicit practice techniques by coaches on skills athletes. The study conducted a six-week training intervention,
two times a week, on two female, expert netball players (Rendell, Farrow, Masters, & Plummer, 2011). One female participant was identified as having 24-years of experience playing netball, while the second participant had only been playing professionally for 2-years. The six-week intervention promoted the use of an implicit learning environment combined with physical practice. The results of the study found that although both netball players adapted implicitly to any skill changes experienced in practice, though accuracy remained unchanged.

However, the study’s findings that the explicit group demonstrated better skill efficiency also coincides with previous research. Studies that have examined the benefits of explicit learning have shown that this learning style can increase self-awareness and willed action (Dienes & Perner, 1999). Previous studies have also demonstrated that explicit learning is linked to rule-based learning. Meaning, as a person learns a task explicitly then the person develop rules and instruction to continue to carry out the task. For the current study, the development of explicit rules that promote self-awareness would also impact a person’s ability to effectively perform a task. The findings of the current study demonstrate the benefits of both learning styles, and the strengths that each style provides to the acquisition of self-defense skills.

In regards to the study’s findings concerning the impact of the learning environment on affect, only positive affect was found to increase. Results regarding affect provided only partial support of the study’s third hypothesis. The findings of the study demonstrated that engaging in six weeks of an implicit or explicit self-defense environments lead to an increase in a participant’s positive affect. Yet the study did not find a positive correlation between the learning environment and negative affect. The findings of the study for positive affect coincide with previous research. Studies examining the impact of self-defense on positive and negative affect showed that participation in a self-defense program positive affect increases and decreased
negative affect (Bodin & Martinsen, 2004). It is this later aspect regarding negative affect that the present study differs from previous studies. Even so, enough evidence exists within research to show that the outcome of the present study for negative affect is not common. Bodin and Martinsen (2004) demonstrated that participation in a self-defense program, such as martial arts, was shown to decrease a person’s negative affect. Similar findings were indicated by Ball & Martin (2012), which showed that self-defense training influenced affect, by decreasing a person’s feelings of fear.

There are several reasons that the findings demonstrated the lack of a relationship between the implicit versus explicit learning environment and negative affect. First, the fact that the participants in the present study were older in age could have been a factor. The fact that the participants were older and engaged in regular physical activity might have contributed to the lack of changes in negative affect. At the same time, the older participants attended the Vidant Wellness Center not only for physical activity purposes, but for social interaction as well. The social engagement received while at the center could have impacted the participant’s affect. Therefore, causing the participant to exhibit a lower negative affect due to the training environment. Another possibility is that the participants could not have fully understood PANAS-X evaluating affect, or had not wanted to answer truthfully on the questionnaire. The study proposes that these factors: participant’s age, consistent engagement in physical activity, and lack of understanding of the affect scale could have led to the results regarding self-efficacy and negative affect. The study also maintains that the participant’s negative affect was already low, and not be lowered by further instructional environment, or the six-week self-defense program.
The current study found that the learning environment did have a marked impact on a participant’s subjective well-being. The findings of the study showed that over time participants in both the implicit and explicit groups demonstrated an increase in personal well-being and subjective vitality. The results regarding subjective well-being, the final hypothesis, was the only other hypothesis to be fully supported by the results of the study. The findings indicated that from pre to post intervention, participants of both groups demonstrated greater subjective well-being. Although minimal research has been conducted on the influence of implicit versus explicit learning on subjective well-being. Previous research has shown a correlation between self-efficacy and subjective well-being (Tong & Song, 2004; Sharma & Sharma, 2013; Laureano, Grobbelaar, & Nienaber, 2014).

Mamta & Nov Rattan Sharma (2013) examined the relationship between self-efficacy and subjective well-being in older adults. The study surveyed 150 elderly persons with a mean age of 65.60 years. The results of the study showed that an older person’s perceived self-efficacy influenced subjective well-being (Sharma & Sharma, 2013). The study found that subjective well-being decreased as the older person’s self-efficacy decreased, and increased as did self-efficacy (Sharma & Sharma, 2013). The findings of Sharma & Sharma coincide with studies examining older adults. The findings of the presents study reinforce the findings of previous studies, indicating self-efficacy can have a direct influence on subjective well-being.

Research comparing older and younger adults, discovered that explicit learning declined in older adults compared to younger adults, but not when it came to implicit learning (Benett, Howard, & Howard, 2007; Janacsek, Fiser, & Nemeth, 2012; Verneau, Kamp, Savelsbergh, & de Looze, 2014). This demonstrated that older adults continue to learn implicitly, even if there is a decline in explicit learning over time (Beenett, Howard, & Howard, 2007; Janacsek, Fiser, & Nemeth,
The findings of previous studies demonstrate that implicit learning can be retained and used for learning of new skills; regardless of age.

