

LIFE EXPERIENCE AS A MODERATOR OF THE WEAPONS PRIMING EFFECT

A Thesis

by

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This thesis meets the standards for scope and quality of Texas A&M University – Corpus Christi
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Abstract

The weapons priming effect proposes that guns act as priming agents that lead to increased aggression. However, recent literature demonstrated that the gun user's life experience (e.g., knowledge or years of gun use) moderates the weapons effect (Bartholow, Anderson, Carnagey, & Benjamin, 2005; Nagtegaal, Rassin, & Muris, 2009); thus, gun owners with increased gun experience do not demonstrate the gun-aggression link previously thought to be universal. This study explored the gun-aggression link with handgun life experience. Participants were primed with pictures of handguns or tennis rackets and subsequent aggressive cognitions were measured through a word completion task. Participants were also surveyed on gun use and gun life experience. Results showed no significant difference in aggression between individuals with low, average, or high handgun life experience, regardless of priming condition. In addition, when comparing individuals with low, average, and high levels of total handgun and long gun life experience, there were no significant differences in aggression, and this was true for both priming conditions; although these results did not support the directional hypotheses of previous research, these findings still suggest that despite the handgun prime, those with increased gun life experience do not exhibit an increase in aggression, which contradicts the weapons effect theory and ultimately supports the recent research on gun life experience and aggression.

Finally, neither gun purpose nor target shapes have been studied in relation to the weapons effect; relationships between guns, target shapes, gun purpose and aggression were explored. The results of this study can better inform gun owners, the general public, gun-affiliated organizations, and government officials about the benefits of increasing gun knowledge and experience on decreasing aggressive acts.

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Life Experience as a Moderator of the Weapons Priming Effect

Despite an influx of media portrayals of never-ending violence, including school shootings, rape allegations, and mass murders, violent crime in America has surprisingly and steadily decreased over the past decade (Federal Bureau of Investigation, 2014). According to the Uniform Crime Reporting Program, violent crime in 2013 decreased 4.4% from the previous year and decreased almost 15% from 2004 (Federal Bureau of Investigation, 2014). However, mass media news coverage is still showing prevalent gun violence, including the Sandy Hook, Aurora movie theater, and Virginia Tech massacres. In fact, firearms are present for the majority of all violent crimes: Sixty-nine percent of all homicides in 2013 were committed with a firearm, and 68.4% of those firearms were handguns (Federal Bureau of Investigation, 2014). Further, 40% of all robberies and 21.6% of all aggravated assault cases included firearms (Federal Bureau of Investigation, 2014).

Firearms continue to be an important social issue. A 2004 literature review on firearms and homicide concluded that an increase in gun prevalence subsequently increased the homicide rate (Hepburn & Hemenway, 2004). Siegel, Ross, and King (2013) found similar results analyzing a three decade data span: States with more gun ownership also had significantly more firearm-related homicides.

The Weapons Effect

It is no surprise that the continuous presence of firearms with crime, especially violent crime, creates an undeniable connection between firearms and aggressive behavior. In fact, research over the past four decades has established this relationship, demonstrating that the presence of weapons leads to an increase in aggressive behavior. This phenomenon, known as the weapons effect, was first demonstrated by Berkowitz and LePage (1967). In this original

study, confederates administered one or seven shocks to participants, with the latter designed to induce anger. The participants were then allowed to give retaliatory shocks to the confederate while in the presence of a gun, a badminton racket, or nothing on a nearby table. The results indicated that subjects administered more retaliatory shocks when in the presence of a gun than subjects not exposed to the gun, and the most shocks were given when participants were previously angered (Berkowitz & LePage, 1967). Of course, emotions like anger, hostility, and desire for retaliation have long been associated with aggressive behavior (Carlson, Marcus-Newhall, & Miller, 1990); however, this was the first study to show that even if the individual was not previously angered, the mere presence of a gun still induced aggressive behavior. This suggests the aggression may not always reside in the motivation of the individual, but rather that the gun itself serves as an aggressive cue.

The weapons effect was previously controversial, as many studies failed to replicate the original findings (Buss, Booker, & Buss, 1972; Cahoon & Edmonds, 1984; Cahoon & Edmonds, 1985), while other studies confirmed the effect (Anderson, Anderson, & Deuser, 1996; Anderson, Benjamin, & Bartholow, 1998; Caprara, Renzi, Amolini, D'Imperio, & Travaglia, 1984; Epstein, 1981; Leyens & Parke, 1975). Today, however, the effect is widely accepted, given that participants are not suspicious, apprehensive, or influenced by demand characteristics (Anderson et al., 1998). Suspicion or awareness could enable participants to supersede original impulses with self-regulatory control, potentially explaining the lack of replicated results in some studies (Engelhardt & Bartholow, 2013).

A further complication in the weapons effect controversy is the challenge of measuring aggression accurately and reliably in a laboratory setting. Aggression as a construct is a multifaceted, complicated puzzle of cognition, affect, and behavior and few tests have been

designed to test all aspects concurrently. Moreover, ethical constraints can prevent participants from responding the way they would naturally outside the laboratory, and social scripts and social forbiddance against aggression may encourage participants to lie or otherwise modify an honest response (Engelhardt & Bartholow, 2013). It is important, then, to test aggression unconsciously or through cleverly deceptive paradigms to ensure participants are unaware of what is being measured. Researchers have indeed developed such paradigms and implicit tests to measure aggression, including the conditional reasoning test (James et al., 2005), an aggression-modified Stroop task (Anderson et al., 2006), noise blasts (Giancola & Zeichner, 1995), or evaluation of a confederate with negative implications (Cahoon & Edmonds, 1984). These tests, as well as many other implicit tasks, are determined to be both reliable and valid in measuring various aspects of aggression; some are better at targeting the cognitive part of the construct, whereas some are better at targeting the behavioral or affective part of the construct.

Weapons as Aggressive Stimuli

Behavioral Explanations

The first model proposed to explain the weapons effect involves stimulus-response learning. In this behavioral model, items develop a close association over time if they are consistently paired with each other. The most famous example of this learning model is through Pavlov's salivating dog. Pavlov identified that an unconditioned stimulus (food) elicited an unconditioned response (salivation). Initially, a ringing bell did not produce any response from the dog. Over time, the bell rang concurrently with the presentation of food, to which the dog, naturally, salivated. After repeated exposure of the bell and food pairing, the bell itself, without the presence of food, came to elicit salivation (Pavlov, 1927/1949). This is due to consistent

pairing of two stimuli together, allowing for a previously neutral stimulus (bell) to become a conditioned stimulus that on its own produces a now conditioned response (salivating).

It is no surprise that repeated pairings of guns and aggressive behavior, then, produce a similarly learned association. Media portrayals of firearms and violence together occur abundantly in the news, movies, and video games: drawing a gun in a Western movie signals a shootout; violent scenes in television and movies are almost always precipitated by the exposure of weapons, especially firearms; and video games frequently use weapons as a means to harm or kill other characters (Turner, Simons, Berkowitz, & Frodi, 1977; Ybarra, Huesmann, Korchmaros, & Reisner, 2014).

Guns and aggression may also become associated through repeated reinforcement. This process of learning is similar to classical conditioning in that two previously separate constructs or items develop an association when paired together consistently over time, and that pairing results in positive consequences, or reinforcement. As a simple example, a bullied teenager may bring a weapon to school and by exposing the weapon to his bullies, subsequently stops the bullying. To the teenager, this is a positive outcome, reinforcing this behavior. The next time the teenager is bullied, he is likely to bring another weapon to ward off his bullies. A gang member may associate his gun with aggression when the rest of the gang applauds him for using his gun to threaten a non-gang member. Verbal or physical reinforcement of behavior, from other people, or positive emotions or cognitions within the self after the behavior will create a connection between stimuli, and repeated reinforcement will create a strong learned response.

Reinforcement of behavior not only fosters a strong learned association, but also does so quickly. Buss and Durkee (1958) demonstrated the speed of learning of hostile words through reinforcement. Subjects were presented with three words, categorized as neutral, mildly hostile,

and intensely hostile, and were told to use one of the words to complete a sentence. After a few non-reinforced trials, participants were then told “right” or “wrong” to provide reinforcement after completing the sentence. For half of the participants, the “right” response was an intensely hostile word; for the other half, the “right” response was a neutral word. The results indicated that the hostile words were learned faster than neutral words; the hostile words were quickly connected to being “right,” and the reinforcing nature of “right” answers increased the frequency of responding with hostile words. One critique of this finding is that the learning of hostile words may have been easier simply because the sampling pool for hostile words was much smaller than the sampling pool for neutral words (Buss & Durkee, 1958). However, studies that have constructed comparable lists (e.g., in frequency, familiarity, number of syllables) of neutral and aggressive words still show quicker identification of aggressive words than neutral words (Bartholow & Heinz, 2006; Zuckerman, 1955).

Social observation, especially from a young age, greatly influences aggressive behavior as well. In Bandura’s classic Bobo Doll study, young children were significantly more likely to act aggressively toward the doll only after observing adults interacting with the doll with verbal or physical violence; this effect was seen more so in male children, especially when the male child observed a male adult acting aggressively. Murrell, Merwin, Cristoff, and Henning (2005) found that when men reported witnessing inter-parental violence or threat with a weapon as a child, they were significantly more likely as an adult to threaten or use a weapon in intimate partner violence. Moreover, compared to children without exposure to gun violence, children with exposure are more likely to display increased levels of aggression (Slovak & Singer, 2001). These studies suggest that aggressive behavior, especially from a young age, can result from observing others act in a similar manner. This observational learning is important and useful by

allowing the individual to understand behavior and consequences without having to build that knowledge by trial and error (Bandura, 1971). An individual may learn by direct observation, modeling, and imitation, and associations are strengthened if positively reinforced. A child living in a poor, urban environment may witness family or friends using guns for violence and unconsciously learns from them the aggressive purpose of a gun and the consequences, or lack thereof, to using the gun aggressively. If the child repeatedly sees the gun being used as a status symbol, or as a tool to harm others, he will incorporate that purpose into his forming knowledge of guns. If the child never sees negative consequences of the gun, such as an arrest, he may not attribute any punishment to owning or using a gun, but rather only see the rewards, such as status or protection. In this form of learning, adults and others in the immediate environment play a fundamental role in modeling aggressive behavior; in a culture that promotes gun use, the child will build a knowledge base from the way others use and interact with guns paired with accompanying emotions and consequences.

Cognitive Explanations

Most recently, the effect of stimuli on aggression is also explained through socio-cognitive models, in which aggression-eliciting cues serve as primes; once the stimulus is associated with something aggressive, the mere presence of the stimulus serves as a priming cue that makes related aggressive thoughts or emotions more readily available, often immediately and unconsciously (Anderson et al., 1996; Engelhardt & Bartholow, 2013). The most comprehensive socio-cognitive model of aggression, the general aggression model (GAM), incorporates specific cognitive and behavioral domains of aggression, including script theory, frustration-aggression theory, and social learning theory. GAM proposes three stages of aggressive action. The first stage recognizes that due to individual differences, different persons

perceive and interpret the same environmental stimuli differently (DeWall & Anderson, 2011). Subsequently, the reaction in the first stage greatly influences the second stage: the individual's cognition, affect, and level of arousal. For example, perceiving a threat will increase levels of arousal, but appraising stimuli as harmless or fun will stimulate different cognitions and emotions. This second stage, due to the variation of these internal states, may mediate the link between the aggressive stimulus and subsequent cognitions and behavior. Finally, the individual enters the stage of appraisal and decision-making, resulting in the expressed behavior (Engelhardt & Bartholow, 2013). In the simple case of a hostile stimulus, such as a gun, eliciting aggressive behavior, an individual may initially perceive the gun as dangerous. Her internal states are then influenced by this perception and based on the first two stages, she may decide to behave in a manner aligned with fear and desire for self-protection by physically fighting the owner of the gun. This last stage is also important in explaining why behavior is sometimes inconsistent with internal states and initial appraisals; someone may perceive a threat, react appropriately internally, but engage in self-regulatory control to supersede original impulses. This may clarify why the weapons effect is not always present, even if the weapon itself serves as a cue or prime for aggressive associations.

The current explanation for the weapons effect, specifically, follows socio-cognitive models. The weapons-as-primers hypothesis is based on associative network models of memory (Collins & Loftus, 1975). In the most basic form, concepts in semantic memory become linked to other concepts that have similar meaning and shared experiences. Related concepts (e.g., aggression and hostility) and concepts that are repeatedly activated simultaneously (e.g., guns and shooting) form strong associations. Activation energy from the originally activated concept extends to related concepts, dependent upon the strength of the association; concepts with strong

associations are likely to be activated most easily and quickly (Anderson et al., 1998). Weapons concepts, like guns and knives, tend to become linked to the concepts of aggression and hostility through repeated exposure to violent television, movies, news, and firsthand experiences of weapons as threatening or harmful tools. Once the association between gun and aggression has been formed, the activation of the gun concept then increases accessibility of concepts of aggression, and together influence subsequent thoughts, behaviors, and interpretations of situations (Bartholow, Anderson, Carnagey, & Benjamin, 2005). Anderson et al. (1998) tested the weapons-as-primers hypothesis and demonstrated that subjects who viewed pictures of weapons identified aggressive words significantly faster than non-aggressive words, compared to those who viewed neutral pictures. This suggests that the identification of a weapon serves as a prime by increasing accessibility of aggressive thoughts.

However, similar to the third stage of the GAM, participants who are aware of the prime and its effect may be able to override or inhibit their behavior; although the gun may initially increase access to aggressive cognitions, individuals can engage in self-regulation of behavior and affect. It is important to test participants, then, when they are unaware of the prime and react unconsciously.

Guns as Non-Aggressive Stimuli

Although these theories of learned gun-aggression associations are abundant and valid, it must be noted that nearly half the households in the United States own a gun and yet most people never commit crimes with firearms and maintain a relatively unaggressive lifestyle (Gallup, Inc., 2015). Although guns have an undeniable association with violence in some contexts, this is not a universal, complete connection. In fact, the same cognitive and behavioral explanations used to describe gun-aggression connections can also explain non-aggressive associations with guns.

Just as one can learn behaviorally and cognitively that guns elicit or create aggression, so too can the individual learn neutral or pleasurable associations with guns. Using the associative network models of memory, strong associations between concepts can form through repeated and concurrent activation. For example, it is theorized that the weapons-as-primers hypothesis is due to aggressive concepts being activated simultaneously with gun concepts. It stands to reason, then, that gun concepts can also form associations with concepts of sport (e.g., fun and pleasurable) if they are repeatedly activated at the same time. The stronger the association, the more activation energy extends to related concepts, creating a linked framework that is activated easily and rapidly (Anderson et al., 1998). An individual who consistently pairs guns with sporting concepts will grow to have strong associations with these concepts rather than concepts of aggression; because of inescapable mass media influence, the individual may still develop connections between guns and aggression, but if not consistently and repeatedly activated, this link will be weak and not as easily activated. The strongest association will have most influence on subsequent cognitions, perceptions, and behaviors (Bartholow et al., 2005).

The individual can learn pleasurable or positive gun associations through experience, too. If, for example, the individual uses a gun only for sporting purposes, such as skeet shooting, his use of a gun is connected solely to a non-aggressive concept, one that is never used to harm or threaten another human being. Further, if the individual derives great pleasure from skeet shooting, his gun use and behavior will be reinforced, strengthening the connection between gun and reward or pleasure, not involving any aggressive concepts. On the other end, if that individual one day uses his gun for an aggressive purpose, such as to create fear in another human, and he is punished (e.g., feelings of guilt, apprehended by authority figures), his gun-

aggression association will not be strengthened; because punishment serves to decrease the frequency of a behavior, it is likely he would not use his gun to threaten someone again.

Similar to these behavioral learning styles, one can learn non-aggressive gun associations through observation or modeling of others. A parent can model such associations by using a gun strictly for target shooting or sport; if the child consistently observes the gun used solely for non-aggressive purposes, the child will incorporate the concept of gun with the concept of sport or food. Arguably, immediate culture plays an important role in this form of learning since growing up in an atmosphere that promotes gun use for hunting is different from growing up in an atmosphere that promotes gun violence or no gun use at all. In one, the child learns to use guns for sport and food, but in another, the child learns the gun is a tool for threat, hostility, and power; in the last, the child may not learn about gun use from her immediate environment, but rather only through mass media or peers as she grows older. The context in which the child grows shapes expectations about normal gun use, depending on the prevalence, type of gun, and purpose of gun use.

Gun Prevalence, Type, and Purpose

Unsurprisingly, it is easier for an individual to learn about guns if they are abundant in the individual's environment. Southerners, for example, are more likely to own firearms than residents of other regions in the United States; with a heavy sporting gun subculture, individuals in these areas not only have more opportunity to learn about guns, but also ample opportunity to learn about their use recreationally (Ellison, 1991). Handguns are also prevalent in urban areas, especially those of dense population, high unemployment, and deficits in resources (Vaughn et al., 2012). Unfortunately, crime is also prevalent in such areas, so while individuals have more

opportunity to learn about guns, they also have more opportunity to learn about their use in hostile, violent, and fearful situations.