*Self-Defense Implications*

The current study consisted primarily of older adults that were sixty years of age and older. The mean age of the participants represent 24.3% of the United States current population. Recruitment of older adults for a self-defense training program was unique. Most self-defense programs focus on recruiting college age to middle-aged females. Reasoning behind this is the view that younger people are exposed to and experience more violence than older adults. Additionally, the capabilities of older adults being to learn and utilize self-defense skills is often overlooked. However, trends reported by the CDC and FBI have indicated that violence toward the elderly is rising. Minimal research has been conducted on examining the benefits of self-defense training for older adults. In conducting the review of literature, the researcher could not find a study that evaluated self-defense on older adults, other than studies involving Yoga or Tai Chi classified as mind-body activities. The findings of the present study provides support that self-defense training can be just as beneficial for older adults, as for younger populations.

Research has shown that older adults can learn new motor skills, especially when the skill involves a series of tasks (Seidler, 2007). In order to promote successful learning of new skills, the task should be repetitive and involve practice trails (Seidler, 2007). This is particularly important when it comes to teaching and instructing older adults during a physical activity program, like self-defense training. As the current US population grows older, the sport and exercise field will need to make necessary adjustments to promote the retention and learning of new motor skills in older adults. The same has to be done by self-defense and martial arts
instructors seeking to counter violence and elder abuse specifically by teaching older adults self-defense. The CDC (2013) maintains that when it comes to elder abuse, 1 in 10 older adults have reported experiencing some form of physical, emotional, or sexual mistreatment as well as neglect within the last year. The fear of sexual assault, rape, and other acts of violence does not decline with age. By offering self-defense training to older adults, violence as a public health concern can be addressed within this population.

Self-defense programs will also want to employee the use of an implicit versus explicit environment or an instructional environment that provides both learning styles. In doing so, self-defense training programs will be able to promote retention of skills learned that is robust and long-lasting. Unfortunately, most self-defense programs rely on explicit verbal instruction when teaching self-defense, which overload the learner. As indicated, the use of implicit instruction to promote skill acquisition and performance are beneficial to enhancing the accuracy and retention of self-defense skills (Poolton et al., 2007; Masters et al., 2008; Gabbett & Masters, 2011; Rendell, Farrow, Masters, & Plummer, 2011). The findings of this study recognize that further research on how self-defense training is provided can lead to greater benefits; such as greater performance, self-efficacy, affect, and subjective well-being.

Recommendations for Future Research

Therefore, based on the findings of this study, future research would benefit from further examination in the role implicit versus explicit learning plays on learning new motor skills. Additionally, future research should continue to investigate the benefits of implicit versus explicit learning on self-defense training and similar forms of physical activity, such as martial arts and military combat training. Future research should also continue to examine the
relationship between implicit and explicit learning on self-efficacy and subjective well-being. Both implicit and explicit learning methods affected the participant’s self-efficacy and subjective well-being and investigating this relationship further is essential. As previously indicated, minimal research has been done to evaluate implicit versus explicit learning on self-defense, self-efficacy, or a person’s subjective well-being. Due to the study’s mean age, future research would benefit from examining the benefits of self-defense training on older adults as well as other populations. With elder abuse becoming more of a concern, further research into the implications self-defense training has for those sixty-years of age and older is essential. Future researcher should also examine the impact implicit/explicit learning has on older adult’s self-efficacy, subjective well-being, and ability to learn new motor skills. The findings of the present study provided evidence that older adults are capable of learning self-defense, whether provided implicitly or explicitly. This broadens the horizon for future studies to explore the possibility that older adults are capable of benefiting from and learning complex motor skills that were previously afforded to younger adults. Finding ways of providing self-defense training in a more effective manner will be key to offset violence in the future. To counter this public health concern, future research should investigate the impact of implicit versus explicit learning on self-defense instruction.

Conclusion

Based on the findings of the current study, a void within research was filled regarding self-defense and the type of learning environment provided, subjective well-being, and the elderly population. Previous studies examining self-defense training have done little to examine the impact of the learning environment on the acquisition of self-defense skills. The present study took previous research further by providing the self-defense training in an implicit versus
explicit manner. Minimal research has been conducted studying the impact of self-defense on the older population. The present study also recruited a population that was not common for most self-defense studies. The findings of this study demonstrated that self-defense can have a positive impact for all age groups, including older adults. Additionally, the study added to the knowledge base regarding self-defense and subjective well-being. Previous studies that have examined subjective well-being have primarily focused on the relationship between well-being and self-efficacy. The findings of the study showed that training such as self-defense, can have a positive impact on a participant’s well-being, particularly on subjective vitality. The present study exhibited that an implicit and explicit learning environment can influence a person’s well-being. Ultimately, the study contributed to the knowledge base, regarding implicit/explicit learning and self-defense, and provided implications for areas previously void of such knowledge. In summary, the findings associated with the present study coincide with previous studies on self-defense, self-efficacy, and affect. Yet, the present study took previous research further, and gave implications to how violence might be countered by offering more effective ways of providing self-defense training.
REFERENCES


http://cascade.uoregon.edu/spring2013/social-sciences/are-women-safer-when-they-learn-self-defense/


APPENDIX A: INFORMED CONSENT DOCUMENT

Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Implicit versus Explicit Self-Defense Training Instruction on Self-Efficacy, Affect, Subjective Well-being, & Skill Acquisition
Principal Investigator: ‘Meg’ Margaret Sanders
Institution/Department or Division: Kinesiology Department
Address: Minges Coliseum, Greenville, NC 27858
Telephone #: 252-328-4630

Study Sponsor/Funding Source: N/A

Researchers at East Carolina University (ECU) and the Vidant Wellness Center study problems in society, health problems, environmental problems, behavior problems and the human condition. Our goal is to try to find ways to improve the lives of you and others. To do this, we need the help of volunteers who are willing to take part in research.