The type of gun also shapes aggressive learning. Rifles are more associated with hunting than are handguns, for example. Those who use rifles to hunt for sport or food will develop connections between guns and positive concepts, such as leisure, social connection, and fun. Adult hunters are often exposed to guns at a young age by parents who themselves own guns; they also tend to have lived in an area receptive to hunting and have taken firearm safety classes before procuring a hunting license (Bartholow et al., 2005; Lizotte & Bordua, 1980). These factors combine to generate years of the repeated pleasurable experiences necessary to create non-aggressive gun associations. The strong association between guns and positive experiences leads hunters to view hunting guns more positively than nonhunters and actually generates fewer aggressive thoughts (Bartholow et al., 2005). In support of this, research by Nagtegaal, Rassin, and Muris (2009) found that members of shooting associations scored lower on measures of aggression, impulsivity, and aggressive thoughts compared to members in the community. Members of the shooting association had developed knowledge structures that connected gun concepts to pleasurable concepts. Research by Epstein (1979), using methods similar to Berkowitz and LePage (1967), also supports this theory. Individuals in this study were first provoked or not provoked, then were exposed to slides of firearms, non-firearm weapons, or neutral items. Aggression toward the provocateur was measured and the results indicated provoked individuals with considerable prior pistol and rifle experience displayed less aggression toward their provocateur than similarly provoked individuals without experience. This suggests that while the underlying emotional response may be similar across subjects, those

with firearms experience may have different cognitive processes by recognizing, labeling, and inhibiting implicit aggressive reactions as inappropriate (Epstein, 1979).

Further research does indicate the cognitive processing is different among individuals with firearm experience. Bartholow et al. (2005) found that hunters not only incorporated a wider array of concepts in their schema about guns, such as social benefits and outdoor activities, but were also more able to separate different gun concepts; even though hunters rated hunting rifles positively and non-aggressively, they were just as likely as nonhunters to rate assault rifles, guns used primarily in violent contexts, negatively and with aggressive implications. This suggests that the hunter's knowledge and experience with hunting rifles, specifically, shapes a schema differentiated from schemas of other types of guns. Nonhunters, on the other hand, tended to have a less differentiated, blanketed negative schema for all gun types. This finding further supports the theory that the weapons effect depends on the subjective meaning the individual associates with that particular weapon, and that meaning is shaped by the individual's knowledge and past experience.

However, compared to traditional long guns, handguns tend to be more complex in their associations. Although handguns may also be used for sport, such as skeet shooting, this is the type of gun most frequently used during crimes, compared to long guns (Cook, Braga, & Moore, 2011). Because of their smaller and more discreet size, handguns are much more easily carried in public without notice, and they are quick to use in a moment requiring fast response. This enables handguns to be used more often to inspire fear in others, to acquire respect, and to facilitate aggressive or violent interactions.

Of course, with the various media outlets, the lethality of handguns is well known. Handguns, however, can and are used for other purposes. If an individual owns a handgun only

for sporting purposes, the cognitive connections between guns and fun are established the same as it is with hunting guns. These individuals are likely aware of the threatening nature of the handgun from mass media coverage, but that association may be weak and not quickly connected, as the link between guns and recreation is strongly established. It is possible, though, that individuals develop an aggressive association through sport solely. Target shooting, for example, can include the outline of a human with the shooting circles encompassing the middle of the chest and sometimes even the head. In this situation, the individual is making associations between guns and the pleasure from the sport, but can the individual ignore that he is still practicing shooting at a human figure? To the author's knowledge, there have not been any studies examining this question. However, police members tend to train and practice handgun use on human-shaped targets to improve accuracy and speed of reaction in a threatening situation with another human, especially under various psychological conditions (Helsen & Starkes, 1999; Morrison & Vila, 1998; Nieuwenhuys & Oudejans, 2011). Although there are many variables police officers face that sport shooters do not, it is possible that the human-shaped target itself may facilitate stronger and quicker associations between guns and aggressing against another human.

Handguns pose another complicated cognitive association if they are used solely for protection or defensive purposes. The implication of owning a gun for this purpose is that if threatened, one can use the gun to harm another person; this connection should, theoretically, establish cognitive associations between guns and aggression. This may be especially true if the individual has used a gun for this purpose in the past or has witnessed it being used in such a manner. Interestingly, research on this is also non-existent.

One of the biggest limitations of the previous research is the lack of focus on handguns specifically, and that is what this current study addressed. This research study explored the influence of handgun life experience (e.g., quantity and years of handgun ownership, knowledge, years of exposure learning and/or shooting handguns) as a potential moderator of the weapons priming effect. In addition, this study also explored the effects of gun purpose (e.g., sport, protection) and target shape on aggression. The following were hypothesized:

1. Individuals with more handgun life experience will show decreased levels of aggression as seen in the weapons effect.
2. Compared to individuals who do not target shoot, individuals who frequently target shoot at a human outline with a handgun will display an increase in aggression.
3. Individuals who own a handgun for protection purposes will show an increase in aggression compared to individuals who own a handgun for other purposes.

Method

Participants

A total of 347 undergraduate students (120 males and 212 females), ranging from 18 to 43 years-old ($M = 19$ years), were recruited from two introductory psychology classes at Texas A&M University – Corpus Christi. Students were primarily Hispanic (44.1%) or White (Non-Hispanic; 32.9%) college freshmen (81%). Seventy-two participants indicated owning a gun, and 243 indicated a family member owning a gun. Participants received extra credit for participation. Students younger than 18 years of age were excluded from data analysis.

Materials

Prime. Microsoft PowerPoint was used to present one of two types of priming pictures. A coin flip determined which of the two classes was primed with handguns ($n = 188$) or the

tennis racket ($n = 159$). A pilot study ($n = 14$) was conducted to determine the neutrality of the control picture. Participants rated 10 pictures of various hobbies on a scale of 1 (negative connotation) to 10 (positive connotation), with 5 indicating a neutral connotation. The picture rated closest to “neutral” (a rating of 5) was chosen ($M = 5.14$).

Word Completion Task. The priming of aggressive cues enables easier and quicker access to aggressive cognitions (Anderson et al., 1998). It is best to measure aggression at this cognitive stage rather than through behavioral measures because it is when participants are most unaware of the prime and thus they will react unconsciously, before they can engage in self-regulatory behaviors (Engelhardt & Bartholow, 2013). A frequently used implicit, state-level measure for aggressive cognitions is the word completion task (see Appendix C), in which participants are given 98 incomplete words (e.g., “W _ _ M”) that must be completed as quickly as possible. Most of the word fragments have several possible completions (e.g., “MU _ _ ER” can be “MURMER” or “MURDER”), depending on the individual’s current cognitions; fifty fragments can yield either aggressive or nonaggressive words, while the remaining 48 only yield nonaggressive words (Anderson, Carnagey, & Eubanks, 2003). Participants were given 3 minutes to complete as many word fragments as possible to ensure participants were answering without self-reflection or regulation. The word completion task has been consistently accurate in measuring activation of targeted constructs (Bassili & Smith, 1986; Gilbert & Hixon, 1991; Johnson & Steinman, 2009).

In this particular study, the priming condition should have activated either aggressive or nonaggressive cognitive constructs, which were readily accessible when completing the word completion task. The subsequent number of generated aggressive words was used to measure the level of aggression. Two independent raters scored the responses, categorizing responses as

aggressive, nonaggressive, or nonwords. Discrepancies were discussed until a 100% consensus was reached. The ratio of generated aggressive words to the number of overall responses for that particular individual was computed; this protected against misleading high aggression scores due simply to a higher number of overall completed word fragments.

Hobby questionnaire. A four-question survey asking about the viewed hobby (either handguns or tennis) was designed to facilitate deception (see Appendix A). Participants listed what hobby they saw, if they had participated in the hobby in the past, if they would participate in the hobby in the future, and rated their interest in the hobby on a scale of 1 (not at all interested) to 5 (very interested). No answers were used further in data analysis.

Gun use questionnaire. A survey was created to determine overall participant knowledge, experience with, and purpose of handgun ownership (see Appendix B). Life experience was measured through personal gun/handgun ownership (e.g., types of guns owned, quantity of guns owned, years of ownership), family history of gun ownership, years handling, learning about, and/or shooting guns/handguns, and participation in a gun/handgun safety class, which indicated gun knowledge. A section on target shooting frequency of various targets (e.g., human outline, clay disks, bottles) determined frequency of shooting at a human-shaped target with a handgun. Participants were also asked for what purpose they owned a handgun. The survey ended with demographic questions.

All collected data was analyzed using SPSS software.

Procedure

Upon the start of the study, participants read and signed an informed consent form. They were told that the purpose of the experiment was to study how hobbies influence cognitive tasks. Participants first viewed a PowerPoint presentation consisting of one of the priming conditions,

which was randomized for each class. There were 30 pictures in each priming condition, with each picture lasting for 3 seconds. Participants were then given the hobby questionnaire. When the hobby questionnaire was collected, each participant was given a 2-page word completion packet and given brief instructions to fill in the blanks to make a word as quickly as possible within 3 minutes. After the word completion task, participants were administered the gun use questionnaire. Once participants completed all items, they were dismissed. Participants in the handgun priming condition were shown a comic as they prepared to leave, inducing an incompatible response to inhibit any aggressive cognitions from the study (Baron & Ball, 1974).

Results

First, a between-subjects independent samples t-test was conducted to compare amount of aggressive cognitions between gun prime and tennis prime conditions. There was a significant difference in aggressive cognitions for handgun ($M = 19.48$, $SD = 6.96$) and tennis primes ($M = 16.55$, $SD = 5.68$), $t(345) = 4.25$, $p < .001$, $d = .46$. This indicated that individuals who were primed with handguns subsequently generated significantly more aggressive words, and thus more aggressive cognitions, than individuals primed with tennis rackets.

Life Experience and Aggression

It was hypothesized that individuals with higher levels of life experience with handguns would generate fewer aggressive words when primed with handguns. The results did not support this hypothesis. Handgun life experience was determined using the sum of the following gun use questionnaire variables: owning a handgun, the number of handguns owned, years having owned a handgun, years spent learning about and shooting a handgun, and taking a handgun safety class. Due to skew, the median was used to classify individuals into low handgun experience (zero to median), average handgun experience (median to one standard deviation above the

median), and high handgun experience (greater than one standard deviation above the median). A factorial analysis of variance (ANOVA) was conducted to explore the impact of such experience (low, average, high) and priming condition (handgun, tennis) on aggressive words. There was no significant main effect, $F(2, 339) = .48, p = .62$, suggesting no difference in amount of aggressive words regardless of prime and low, average, or high handgun life experience (see Table 1). While this result is not statistically significant, it still may be important; although there was no decrease in aggressive words, there was no significant increase either, as the weapons priming effect would predict. This may indicate that increased handgun life experience does actually impact or moderate the weapons effect.

However, a between-subjects independent samples t-test revealed a conflicting result. Individuals were separated into two groups: no experience and average to high handgun life experience. Contrary to the original hypothesis, those who had an average to high amount of handgun life experience ($M = 18.98, SD = 6.50$) actually generated significantly more aggressive words than those without such handgun life experience ($M = 17.47, SD = 6.57$), $t(337) = -2.12, p = .035, d = .23$. This significant effect was still true when exclusively comparing individuals within the handgun priming condition; those without handgun life experience ($M = 18.51, SD = 7.08$) had significantly fewer aggressive words than those with average to high handgun life experience ($M = 20.60, SD = 6.69$), $t(182) = -2.06, p = .041, d = .30$, suggesting that the handgun prime did increase access to aggressive cognitions and handgun life experience did not reduce such access as hypothesized.

A second set of analyses took into consideration an overall amount of gun life experience, rather than just handgun life experience. In addition to using handgun life experience variables, gun life experience was determined by the sum of the following gun use questionnaire

variables: owning guns, which guns were owned (e.g., rifle, shotgun, assault rifle), the number of each gun owned, years owning guns, family history of guns (e.g., which types were owned by family), years learning about and shooting guns, and taking a gun safety class. A factorial ANOVA exploring the impact of priming condition (handgun, tennis) and gun life experience (low, average, high) on aggressive words did not result in significant differences between low, average, and high gun life experience groups (see Table 2), $F(2, 337) = 1.75, p = .17$, indicating that all participants had similar amounts of aggressive words regardless of prime and gun life experience. This was still true when analyzing results of individuals in the handgun priming condition exclusively; there was no significant difference in amount of aggressive words between low ($M = 18.89, SD = 7.17$), average ($M = 19.22, SD = 6.27$), and high ($M = 20.95, SD = 7.06$) gun life experience, $F(2, 180) = 1.31, p = .27$. Despite the absence of statistical significance, this may still be an important finding. Although it was hypothesized that high levels of gun experience would lead to a decrease in aggressive cognitions, the data shows that such individuals did not have increased aggressive cognitions after primed with a handgun either, and this is contrary to much of the original data for the weapons priming effect (Anderson et al., 1996; Anderson et al., 1998; Berkowitz & LePage, 1967).

A series of between-subjects independent samples t-tests were conducted to explore the impact of individual variables in the gun use questionnaire on aggressive cognitions (see Tables 3 and 4). There was no significant difference in amount of aggressive words if: the individual owned a gun or handgun, the family owned a gun or handgun, or if the individual had taken a handgun safety class. Of note, though, was a significant difference in aggressive cognitions between individuals who had taken a gun safety class ($M = 19.77, SD = 6.75$) and those who had never taken a gun safety class ($M = 17.77, SD = 6.48$), $t(344) = 2.23, p = .027, d = .30$. This

effect was true when comparing both conditions, as well as for when solely comparing individuals in the handgun priming condition: Those who had taken a gun safety class ($M = 22.11$, $SD = 6.75$) had significantly more aggressive words than those who had never taken a gun safety class ($M = 18.88$, $SD = 6.89$), $t(185) = 2.54$, $p = .012$, $d = .47$. Upon first glance, this may be counterintuitive, as participation in gun safety classes should increase knowledge of guns and thus inhibit development of aggressive cognitive schemas (Bartholow et al., 2005); however, the group of individuals who had not taken a gun safety class could include both those who had never touched a gun and also those who otherwise had experience with guns, low to high, and had simply not taken a formal gun safety class. Likewise, individuals who had taken a formal gun safety class may have differing levels of experience with guns as well; while an interesting statistical finding, this result is difficult to truly interpret.

Between-subjects one-way ANOVA analyses were also used to understand the impact of individual variables in the gun use questionnaire on aggressive cognitions (see Table 5). The variables “years of experience with guns” and “years of experience with handguns,” described in the survey as handling, learning about, and/or shooting guns, were grouped into five levels depending on denoted years: no experience, .05 – 2 years, 2 – 5 years, 6 – 10 years, and above 10 years of experience. There was a trend toward significance, though no statistical significant differences, in amount of aggressive words between levels for individuals with varying years of experience with guns, $F(4, 339) = 2.32$, $p = .057$. Years of experience with handguns yielded no significant differences in aggressive words between varying levels of years of experience, $F(4, 338) = 1.76$, $p = 0.14$. Both analyses indicate that regardless of the years of experience learning about and shooting guns or handguns, there was no difference in amount of aggressive cognitions. This effect was true overall and for the handgun priming only condition as well,

suggesting that the handgun prime and years of experience together did not significantly increase nor decrease access to aggressive cognitions.

Years owning a handgun did not impact the amount of aggressive words. Individuals were grouped into four levels depending on denoted years: 0, .05 – 1 year, 2 – 4 years, and 5 or more years. A between-subjects one-way ANOVA indicated no significant differences, $F(3, 341) = 0.88, p = .45$, suggesting no differences in amount of aggressive words regardless of how short or how long the individual had owned a handgun. It should be noted, however, that the number of individuals in groups 2, 3, and 4 were quite low ($n = 11, 18, \text{ and } 9$, respectively), and this may have influenced results when comparing to group 1 with zero years of experience ($n = 307$). Future studies should strive to create more equal groups for more accurate comparison.

Analysis of the variable years owning a non-pistol gun (e.g., rifle, shotgun, assault rifle) yielded surprising results. Individuals were grouped into five levels, depending upon denoted years owning a non-pistol gun: 0, .05 – 2 years, 3 – 5 years, 6 – 10 years, and greater than 10 years. There was a significant difference in aggressive words for the varying levels, $F(4, 340) = 2.90, p = .022, \omega^2 = .02$. Post-hoc comparisons using the Tukey HSD test showed the mean amount of aggressive words for group 1 ($M = 17.87, SD = 6.41$) was significantly different from group 2 ($M = 22.74, SD = 6.34$). This suggests that individuals without any years of experience owning a gun had significantly fewer aggressive words than individuals who have owned a gun for two or fewer years. Further, the mean amount of aggressive words for group 2 was significantly different from group 4 ($M = 16.24, SD = 6.38$), indicating that individuals with 6 – 10 years of experience owning a gun had significantly fewer aggressive cognitions than individuals who have owned a gun only for two or fewer years. This is an interesting finding partially supporting the original life experience moderating hypothesis, as more experienced

individuals had fewer aggressive thoughts than novices. It should be interpreted with caution, though, as the number of individuals in each level was still quite low.