Why is this research being done?
The purpose of this research is to see if how a self-defense training class is instructed has a noticeable impact on a participant. Specifically, I want to see if the way self-defense training instruction is provided increases a person’s belief that he or she can perform the self-defense skill being taught. The study will also look to see if a person’s beliefs or confidence to perform a skill has a positive effect on his or her emotional state, well-being, and abilities to perform the skills being learned. The decision to take part in this research is yours to make. By doing this research, we hope to gain more insight into the benefits or lack thereof of engaging in self-defense training.

Why am I being invited to take part in this research?
You are being invited to take part in this research because you’re a healthy, adult volunteer. If you volunteer to take part in this research, you will be one of about 50 people to do so.

Are there reasons I should not take part in this research?
I understand I should not volunteer for this study if I am under 18 years of age, I am on medicine for depression, physically or mentally unhealthy, or not able to complete the six week self-defense program.

What other choices do I have if I do not take part in this research?
You can choose not to participate, and can discontinue participation in the study at any time.

Where is the research going to take place and how long will it last?
The research procedures will be conducted at the Vidant Wellness Center of 2610 Stantonsburg Road in Greenville, NC. The facilities phone number is 252-847-6501. During the study, you will need to come to the entrance of the Vidant Wellness Center, check in at the service desk, and proceed to the ‘aerobics’ studio. The total amount of time you will be asked to volunteer for this study is 50 minutes a week (two visits per week) over the next six weeks.

What will I be asked to do?
You are being asked to do the following:
1. Participate in and complete a 6 week self-defense program, at the Vidant Wellness Center.
2. Learn a variety of basic self-defense techniques such as a block; non-lethal strike with both your hands, knees, and elbows; how to defend against a choke or a grab, and perform a combination of techniques by the end of the six week program.
3. Take part in two different skills tests that will be offered three weeks into the program, and again at the end of the program. The skills tests will assess how each participant is progressing in the program with learning as well as performing the skills being taught.
4. Allow the principal investigator to document the study by taking digital images/pictures during class time or skills tests. Your identity will be evident to those individuals who see any digital images recorded during the study. However, I will take precautions to ensure that anyone not authorized to see your identity will not be given access.
5. Complete a series of questionnaires that examine the following: your beliefs regarding self-defense, your beliefs about your ability to protect yourself, and about your emotional state and well-being.
6. You will be asked to complete the questionnaires at three times during the study; at the beginning, mid or at three weeks, and finally at the end of the six week self-defense program.
7. Consent in allowing photography and digital images of your participation in the course to be taken, during the six week self-defense program; documenting your progress throughout the study.

What possible harms or discomforts might I experience if I take part in the research?
There are possible risks (the chance of harm) when taking part in this research. Those potential risks are experiencing some risk/discomfort regarding the subject of self-defense, performing the self-defense skills being taught, the questions asked within each of the surveys/questionnaires, and sharing information when completing the surveys/questionnaires.

What are the possible benefits I may experience from taking part in this research?
Other people who have participated in this type of research have experienced an increase in self-confidence, self-esteem, increased positive emotions, increased feeling of well-being, and a decrease in negative emotion. There may be no personal benefit from your participation, but the information gained by doing this research may help others in the future. By participating in this research study, you may also experience these benefits.

Will I be paid for taking part in this research?
We will not be able to pay you for the time you volunteer while being in this study.
What will it cost me to take part in this research?
It will not cost you any money to be part of the research. The facility sponsoring this research study will pay for and cover all costs including the cost of the training space, training and safety equipment, and any additional costs for sponsoring the six week self-defense study.

Who will know that I took part in this research and learn personal information about me?
To do this research, ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- Any agency of the federal, state, or local government that regulates human research. This includes the Department of Health and Human Services (DHHS), the North Carolina Department of Health, and the Office for Human Research Protections
- The University & Medical Center Institutional Review Board (UMCIRB) and its staff, who have responsibility for overseeing your welfare during this research, and other ECU staff who oversee this research.
- People designated by Vidant Medical Center and Vidant Health; including the Vidant Wellness Center
- Additionally, the following people and/or organizations may be given access to your personal health information and they are: East Carolina University Graduate School, East Carolina Kinesiology Department, the faculty supervisor Dr. Nicolas Murray, and any other designated faculty member at East Carolina University.