Human Target Shooting and Aggression

The second hypothesis, predicting that the frequency of shooting a human-shaped target will be associated with increased aggression, was supported. Due to a low number of respondents for each frequency, individuals were categorized into never having shot at a human-shaped target or having shot at a human-shaped target at least once (e.g., including once or twice in the past, sometimes, often, almost always, and always). Using a between-subjects independent samples *t*-test, results demonstrated that individuals who shot a human-shaped target at least one or more times ($M = 19.44$, $SD = 6.60$) were significantly more likely to complete aggressive words than individuals who had never shot at a human-shaped target ($M = 17.72$, $SD = 6.50$), $t(345) = -2.11$, $p = .04$, $d = .26$.

A one-way between-subjects ANOVA was also computed. Participants were categorized into seven levels: not applicable (e.g., never target shot), never (e.g., has not target shot at a human-shaped target but has target shot at other targets), once or twice in the past, sometimes, often, almost always, and always. There were significant differences between the frequency of shooting at a human-shaped target and number of aggressive words, $F(6, 340) = 3.15$, $p = .005$, $\omega^2 = .035$ (see Table 6). Post-hoc analysis using the Tukey HSD test demonstrated that individuals who had never participated in target shooting (“Not Applicable”, $M = 17.30$, $SD = 6.42$) generated significantly fewer aggressive words than individuals who had target shot once or twice in the past ($M = 21.88$, $SD = 6.18$). This effect was approaching significance when exclusively comparing individuals in the handgun priming condition, $F(6, 181) = 2.14$, $p = .051$. This suggests that individuals primed with pictures of handguns generated more aggressive

words when they had target-shot at a human-shaped target at least once. However, post-hoc analyses did not reveal any significant differences between frequency groups. These results should be interpreted with caution, though, as the number of responses per frequency category was quite low ($n \leq 20$).

Of note is that post-hoc analyses between those who had target shot sometimes, often, almost always, and always were not statistically significant for both experimental conditions. Thus, in comparison to those without target shooting experience, there was an increase in aggression for participants with minimal experience targeting shooting a human-shaped target, yet there was no significant increase in aggression for those who consistently target shot at the human-shaped target.

Gun Ownership for Protection and Aggression

The third hypothesis, predicting that owning a handgun for protection will be associated with increased aggression, was not supported. There was no significant difference in aggressive words between individuals who owned a handgun for protection ($M = 18.17$, $SD = 5.53$) and those who owned a handgun for other purposes ($M = 18.13$, $SD = 6.65$), $t(345) = 0.03$, $p = .98$. Thus, those who owned a handgun for protection purposes did not have more aggressive words. It should be noted, however, that the number of participants who owned a handgun for protection was quite low ($n = 30$) in comparison to those who owned the handgun for other purposes ($n = 317$); further research should use groups of relatively equal size for more accurate comparison.

Discussion

Individuals who were primed with pictures of handguns subsequently generated significantly more aggressive words, suggesting an increase in aggressive thoughts, than individuals who were primed with pictures of tennis rackets. This result does support the original

weapons priming effect, suggesting that the presence of guns leads to an increase in aggression (Berkowitz & LePage, 1967). However, despite this initial finding, analysis of other variables and interactions indicates that life experience with guns does, in fact, play a role in moderating the weapons priming effect.

It was hypothesized that individuals with higher levels of handgun experience would have decreased levels of aggression due to the weapons priming effect. Using the Word Completion Task, it was believed that such individuals would generate fewer aggressive words as a reflection of fewer aggressive cognitions. This hypothesis was not supported and demonstrated mixed results. When comparing individuals with low, average, or high levels of handgun experience, there was no difference in the amount of aggressive words. However, when comparing individuals without any life experience to those with average-high handgun life experience with handguns, those with the increased experience actually generated more aggressive words, indicating that such life experience was related to an increase in aggression. This was contrary to previous work on gun life experience by Nagtegaal and colleagues (2009) and Epstein (1979), in which an increase in gun life experience for long gun owners and pistol owners, respectively, was related to a decrease in aggression. Further, when comparing individuals within the handgun priming condition, those with average-high handgun life experience with handguns still demonstrated more aggressive cognitions than individuals without such life experience, indicating the handgun picture prime did increase access to aggressive cognitions, and handgun life experience did not decrease or otherwise moderate the gun-aggression association. Overall, these results do support the original weapons effect theory, proposing that the presence of handguns in general leads to an increase in aggression, regardless of the individual's level of handgun life experience. Perhaps this also implies that handguns,

compared to long guns, are by nature the more aggressive gun; the media consistently portrays handguns in situations of violence, promoting years of repeated activation of handgun and aggression concepts. Further, handguns are not used as frequently for sporting purposes, such as long guns for hunting, so individuals with handguns might not build the same gun-pleasure associations as those with long guns can. The combination of the frequent gun-aggression media presence and the decreased opportunity to learn gun-pleasure links may make overcoming handgun-aggression links more difficult, regardless of handgun life experience.

In contrast to the previous results, however, the gun-aggression link becomes more complex when taking into consideration the amount of overall gun life experience, rather than just handgun life experience. When comparing individuals with low, average, or high general gun life experience, which included variables about family gun history, gun safety classes, and ownership of long guns, amongst other variables, there was no difference in the amount of aggressive cognitions. This was true regardless of experimental condition, indicating that even when primed with pictures of handguns, the individuals did not complete more aggressive words. This contradicts the previous results and the weapons effect. Although the results were not significant or directional, as hypothesized, this may itself be an important finding. Even though the higher levels of life experience did not decrease aggression, the fact that they did not increase aggression, as predicted by the previous weapons effect research, may indicate that the overall gun life experience did indeed moderate the strength of the gun-aggression association. Thus, having a long history of handgun life experience may or may not impact the weapons effect, but having a long history of overall gun use, knowledge, and experience is more likely to moderate the gun-aggression link.

When analyzing various life experience variables individually, there was no difference in amount of aggressive words whether or not the individual owned a gun or a handgun, if close family members owned a gun or a handgun, or if the individual had taken a handgun safety class. This suggests that these variables separately do not greatly impact the weapons effect or moderate the gun-aggression link. Years of experience with guns and years of experience with handguns, both defined in the gun use questionnaire as handling, learning about, and/or shooting guns or handguns respectively, was also not related to an increase or decrease in aggression, nor were the years owning a handgun. This was surprising and contradictory to the original hypothesis. It seems that such variables alone are not important or strong enough to moderate the strength of the weapons effect; when combined, though, the variables together did provide results contrary to the weapons effect, indicating that the aggregation of different life experiences may be more important than any single one life experience variable in decreasing, or moderating, the gun-aggression link. When considering cognitive schemas, if one life experience variable creates a gun-pleasure link, then having multiple gun-pleasure links from other life experience variables should provide a more powerful and quickly activated gun-pleasure association network, or, consequently, at least render residual gun-aggression links weaker or less easily accessible.

Of final note is what could be an important difference between novice gun owners and experienced, or expert, gun owners. When analyzing the years having owned a non-pistol gun, individuals with two or fewer years of ownership (e.g., “novices”) generated significantly more aggressive words than individuals who had owned the non-pistol gun for 6 to 10 years (e.g., “experts”). This result does support life experience as a moderator for the weapons effect, as the longer the individual had owned a gun, the more time there could be to build non-aggressive

associations, whereas those just starting out may not have had the time nor experiences necessary to build such associations. This was particularly true when comparing individuals who had never owned a gun to those who were novices; those who had never owned a gun had fewer aggressive cognitions than novices, supporting the weapons effect. Compared to not owning a gun, the simple act of owning one provides the owner with more opportunity to learn about such gun use, for positive or negative. It appears that the initial period of owning a gun for the first time may enable the individual to engage in new and various kinds of life experience with the gun, such as gun safety classes or experimenting with using the gun in different situations, which can, for some individuals, lead to building gun-aggression links. Such links may be countered over time as the individual can engage in more varied gun experiences throughout the years, which could build gun-pleasure associations or weaken prior gun-aggression associations.

Frequency of Shooting a Human-Shaped Target

The frequency of shooting a human-shaped target with a handgun was, in fact, related to an increase in aggression, as predicted in the second hypothesis. Individuals who shot a human-shaped target at least one or more times generated more aggressive words, suggesting an increase in aggressive cognitions, than individuals who had never shot at a human-shaped target. This effect was true almost exclusively when comparing individuals without any target shooting experience to those who had shot once or twice in the past. To the author's knowledge, there have been no previous studies to demonstrate this link or theorize why this may be so. Although individuals who engage in handgun use for sport might develop stronger gun-pleasure associations compared to gun-aggressive associations (Nagtegaal et al., 2009), it is possible that shooting at a human-shaped target, even once, encourages development of gun-aggressive associations against another human, either overriding or in addition to the gun-pleasure

association from the sport itself. There may also be an element of self-selection in which more aggressive individuals choose to shoot at such targets; compared to a traditional bullseye target, for example, the human-shaped target may add extra excitement to the sport, encouraging thrill-seekers to favor such targets.

However, the effect was not consistent when comparing individuals who had target-shot human-shaped targets more frequently than just once or twice in the past. It is possible that there may be a quick and strong gun-aggression association built upon the first or second time shooting at a human-shaped target, aligned with the theoretical basis of the weapons effect, but as one continues to shoot at the human-shaped target over time, perhaps the individual becomes habituated to the stimulus and thus the human-shaped target eventually loses its once aggressive meaning. Future research should explore this link in greater detail. With the low number of respondents per frequency condition, it is difficult to truly interpret the results; it would be helpful to survey individuals at a shooting range, for example, to get a better idea of the associations between handguns, human-shaped target shooting, and aggression.

Owning a Handgun for Protection

It was hypothesized that individuals who owned a handgun for protection purposes would show an increase in aggression. This hypothesis was not supported. There were no differences in aggressive words between individuals who owned a handgun for protection in both overall and handgun priming only condition. It was theorized that owning a handgun for protection implies a readiness and willingness to use the handgun to aggress against another human, which could lead to gun-aggression cognitive associations. There has not been previous research on this particular link and future research should explore this more in depth, particularly with different methods, as the methods used in this study might not have accurately captured or isolated the variable in

question. For example, respondents often cited owning a handgun for more than one reason, including sport and hunting, thus it was difficult to explore the impact of owning a handgun only for protection; if the individual frequently uses the handgun for sporting purposes, the gun-pleasure associations might develop in addition to any gun-aggression links developed from owning the gun for protection. Surveying individuals who only own a handgun for protection purposes, not for any other reason, could provide more insight. Further, many participants in this study misread or misunderstood the question. Frequently, individuals who claimed not to have owned a handgun still answered the question for why they owned a handgun; it is possible that they misread the word “handgun” and answered as to why they owned a gun in general, or answered as to why family members owned handguns or guns. Thus, the answers must be interpreted with caution and future research should word the question carefully. A final explanation is simply that owning a gun for protection does not lead to the development of gun-aggressive associations. Perhaps knowing it is available as a tool to harm someone in the future, if need be, does not lend itself to the necessary repetition and consistent gun-aggression pairings that eventually develop into a gun-aggression link.

Limitations and Future Directions

There are several limitations to this study. First, and perhaps most important, is the generalizability of the participant sample. This study utilized undergraduate college students in their late teenage years; results may not be applicable to other age ranges or education levels. This study was also conducted at a southern university, housed within a heavy pro-gun culture; future research could study individuals in more liberal areas of the United States. Further, there were relatively low numbers of participants for each analyzed condition; future research should take into consideration various demographic variables and perhaps use a sample of established

gun owners, such as those recruited from shooting ranges, in order to get a more accurate idea about life experience variables and to better analyze such variables statistically. It is possible that such a young college-aged sample simply did not have the life experience necessary to truly test for the hypothesized moderation effects; testing individuals with more years of experience and more types of gun experiences could better inform current research efforts on life experience and the gun-aggression link.

The survey methods used also provided a limitation. Although worded carefully, it is possible that some questions were misinterpreted or misunderstood. For example, many individuals who claimed not to own a handgun still frequently answered the question for what purpose they owned a handgun. They may have been answering out of past experience (e.g., for what purpose they had owned a handgun in the past), why they owned a non-pistol gun, or even why their family members owned a gun. The same misinterpretation could have occurred for questions about handgun target shooting, as individuals frequently answered despite not having owned a handgun; they may have misread and answered about their target shooting with a non-pistol gun. The use of an online survey, in which logic and skip questions can be set up, would be beneficial for future research to ensure that those who own a handgun answer handgun-related questions, and those who do not own a handgun skip over such questions. Finally, there may have been misinterpretation or exaggeration in the number of years individuals claimed to have experience with guns, as many reported having the experience their entire lives from birth (e.g., an 18-year-old claiming to have 18 years of experience with guns). They may have been trying to indicate that they have been around guns or used guns their whole lives, or they may have misunderstood and answered as though speaking for their family, as the question followed inquiries about the family gun history.

This study focused on handguns, specifically, but future research would benefit from focusing on non-pistol gun ownership too. Inquiries into the purpose for owning a non-pistol gun and its relation to aggression could provide an interesting contrast to the purpose for owning a handgun. Further, target shooting variables could be addressed through the lens of non-pistol guns as well; perhaps the purported gun-pleasure associations of long guns produces a more complex aggressive association when target shooting at human-shaped targets, as gun-pleasure associations could compete with gun-aggressive associations.

Finally, although the Word Completion Task has been previously used as an implicit measure of aggressive cognitions (Anderson et al., 2003), it is possible that this task did not accurately measure aggression for the purposes of this study. Future research could use a different established implicit measure, such as implicit testing through E-Prime software, or established behavioral measures to determine state aggression or aggressive cognitions.

With a growing body of literature demonstrating the harmful effects of video game violence on aggression (McGloin, Farrar, & Fishlock, 2015), future research could also study the impact of pseudo gun experience via shooting video games on aggression, and how the player's own gun life experience influences the effects of video game violence on aggression.

Conclusion

This study found support both for the weapons priming effect and possible support for life experience as a moderator for the weapons effect. This study found mixed results for the effect of handgun life experience on aggression and future studies should attempt to replicate the study, perhaps with various populations, in order to better test and understand the moderating hypothesis. However, even though this study did not demonstrate a significant decrease in aggression for individuals with higher levels of general gun life experience, the results did not

show a significant increase in aggression, either; this contradicts the weapons effect and simultaneously provides possible support for such life experience, especially the aggregation of multiple life experience variables, as a moderator.

Further, individuals who have target shot at a human-shaped outline at least once in the past demonstrated an increase in aggression compared to individuals who have never target shot. This indicates that target shape itself may have a direct impact on the development of gun-aggression links. Lastly, results demonstrated that the purpose of gun ownership was not related to aggression.

Because gun violence is such an important social issue in the United States today, the results of this study can better inform gun owners, the general public, the National Rifle Association (NRA) and affiliated gun organizations, and governmental officials about the potential benefits of increasing gun life experience, through multiple experiential avenues (e.g., years of ownership, knowledge, years of exposure, etc.), for possibly decreasing the strength of the gun-aggression link.

References

- Anderson, C. A., Anderson, K. B., & Deuser, W. E. (1996). Examining an affective aggression framework: Weapon and temperature effects on aggressive thoughts, affect, and attitudes. *Personality and Social Psychology Bulletin*, *22*(4), 366-376.
doi:10.1177/0146167296224004
- Anderson, C. A., Benjamin, A. J., & Bartholow, B. D. (1998). Does the gun pull the trigger? Automatic priming effects of weapon pictures and weapon names. *Psychological Science*, *9*(4), 308-314. doi:10.1111/1467-9280.00061
- Anderson, C. A., Carnagey, N. L., & Eubanks, J. (2003). Exposure to violent media: The effects of songs with violent lyrics on aggressive thoughts and feelings. *Journal of Personality and Social Psychology*, *84*(5), 960- 971.
- Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.
- Baron, R., & Ball, R. L. (1974). The aggression-inhibiting influence of nonhostile humor. *Journal of Experimental Social Psychology*, *10*(1), 23-33. doi: 10.1016/0022-1031(74)90054-7
- Bartholow, B. D., & Heinz, A. (2006). Alcohol and aggression without consumption: Alcohol cues, aggressive thoughts, and hostile perception bias. *Psychological Science*, *17*(1), 30-37. doi:10.1111/j.1467-9280.2005.01661.x
- Bartholow, B. D., Anderson, C. A., Carnagey, N. L., & Benjamin, A. J. (2005). Interactive effects of life experience and situational cues on aggression: The weapons priming effect in hunters and nonhunters. *Journal of Experimental Social Psychology*, *41*(1), 48-60.
doi:10.1016/j.jesp.2004.05.005