How will you keep the information you collect about me secure? How long will you keep it?
The identifying information will be kept for a minimum of three years. At the same time, all of the physical data and electronic data, including digital images, will be stored in a locked cabinet. If the information obtained; whether physical, electronic or digital be used in future research, then the information will be stripped of identifiers. The information obtained could also be used in future research without anyone knowing it is information from the participant. In addition, the information and data obtained will exclude any physical or electronic identifiers that would link the participant to the study.

What if I decide I do not want to continue in this research?
If you decide you no longer want to be in this research after it has already started, you may stop at any time. You will not be penalized or criticized for stopping. You will not lose any benefits that you should normally receive.

Who should I contact if I have questions?
The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator, ‘Meg’ Sanders at 828-216-7312 (days, 8:00 am – 5:00 pm) or the Faculty Supervisor, Dr. Nicolas Murray at 252-737-2977 (days, 8:00 am-5:00 pm).

If you have questions about your rights as someone taking part in research, you may call the Office for Human Research Integrity (OHRI) at phone number 252-744-2914 (days, 8:00 am-
If you would like to report a complaint or concern about this research study, you may call the Director of the OHRI, at 252-744-1971

Is there anything else I should know?
Again, your participation in this study is voluntary. You do not have to take part in this research, and at any time during the study you can choose to stop participating.

If you decide you are willing to take part in this study, please sign below.

I have decided I want to take part in this research. What should I do now?
The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

__________________________
Participant's Name (PRINT)    Signature    Date

Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person’s questions about the research.

__________________________
Person Obtaining Consent (PRINT)    Signature    Date

Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person’s questions about the research.
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<th>Person Obtaining Consent (PRINT)</th>
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APPENDIX B: IRB APPROVAL FORM

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building Mail Stop 682
600 Mowe Boulevard · Greenville, NC 27834
Office 252-744-2914 Fax 252-744-2284 · www.ecu.edu/irb

Notification of Amendment Approval

From: Social/Behavioral IRB
To: Margaret Sanders
CC: Nicholas Murray Margaret Sanders
Date: 3/3/2014
Re: Am 1 UMCIRB 14-000052
UMCIRB 14-000052
Implicit versus explicit self-defense training instruction on self-efficacy, affect, subjective well-being, & skill acquisition.

Your Amendment has been reviewed and approved using expedited review for the period of 3/3/2014 to 2/17/2015. It was the determination of the UMCIRB Chairperson (or designee) that this revision does not impact the overall risk/benefit ratio of the study and is appropriate for the population and procedures proposed.

Please note that any further changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. A continuing or final review must be submitted to the UMCIRB prior to the date of study expiration. The investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

<table>
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<td>Demographic Survey Self Defense(0.01)</td>
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The Chairperson (or designee) does not have a potential for conflict of interest on this study.
APPENDIX C: VIDANT WELLNESS CENTER APPROVAL LETTER

January 17, 2014

VIDANT HEALTH™

To: East Carolina University
   Attn.: UMCIRB
   600 Moya Blvd.
   Mail Stop 682
   Greenville, NC

From: Dwight Speaker
       Administrator
       Vidant Wellness Center
       2610 Stantonsburg Rd.
       Greenville, NC

Subject: Letter of Support

Dear UMC Institutional Review Board,

As the Administrator of the Vidant Wellness Center in Greenville, NC, I would like to express my support of Mrs. Sanders' research proposal: "Implicit versus Explicit Self-Defense Training Instruction on Self-Efficacy, Affect, Subjective Well-being, and Skill Acquisition."

This research study builds upon the wellness center and Health Access’ goal to create a culture that empowers and educates the people of the Greenville community. I believe the research project will benefit the community by providing a service that enhances and expands the community’s knowledge; regarding self-protection.

The Vidant Wellness Center looks forward to collaborating with Mrs. Sanders and the ECU Kinesiology Department, in an effort that promotes safety and awareness. The wellness center is pleased to offer a space for Mrs. Sanders research endeavors, and I am hopeful that the proposal will be a success. I believe this research project is important, feasible, and consistent with the mission set forth by Health Access.

Sincerely,

Dwight Speaker
Administrator
Vidant Wellness Center-Greenville
2610 Stantonsburg Road
Greenville, NC 27834
252.847.8501
VidantWellnessCenter.com
# APPENDIX D: TABLE 1: SELF-DEFENSE CURRICULUM

*Self-defense curriculum for both the implicit and explicit self-defense groups*

<table>
<thead>
<tr>
<th>Week</th>
<th>Self-Defense Focus</th>
<th>Self-Defense Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic blocks</td>
<td>Blocking a hook punch</td>
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<tr>
<td></td>
<td></td>
<td>Blocking a straight punch</td>
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<tr>
<td></td>
<td></td>
<td>Blocking a jab punch</td>
</tr>
<tr>
<td></td>
<td>Basic striking</td>
<td>Palm heel strike</td>
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<tr>
<td></td>
<td></td>
<td>Knife hand strike</td>
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<tr>
<td></td>
<td></td>
<td>Claw or gauging strike</td>
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<tr>
<td>2</td>
<td>Advanced basic blocks</td>
<td>Blocking an elbow strike</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blocking a knee strike</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blocking a hook, straight, or jab punch</td>
</tr>
<tr>
<td></td>
<td>Advanced striking</td>
<td>Elbow strike</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knee strike</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strike with a hook, straight, or jab punch</td>
</tr>
<tr>
<td>3</td>
<td>Combination of blocks</td>
<td>Blocking against multiple techniques: a hook punch, straight punch, jab punch, knee strike, or elbow strike</td>
</tr>
<tr>
<td></td>
<td>Skills Test 1: Time 2 (mid)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Grab defense</td>
<td>Defense against one-hand grab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Defense against two-hand grab</td>
</tr>
<tr>
<td>5</td>
<td>Choke hold defense</td>
<td>Review of combos</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>Defense against a front-choke with one-hand</td>
<td>Review of combination of techniques:</td>
</tr>
<tr>
<td></td>
<td>Defense against a front-choke with two-hands</td>
<td>all blocking and striking techniques</td>
</tr>
<tr>
<td></td>
<td>Defense against a rear-choke hold</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Review of grab and choke defense</td>
<td>Review of all grab defense techniques and choke defense techniques</td>
</tr>
</tbody>
</table>

Skills Test 2: Time 3 (post)
APPENDIX E: IMPLICIT SELF-DEFENSE INSTRUCTIONAL MATRIX

The following techniques have been used to ensure implicit self-defense instruction occurred.

The coaching or instructional techniques used were combined with lots of physical demonstration.

- Analogies
- Cue Words
- Physically demonstrating techniques while using analogies and cue words
- Attack Scenarios and self-defense scenarios
- Refrained from using technical terms or specified instruction.
- Errorless learning to promote mastery experiences.

Example of analogies and cue words for each technique:

<table>
<thead>
<tr>
<th>Technique</th>
<th>Implicit Instruction:</th>
<th>Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
<td>Cue word(s)</td>
<td>Arc block; Arc Fast; Fast Arc</td>
</tr>
<tr>
<td></td>
<td>Analogies</td>
<td>“Imagine your arm is like a strong whip or metal rod that arcs up and fast through the air, stopping anything that comes in its way.” “Imagine someone is trying to reach for your shoulder/purse.”</td>
</tr>
<tr>
<td>Palm strike</td>
<td>Cue word(s)</td>
<td>Palm Punch; Fast Palm; High five face;</td>
</tr>
<tr>
<td></td>
<td>Analogies</td>
<td>“Say ‘Hi’ to the face.” “Imagine your hand is like a stop sign coming towards the attacker to tell him or her to stop.”</td>
</tr>
<tr>
<td>Finger strike</td>
<td>Cue word(s)</td>
<td>Leopard claw; Claw strike; Fast Claw</td>
</tr>
<tr>
<td></td>
<td>Analogy</td>
<td>“Imagine your fingers and hand are like a leopard’s paw that reaches out to claw your attacker’s face.”</td>
</tr>
<tr>
<td>Knife-hand strike</td>
<td>Cue word(s)</td>
<td>Sword-hand; Sword-hand chop; Fast Chop</td>
</tr>
<tr>
<td></td>
<td>Analogies</td>
<td>“Imagine your hand is a sword that quickly cuts the attacker.” “Imagine you’re chopping a tree or wood, and your hand is the hatchet.”</td>
</tr>
<tr>
<td>Elbow block</td>
<td>Cue word(s)</td>
<td>Push Away; Fast Push Away; Catch and Arc</td>
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</tr>
<tr>
<td>Analogy</td>
<td>“Imagine you have a__(bug/bee/object)__ in your face, and you’re pushing/arcing/ moving it out of your face.”</td>
<td></td>
</tr>
<tr>
<td>Elbow block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee block</td>
<td>Cue word(s)</td>
<td>Slap Away; Fast Slap Away</td>
</tr>
<tr>
<td>Analogy</td>
<td>“Imagine a__(dog/object)__ is coming towards your knee/lower body, and you have to slap it away.” “Imagine something is coming towards a small child beside you, and you’re protecting the child by slapping it away.”</td>
<td></td>
</tr>
<tr>
<td>Elbow block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grab Defense</td>
<td>Cue word(s)</td>
<td>Rock &amp; Roll; Rock In &amp; Roll; Fast Rock &amp; Roll</td>
</tr>
<tr>
<td>Analogy</td>
<td>“Imagine your arm is like a rocking horse, rocking up and then flinging away.” “Imagine you’re throwing a bowling ball, and then turn and wave to the crowd.” “Imagine your flinging the attacker away.”</td>
<td></td>
</tr>
<tr>
<td>Choke Defense</td>
<td>Cue word(s)</td>
<td>“L” Chop; “L” Chop Fast; Push &amp; Pull</td>
</tr>
</tbody>
</table>
| Analogy     | “Imagine your arm is the shape of an ‘L.’ “Imagine your arm is a wind shield wiper that’s rising up and swiping down.” “Imagine your arm is like an axe that is swinging up, and chopping down
on a log of wood that is beside you (as opposed to directly in front).” “Imagine leaning forward to take your jacket/shirt off (over your head).”
APPENDIX F: EXPLICIT SELF-DEFENSE INSTRUCTIONAL MATRIX

The following techniques have been used to ensure explicit self-defense instruction occurred.