- Bassili, J. N., & Smith, M. C. (1986). On the spontaneity of trait attribution: Converging evidence for the role of cognitive strategy. *Journal of Personality & Social Psychology*, *50*(2), 239-245.
- Berkowitz, L., & LePage, A. (1967). Weapons as aggression-eliciting stimuli. *Journal of Personality and Social Psychology*, *7*(2), 202-207.
- Buss, A. H., Booker, A., & Buss, E. (1972). Firing a weapon and aggression. *Journal of Personality and Social Psychology*, *22*(3), 296-302. doi:10.1037/h0032869
- Buss, A. H., & Durkee, A. (1958). Conditioning of hostile verbalizations in a situation resembling a clinical interview. *Journal of Consulting Psychology*, *22*(6), 415-418. doi:10.1037/h0046505
- Cahoon, D. D., & Edmonds, E. M. (1984). Guns/no guns and the expression of social hostility. *Bulletin of the Psychonomic Society*, *22*(4), 305-308.
- Cahoon, D. D., & Edmonds, E. M. (1985). The weapons effect: Fact or artifact?. *Bulletin of the Psychonomic Society*, *23*(1), 57-60.
- Caprara, G. V., Renzi, P., Amolini, P., D'Imperio, G., & Travaglia, G. (1984). The eliciting cue value of aggressive slides reconsidered in a personological perspective: The weapons effect and irritability. *European Journal of Social Psychology*, *14*(3), 313-322. doi:10.1002/ejsp.2420140306
- Carlson, M., Marcus-Newhall, A., & Miller, N. (1990). Effects of situational aggression cues: A quantitative review. *Journal of Personality and Social Psychology*, *58*(4), 622-633. doi:10.1037/0022-3514.58.4.622
- Collins, A. M., & Loftus, E. F. (1975). A spreading activation theory of semantic processing. *Psychological Review*, *82*(6), 407-428.

- Cook, P. J., Braga, A. A., & Moore, M. H. (2011). Gun control. In J. Q. Wilson & J. Petersilia (Eds.), *Crime and public policy* (pp. 257–292). New York, NY: Oxford University Press.
- DeWall, N. C., & Anderson, C. A. (2011). The general aggression model. In P. R. Shaver, M. Mikulincer, P. R. Shaver, M. Mikulincer (Eds.), *Human aggression and violence: Causes, manifestations, and consequences* (pp. 15-33). Washington, DC, US: American Psychological Association. doi:10.1037/12346-001
- Ellison, C. G. (1991). Southern culture and firearms ownership. *Social Science Quarterly*, 72(2), 267-283.
- Engelhardt, C. R., & Bartholow, B. D. (2013). Effects of situational cues on aggressive behavior. *Social and Personality Psychology Compass*, 7(10), 762-774. doi: 10.1111/spc3.12067
- Epstein, J. F. (1979). *Prior experience with firearms can mitigate the weapons effect* (Unpublished master's thesis). Tulane University, Louisiana.
- Epstein, J. F. (1981). *Firearms experience and the weapons effect: A motivated discounting hypothesis* (Doctoral dissertation). Retrieved from Dissertation Abstracts International. (1982-52397-001)
- Federal Bureau of Investigation. (2014). Crime Statistics. Retrieved January 20, 2015, from FBI.gov: https://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2013/crime-in-the-u.s.-2013/violent-crime/violent-crime-topic-page/violentcrimemain_final
- Gallup, Inc. (2015). *Guns*. Retrieved from Gallup: <http://www.gallup.com/poll/1645/guns.aspx>
- Giancola, P. R., & Zeichner, A. (1995). Construct validity of a competitive reaction-time aggression paradigm. *Aggressive Behavior*, 21(3), 199-204. doi:10.1002/1098-2337
- Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology*, 60(4), 509-517.

- Helsen, W. F., & Starkes, J. L. (1999). A new training approach to complex decision making for police officers in potentially dangerous interventions. *Journal of Criminal Justice*, 27(5), 395-410. doi:10.1016/S0047-2352(99)00012-4
- Hepburn, L. M., & Hemenway, D. (2004). Firearm availability and homicide: A review of the literature. *Aggression and Violent Behavior*, 9(4), 417-440. doi:10.1016/S1359-1789(03)00044-2
- James, L. R., McIntyre, M. D., Glisson, C. A., Green, P. D., Patton, T. W., LeBreton, J. M. ... & Williams, L. J. (2005). A Conditional Reasoning Measure for Aggression. *Organizational Research Methods*, 8(1), 69-99. doi: 10.1177/1094428104272182
- Johnson, R., & Steinman, L. (2009). Use of implicit measures for organizational research: An empirical example. *Canadian Journal of Behavioural Science*, 41(4), 202-212. doi: 10.1037/a0015164
- McGloin, R., Farrar, K. M., & Fishlock, J. (2015) Triple whammy! Violent games and violent controllers: Investigating the use of realistic gun controllers on perceptions of realism, immersion, and outcome aggression. *Journal of Communication*, 65, 280-299. doi:10.1111/jcom.12148
- Morrison, G. B., & Vila, B. J. (1998). Police handgun qualification: Practical measure or aimless activity. *Policing: An International Journal of Police Strategies & Management*, 21(3), 510. doi:10.1108/13639519810228804
- Murrell, A. R., Merwin, R. M., Christoff, K. A., & Henning, K. R. (2005). When parents model violence: The relationship between witnessing weapon use as a child and later use as an adult. *Behavior and Social Issues*, 14(2), 128-133. doi:10.5210/bsi.v14i2.359

- Nagtegaal, M. H., Rassin, E., & Muris, P. M. (2009). Do members of shooting associations display higher levels of aggression?. *Psychology, Crime & Law, 15*(4), 313-325.
doi:10.1080/10683160802241682
- Nieuwenhuys, A., & Oudejans, R. D. (2011). Training with anxiety: Short- and long-term effects on police officers' shooting behavior under pressure. *Cognitive Processing, 12*(3), 277-288. doi:10.1007/s10339-011-0396-x
- Leyens, J., & Parke, R. D. (1975). Aggressive slides can induce a weapons effect. *European Journal of Social Psychology, 5*(2), 229-236. doi:10.1002/ejsp.2420050207
- Lizotte, A. J., & Bordua, D. J. (1980). Firearms ownership for sport and protection: Two divergent models. *American Sociological Review, 45*(2), 229-244.
- Pavlov, I. P. (1927). Conditioned Responses. In W. Dennis, W. Dennis (Eds.), *Readings in general psychology* (pp. 249-267). New York, NY, US: Prentice-Hall, Inc. (Reprinted from *Conditioned Reflexes*, pp. 16-32, by G. V. Anrep, Trans., 1949, London: Oxford University Press)
- Siegel, M., Ross, C. S., & King, C. I. (2013). The relationship between gun ownership and firearm homicide rates in the United States, 1981–2010. *American Journal of Public Health, 103*(11), 2098-2105. doi:10.2105/AJPH.2013.301409
- Slovak, K., & Singer, M. (2001). Gun violence exposure and trauma among rural youth. *Violence and Victims, 16*(4), 389-400.
- Turner, C. W., Simons, L. S., Berkowitz, L., & Frodi, A. (1977). The stimulating and inhibiting effects of weapons on aggressive behavior. *Aggressive Behavior, 3*(4), 355-378.
doi:10.1002/1098-2337(1977)3:4<355::AID-AB2480030405>3.0.CO;2-G

Vaughn, M. G., Perron, B. E., Abdon, A., Olate, R., Groom, R., & Wu, L. (2012). Correlates of handgun carrying among adolescents in the United States. *Journal of Interpersonal Violence, 27*(10), 2003-2021. doi:10.1177/0886260511432150

Ybarra, M. L., Huesmann, L. R., Korchmaros, J. D., & Reisner, S. L. (2014). Cross-sectional associations between violent video and computer game playing and weapon carrying in a national cohort of children. *Aggressive Behavior, 40*(4), 345-358. doi:10.1002/ab.21526

Zuckerman, M. (1955). The effect of frustration on the perception of neutral and aggressive words. *The Journal of Personality, 23*(4), 407-422. doi: 10.1111/j.1467-6494.1955.tb01166.x

Table 1

Descriptive Statistics for the Impact of Handgun Life Experience and Priming Condition on Aggression

Life Experience	Prime	
	Handgun	Tennis
Low	18.51 (7.08)	16.26 (5.71)
Average	20.35 (6.51)	16.90 (5.53)
High	21.00 (7.02)	17.17 (6.10)

Note. Standard Deviations appear in parentheses after means.