The coaching or instructional techniques used were combined with lots of physical demonstration.

- Specific instruction on how to perform the technique.
- Called each technique by its technical or proper name.
- Verbal instruction combined with physical Demonstration
- Verbal instruction combined with attack Scenarios
- Promoted mastery experiences through specified drills

Example of instruction for each technique:

<table>
<thead>
<tr>
<th>Technique:</th>
<th>Explicit Instruction:</th>
<th>Example:</th>
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</thead>
<tbody>
<tr>
<td>Block</td>
<td>Technical term used</td>
<td>Roll block or Circle Block</td>
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<tr>
<td></td>
<td>Verbal instruction</td>
<td>“Block the punch and roll the arm away.”</td>
</tr>
<tr>
<td>Palm strike</td>
<td>Technical term</td>
<td>Palm Heel strike</td>
</tr>
<tr>
<td></td>
<td>Verbal instruction</td>
<td>“Strike to the face with the palm of your hand.”</td>
</tr>
<tr>
<td>Finger strike</td>
<td>Technical term</td>
<td>Finger strike</td>
</tr>
<tr>
<td></td>
<td>Verbal instruction</td>
<td>“Use your fingers to strike and gauge at the face/eyes.”</td>
</tr>
<tr>
<td>Knife-hand strike</td>
<td>Technical term</td>
<td>Knife-hand strike</td>
</tr>
<tr>
<td></td>
<td>Verbal instruction</td>
<td>“Strike at the face/neck with the outside edge of the hand.”</td>
</tr>
<tr>
<td>Elbow</td>
<td>Technical term</td>
<td>Elbow strike</td>
</tr>
<tr>
<td></td>
<td>Verbal instruction</td>
<td>“Bring up your right elbow, palm facing down as you do so, and strike to the face.”</td>
</tr>
<tr>
<td>Technique</td>
<td>Technical term(s)</td>
<td>Verbal instruction</td>
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</tr>
<tr>
<td>Knee</td>
<td>Knee strike</td>
<td>“Grab the attacker by the shoulder as you bring up your knee into the attacker’s groin.”</td>
</tr>
<tr>
<td>Elbow block</td>
<td>Elbow block</td>
<td>“As the attacker throws an elbow strike, step to the outside as you block underneath their arm, and roll the elbow strike away.”</td>
</tr>
<tr>
<td>Knee block</td>
<td>Knee block</td>
<td>“As the attacker throws a knee strike, step to the side, and strike/push their knee away.”</td>
</tr>
<tr>
<td>Grab Defense</td>
<td>One-hand grab, two-hand grab, Cross grab, Split grab</td>
<td>“As the attacker grabs and pulls your arm, bring the arm that’s grab up into an ‘L’ shape, and quickly roll your arm clockwise to the outside.”</td>
</tr>
<tr>
<td>Choke Defense</td>
<td>Front choke, Rear choke hold</td>
<td>“Bring arm up in an ‘L’ shape, and strike the same elbow of the arm that the attacker is using to choke you.” For rear choke only: “Elbow the attacker in the chest, while pushing your head out from under the arm. Trap the attacker’s arm, once free, and place it in a joint locking hold.”</td>
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</tbody>
</table>
APPENDIX G: SELF-DEFENSE SELF-EFFICACY INSTRUMENT

Please use the following scale for question 1.

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<thead>
<tr>
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<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot Do At All</td>
<td>Moderately Certain Can Do</td>
<td>Certainly Can Do</td>
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1. You are walking on a public street when a man grabs you from behind. At the moment that this happens you do not see any other people close by.

How confident are you that you can, as of now:

1a. ________Scream loudly more than once
1b. ________Struggle physically in any way
1c. ________Stomp to the instep of the foot to cause pain
1d. ________Use your elbow to forcefully strike him
1e. ________Pull his finger back and release his arms
1f. ________Come back quickly with another strike if one was not effective
1g. ________Get out of his hold in some way
1h. ________Get out of his hold and run away
1i. ________Disable the assailant so that he cannot run after you
1j. ________Get away if he had blind-folded you as he grabbed you

Please use the following scale for question 2.