Table 2

Descriptive Statistics for the Impact of Total Gun Life Experience and Priming Condition on Aggression

Life Experience	Prime	
	Handgun	Tennis
Low	18.89 (7.17)	15.90 (5.67)
Average	19.21 (6.26)	18.25 (5.55)
High	21.05 (7.10)	16.34 (5.88)

Note. Standard Deviations appear in parentheses after means.

Table 3

Means of Aggressive Words by Individual Gun Use Questionnaire Variables

Variable	Response		<i>t</i>	<i>df</i>
	Yes	No		
Owning a Handgun	18.26 (5.94)	18.12 (6.65)	-0.12	344
Owning a Gun	19.21 (6.85)	17.85 (6.47)	1.57	344
Family Owning a Handgun	17.79 (6.30)	18.55 (6.86)	1.07	344
Family Owning a Gun	18.00 (6.48)	18.44 (6.75)	-0.57	345
Taken a Gun Safety Class	19.77 (6.75)	17.77 (6.48)	2.23*	344
Taken a Handgun Safety Class	19.46 (6.22)	18.02 (6.59)	1.23	343

Note. * = $p \leq .05$, two-tailed. Standard Deviations appear in parentheses after means.

Table 4

Means of Aggressive Words by Individual Gun Use Questionnaire Variables in the Handgun Priming Condition

Variable	Response		<i>t</i>	<i>df</i>
	Yes	No		
Owning a Handgun	19.14 (5.34)	19.52 (7.16)	0.25	186
Owning a Gun	21.10 (6.68)	19.01 (6.99)	1.72	186
Family Owning a Handgun	19.12 (6.34)	19.85 (7.55)	0.72	186
Family Owning a Gun	19.36 (6.74)	19.73 (7.43)	-0.34	186
Taken a Gun Safety Class	22.11 (6.75)	18.88 (6.89)	2.54*	185
Taken a Handgun Safety Class	21.52 (6.53)	19.25 (6.70)	1.42	185

Note. * = $p \leq .05$, two-tailed. Standard Deviations appear in parentheses after means.

Table 5

Means of Aggressive Words by Years of Experience with Guns and Handguns

Variable	Group					<i>F</i>
	1 (0 years)	2 (.05-2 years)	3 (2-5 years)	4 (5-10 years)	5 (10+ years)	
Years of Experience with Guns	17.24 (6.51)	21.30 (7.29)	18.83 (6.13)	18.89 (6.64)	18.00 (6.71)	2.32
Years of Experience with Handguns	17.43 (6.48)	19.02 (6.31)	18.77 (6.13)	20.68 (7.92)	18.13 (7.29)	1.76

Note. * = $p \leq .05$, two-tailed. Standard Deviations appear in parentheses below means.

Table 6

Means of Aggressive Words by Frequency of Target Shooting at a Human-Shaped Target

Frequency	<i>n</i>	<i>M (SD)</i>
Not Applicable	198	17.30 (6.42)
Never	65	19.00 (6.63)
1x or 2x in Past	26	21.88 (6.18)
Sometimes	31	19.03 (7.36)
Often	17	17.29 (4.73)
Almost Always	5	13.60 (4.39)
Always	5	22.40 (5.94)

Appendix A: Hobby Survey

What hobby did you just view? _____

Have you ever participated in this hobby in the past? YES NO

Would you participate in this hobby in the future? YES MAYBE NO

On a scale of 1-10, how interested are you in this hobby?

Not at all interested Neutral Very interested

1

2

3

4

5

Appendix B: Gun Use Questionnaire

1. Do you own any guns? YES NO (if "no", please skip to question 2)

If **YES**, please indicate what type(s) of guns you own: (circle all that apply)

handgun rifle shotgun assault rifle other (please specify: _____)

Approximately *how many of each type of gun* do you own?

Handgun _____

Rifle _____

Shotgun _____

Assault rifle _____

Other _____

How many **years** have you owned a handgun, specifically? _____

How many **years** have you owned a non-pistol gun (rifle, shotgun, assault rifle)? _____

2. Do your immediate family members (parents, siblings, grandparents) own guns? YES NO

If **YES**, which kinds? (circle all that apply)

handgun rifle shotgun assault rifle other (please specify: _____)

3. Please estimate *how many years that you have experience with guns* (handling, learning about, and/or shooting)? _____

How many of those years were spent learning about, handling, or shooting **handguns** specifically?

4. Have you taken a gun safety class? YES NO

If YES, was it for handguns specifically? YES NO

5. For what purpose do you own a **handgun**? (circle all that apply)

Sport or Competition

Hunting

Protection or Defense

Collection / Other (please specify: _____)

Not Applicable (I don't own a handgun)

6. When target shooting with a **handgun**, how often do you shoot the following?

Paper – human outline

Never Once or twice in the past Sometimes Often Almost always Always

Paper – bullseye circle form

Never Once or twice in the past Sometimes Often Almost always Always

Bottles

Never Once or twice in the past Sometimes Often Almost always Always

Clay disks

Never Once or twice in the past Sometimes Often Almost always Always

Other (please specify: _____)

Never Once or twice in the past Sometimes Often Almost always Always

** Not Applicable (I have never target shot with a handgun)*

7. Please circle your gender: Male Female I prefer not to respond

8. What is your age? _____

9. Please indicate your race / ethnicity: (circle all that apply)

White (non-Hispanic)

Hispanic or Latino

Black or African American

Native American or American Indian

Asian / Pacific Islander

Other (please specify): _____

I prefer not to respond

10. Year in College:

Freshman

Sophomore

Junior

Senior

Other (please specify): _____

THANK YOU!

Appendix C:

Word Completion Task

- | | | |
|------------------|----------------|----------------|
| 1 b _ h _ _ _ | 20 s h o _ t | 39 s h _ r _ |
| 2 i n _ _ r e | 21 r _ p _ _ t | 40 d r _ _ n |
| 3 e x _ e _ _ | 22 s t r _ _ e | 41 p _ _ n e |
| 4 m _ u _ _ e r | 23 l _ _ e | 42 a n g _ _ |
| 5 p r _ _ e | 24 b _ r n | 43 f l _ _ t |
| 6 s p e a _ | 25 s t _ r _ o | 44 f i _ _ t |
| 7 f l i _ _ e r | 26 p _ _ s o n | 45 p _ c k |
| 8 e x p l _ _ e | 27 p _ s t _ r | 46 h a _ e |
| 9 w _ _ m | 28 m _ _ g l e | 47 a _ t |
| 10 k i _ _ | 29 b l _ n d | 48 c _ t |
| 11 t _ p _ | 30 s n _ r e | 49 w _ n |
| 12 h _ r _ | 31 b _ e | 50 a _ e |
| 13 a _ t _ r | 32 h _ t | 51 _ r y |
| 14 c h o _ e | 33 g _ _ p e | 52 w a _ |
| 15 s _ m p _ _ | 34 s m _ c k | 53 f _ m _ |
| 16 a t t _ c _ | 35 s m _ _ e | 54 s l _ p |
| 17 c _ m p _ _ t | 36 k n _ _ _ | 55 b _ _ k |
| 18 d e s _ _ _ _ | 37 t _ n e | 56 r _ p e |
| 19 s h _ l _ | 38 s _ _ b | 57 f o _ e _ t |

58 o f f _ _ _

59 l _ _ o n

60 c r _ _ l

61 c _ e _ t e

62 m _ t c _

63 m _ t c _

64 f _ r _ _

65 t _ _ t e

66 n _ _ t _

67 w _ _ d _ w

68 w _ _ k e d

69 v i s _ _ n

70 e n _ a g e

71 s c r _ _ n

72 h _ t r _ d

73 t _ l _ p h _ _ _

74 d i s _ _ s _ e d

75 c _ n t _ _ l

76 p r o v _ _ e

77 p _ n b _ l l

78 o u t _ _ _ e

79 c _ l l

80 r _ d e

81 m _ n _ g e

82 i n s _ _ _

83 s _ d _

84 b _ _ t

85 b r _ _ z e

86 r e v _ _ t

87 c o o _

88 s _ _ y

89 d _ _ r

90 s m _ c k

91 f r _ _ t

92 _ u n c h

93 s h _ r e

94 a _ u s e

95 c l _ _ r

96 h _ n t

97 w _ t _ r

98 s _ a s h