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</tr>
</thead>
<tbody>
<tr>
<td>Cannot Do At All</td>
<td>Moderately Certain Can Do</td>
<td>Certainly Can Do</td>
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</tbody>
</table>

2. You are grabbed from the front or somehow end up facing your assailant

How confident are you that you can, as of now:
2a. ________ Scream or yell loudly more than once
2b. ________ Struggle physically in some way
2c. ________ Stomp to the instep of the foot to cause pain
2d. ________ Forcefully hit him using the heel of your palm
2e. ________ Knee him forcefully in the groin
2f. ________ Kick low to the unstable parts of his body (e.g. knee) and throw him off balance
2g. ________ Forcefully strike him in the throat
2h. ________ Forcefully strike him in the eye
2i. ________ Cover yourself from being hit
2j. ________ Get out of his hold and run away
2l. ________ Continue striking your assailant until he is disabled

Please use the following scale for question 3.

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</tr>
</thead>
<tbody>
<tr>
<td>Cannot Do At All</td>
<td>Moderately Certain Can Do</td>
<td>Certainly Can Do</td>
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</table>

3. You are grabbed from behind and the assailant pulls you down onto the ground

How confident are you that you can, as of now:

3a. ________ Scream or yell loudly more than once
3b. ________ Struggle physically in some way
3c. ________ Stay in a ball for safety when you are knocked down
3d. ________ While in a ball, roll an forcefully bit his arm or hand
3e. ________ Use your advantage or opening from the bite to strike the throat or some other area with your elbow
3f. ________ After striking with you elbow, turn your body and strike to his eyes
3g._________ Turn body and forcefully use a side-thrust kick
3h._________ Jump and out of reach of your assailant
3i._________ Run away
3j._________ Disable your assailant

Please use the following scale for question 4.

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<th>10</th>
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</thead>
<tbody>
<tr>
<td>Cannot Do At All</td>
<td>Moderately Certain Can Do</td>
<td>Certainly Can Do</td>
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</table>

4. The assailant has you lying on your back with him on top of you

How confident are you that you can, as of now:

4a._________ Scream or yell loudly more than once
4b._________ Struggle physically in some way
4c._________ Use your hip to his groin area if he is not completely down and then do a quick shift of your weight to unseat him.
4d._________ If your legs are not completely pinned, push the man off with your legs
4e._________ If your arms are not completely pinned, use fingers to forcefully strike eyes
4f._________ Hook your legs over his shoulders if he is lying up near your chest. Then make a quick move with your legs and get on your side.
4g._________ Use your heel to kick down forcefully on your assailant
4h._________ Through whatever means, get unpinned
4i._________ Run away
4j._________ Disable your assailant

Please use the following scale for questions 5 through 8.

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</thead>
</table>
5. You have been surprised in your bed and the assailant has you pinned on your front.

How confident are you that you can, as of now:

5a. _________ Scream or yell loudly more than once

5b. _________ Roll him off

5c. _________ If his hands are around your hips or shoulder, launch forward quickly. Then get on your side for a kick.

5d. _________ Get away

5e. _________ Disable your assailant

6. If you are grabbed and remain standing

7. If you are pulled to the ground

8. If you are pinned on the ground

Find openings where you can strike

6a. _______ 7a. _______ 8a. _______

Strike quickly and Powerfully

6b. _______ 7b. _______ 8b. _______

Disable assailant

6c. _______ 7c. _______ 8c. _______

Knock out assailant

6d. _______ 7d. _______ 8d. _______

Please use the following scale for questions 9 through 11.

<table>
<thead>
<tr>
<th>Cannot Do At All</th>
<th>Moderately Certain Can Do</th>
<th>Certainly Can Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>9</td>
<td>10</td>
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</tbody>
</table>

9. If you are attacked in a closed space (bedroom, car).

How confident are you that you can, as of now:

9a. _________ Get away

9b. _________ Disable your assailant
9c. ________ Knock out assailant

10. If you are attacked in an open space (street, park).

   How confident are you that you can, as of now:
   10a. ________ Get away
   10b. ________ Disable your assailant
   10c. ________ Knock out assailant

11. If a stranger attacks you

   How confident are you that you can, as of now:
   11a. ________ Yell loudly more than once
   11b. ________ Struggle physically in some way
   11c. ________ Physically fight back to get away
   11b. ________ Disable your assailant
   11c. ________ Knock out assailant

Please use the following scale for question 12.

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<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot Do At All</td>
<td>Moderately Certain Can Do</td>
<td>Certainly Can Do</td>
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</table>

12. If you an acquaintance attacks you (casual dating or friend):

   How confident are you that you can, as of now:
   12a. ________ Yell loudly more than once
   12b. ________ Struggle physically in some way
   12c. ________ Physically fight back to get away
   12b. ________ Disable your assailant
   12c. ________ Knock out assailant
APPENDIX H: PANAS-X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark (number) the appropriate answer in the space next to the word. Indicate to what extent you feel this way right now. Use the following scale to record your answers:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very slightly or not at all</td>
<td>a little</td>
<td>moderately</td>
<td>quite a bit</td>
<td>extremely</td>
</tr>
</tbody>
</table>

1. ______ cheerful                31. ______ active
2. ______ disgusted               32. ______ guilty
3. ______ attentive               33. ______ joyful
4. ______ bashful                 34. ______ nervous
5. ______ sluggish                35. ______ lonely
6. ______ daring                  36. ______ sleepy
7. ______ surprised               37. ______ excited
8. ______ strong                  38. ______ hostile
9. ______ scornful                39. ______ proud
10. ______ relaxed                40. ______ jittery
11. ______ irritable              41. ______ lively
12. ______ delighted              42. ______ ashamed
13. ______ inspired               43. ______ at ease
14. ______ fearless               44. ______ scared
15. ______ disgusted with self    45. ______ drowsy
Item Composition of the PANAS-X Scales

Basic Negative Affect = fear+hostility+guilt+sadness/23

Fear (6)  afraid, scared, frightened, nervous, jittery, shaky
Hostility (6)  angry, irritable, hostile, scornful, disgusted, loathing
Guilt (6)  guilty, ashamed, blameworthy, angry at self, disgusted with self, dissatisfied with self
Sadness (5)  sad, blue, downhearted, alone, lonely

Basic Positive Affect:  = joviality+self-assurance+attentiveness/18
  Joviality (8)  cheerful, happy, joyful, delighted, enthusiastic, excited, lively, energetic
  Self-Assurance (6)  proud, strong, confident, bold, fearless, daring
  Attentiveness (4)  alert, attentive, concentrating, determined

Other Affective States
  Shyness (4)  shy, bashful, sheepish, timid
  Fatigue (4)  sleepy, tired, sluggish, drowsy
  Serenity (3)  calm, relaxed, at ease
  Surprise (3)  surprised, amazed, astonished

General Negative Emotion  = (p18 + p44 + p34 + p40 + p11 + p38 + p32 + p42 + p26 + p50)
Check below, on a scale of 1 to 10 which applies to you and your life, as of right now.

1. “Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole?”

<table>
<thead>
<tr>
<th>No satisfaction at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<th>9</th>
<th>Completely Satisfied</th>
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</tbody>
</table>

2. “How satisfied are you with your standard of living?”

<table>
<thead>
<tr>
<th>No satisfaction at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</table>

3. “How satisfied are you with what you are achieving in life?”

<table>
<thead>
<tr>
<th>No satisfaction at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>Completely Satisfied</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

4. “How satisfied are you with your personal relationships?”

<table>
<thead>
<tr>
<th>No satisfaction at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Completely Satisfied</th>
</tr>
</thead>
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</tr>
</tbody>
</table>

5. “How satisfied are you with how safe you feel?”

<table>
<thead>
<tr>
<th>No satisfaction at all</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</tr>
</tbody>
</table>
6. “How satisfied are you with feeling part of your community?”

7. “How satisfied are you with your future security?”

8. “How satisfied are you with your spirituality or religion?”
APPENDIX J: SUBJECTIVE VITALITY SCALE

Please indicate the degree to which the statement is true for you when you engage in physical activity or exercise.

<table>
<thead>
<tr>
<th>When I engage in exercise or physical activity...</th>
<th>Not True At All</th>
<th>Somewhat True</th>
<th>Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel alive and vital.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. I don’t feel very energetic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Sometimes I feel so alive I just want to burst.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. I have energy and spirit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. I look forward to each new day.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. I nearly always feel alert and awake.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. I feel energized.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Please complete the following information about yourself.

1. Gender (Circle one)       Female       Male

2. Date of Birth:_____________

3. Age:____________________

4. Race (Circle all that apply)
   - American Indian
   - Asian
   - Black / African American
   - Native Hawaiian or Other Pacific Islander
   - Caucasian
   - Latino/a
   - Other: _______________

5. Current Marital Status (Circle one)
   - Married
   - Never married
   - Divorced/Separated
• Widow

5. Education (Circle highest level attained)

• Less than 7th grade
• 9th grade (Jr. High)
• Partial High School
• High School Graduate
• 1-3 years of College
• College/University Graduate
• Master’s Degree
• PhD or Equivalent

6. Occupation (if retired, previous occupation): ________________________________

7. Hours worked per week: _________ hours

8. Years in present (if retired, previous) occupation: ____________ years

9. Annual Household Income (Circle one)

• Less than $5,000
• $5,001 – 10,000
• $10,001 – 15,000
• $15,001 – 20,000
• $20,001 – 25,000
• $25,001 – 30,000
• $30,001 – 40,000
• $40,001 or greater

10. Previous experience with Self-defense training (Yes or No): ________________

11. If you answered ‘Yes,’ what type of Self-defense training (Circle all that apply)?
- Martial Arts
- Basic Self-defense Class
- Kickboxing class
- Mixed Martial Arts
- Military: Hand to Hand Combat
- Reality-based Self-defense Program
- Other:____________________

12. If so, how long did you train or participate in the program (Circle One)?

- Less than 6 weeks
- 6 weeks
- 1 – 3 Months
- 6 – 12 Months
- 1 – 3 Years
- More than 5 Years
- Other:____________________