FIREARM POSSESSION, IMPULSIVE AGGRESSION, AND PTSD: RESULTS FROM THE ARMY STUDY TO ASSESS RISK AND RESILIENCE IN SERVICEMEMBERS (STARRS)

A Dissertation

Presented to the Faculty of

Palo Alto University

Palo Alto, California

In Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy in Clinical Psychology

by

Osnat Lupesko-Persky

May, 2021

FIREARM POSSESSION, IMPULSIVE AGGRESSION, AND PTSD: RESULTS FROM THE ARMY STUDY TO ASSESS RISK AND RESILIENCE IN SERVICEMEMBERS (STARRS)

Osnat Lupesko-Persky
Palo Alto University, 2021

Despite increasing gun ownership and gun violence in the U.S. in the form of suicide and homicide few studies so far have explored the relationship between impulsive aggression as a mental health condition and gun ownership. The Army Study to Assess Risk and Resilience (STARRS) provides the rare opportunity to do so and to begin exploring such potential relationship. The STARRS dataset is derived from a significantly large sample size (N = 21,449) of U.S. active-duty service members. Drawing from theories that explain posttraumatic stress disorder (PTSD) and intermittent explosive disorder (IED) as conditions that react to fear through anger and aggression, this dissertation sought to find strong correlation between these disorders, as well as show that both lifetime IED and lifetime PTSD can predict the personal possession of firearms in working condition.

While some positive correlation was found between participants who endorsed IED and those endorsing PTSD, the correlation between these disorders and gun possession was minimal, and the predictive value of each of these disorders in anticipating gun ownership was smaller than expected. These findings have the potential to better inform mental health practitioners about the PTSD-IED relationship and the importance of evaluating for IED as part of PTSD assessment. In addition, these findings can help provide an additional data point to researchers as well as policymakers who seek to find effective ways of addressing and combating gun violence.

DISCLAIMER

"This publication is based on public use data from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). The data are available from the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan (http://doi.org/10.3886/ICPSR35197-v1). Army STARRS was funded by the U.S. National Institute of Mental Health (grant number U01MH087981). The contents of this publication are solely the responsibility of the authors and do not necessarily represent the views of the Army STARRS investigators, funders, Department of the Army, or Department of Defense."
https://starrs-ls.org/#/

Firearm Possession, Impulsive Aggression, and PTSD: Results from the Army Study to Assess Risk and Resilience in Servicemembers (STARRS)

This dissertation by Osnat Lupesko-Persky, directed and approved by the candidate's committee, has been accepted and approved by the Faculty of Palo Alto University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

IN CLINICAL PSYCHOLOGY

_____

May 24, 2021

Risa Dickson PhD
Vice President for Academic Affairs

Dissertation Committee:

_____

Lisa M. Brown, PhD
Chair

_____

Josef I. Ruzek, PhD
Committee Member

_____

Matthew M. Yalch, PhD
Committee Member

DEDICATION

I dedicate this dissertation to my husband and soulmate, Eldad B. Persky, who provided his unwavering, patient, and loving support throughout this demanding and challenging process. Dude, thank you for providing wise counsel and honest feedback when things got hectic, for making sure I'll have the time to focus on research and writing, and for taking the charge over our three little ones so this work can come to fruition. Thank you for being a true partner while I discover my passion and in this beautiful journey called life on earth. I could not have asked for a better partner.

I also dedicate this dissertation to my parents, Nava and Haim Lupesko, who have instilled in me from an early age the love of reading, learning, and gaining knowledge. Thank you.

ACKNOWLEDGEMENTS

"It takes a village to raise a child". Similarly, the execution of this dissertation would not have been possible without the expertise, guidance and support of my committee members, family, and colleagues from beginning to end. I would like to thank Lisa M. Brown, PhD, my Committee Chair and Research Advisor, who introduced and granted me access to the data, and showed unwavering support throughout this process. I am also grateful to Matthew M. Yalch, PhD, who invested hours of his time to educate, explore and discuss the statistics behind the results. I also thank Josef I. Ruzek, PhD, for his expertise, support, and advice as part of my dissertation committee. I am thankful for the help of Alexander Erickson, M.S. who contributed his time to review and provide advice to important parts of my dissertation. And lastly, this work, indeed my entire degree and future profession, would not have come to existence without the help, motivation, and support of my husband, Eldad Persky.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

Humans greatest fear is arguably death. It is interesting, therefore, how in the face of such fear we choose to own guns, a tool designed to cause immediate death, and violent one at that.

INTRODUCTION

The ongoing public debate on gun possession and gun violence in the U.S. has included social, cultural, political, and legal elements. In recent years, media and political outlets singled out mental health as the cause of gun violence. Recent public debate, channeled through media outlets is making the underlying assumption that mental health is a substantial motivator behind gun violence (Rozel & Mulvey, 2017). However, such assertion warrants serious scientific epidemiological examination which should start with broad exploration of the relationship between certain mental health conditions and possession of firearms.

The purpose of this dissertation is to examine the relationship between lifetime posttraumatic stress disorder (PTSD), lifetime intermittent explosive disorder (IED) among active-duty army service members (military personnel), and whether these mental health conditions can predict the personal ownership of firearms in working condition among that group. The idea to examine the relationship between PTSD and IED among military personnel developed from the realization that both contain elements of *impulsive aggression* and anger (American Psychiatric Association [APA], 2013). Impulsive aggression is a significant factor in both self-directed violence such as suicidal behavior (Oquendo & Mann, 2000; Seo & Kennealy, 2008) and violence exerted towards others (Anderson & Carnagey, 2004; Edwards et al., 2003). Multiple studies found that IED and PTSD are considerably prevalent in the overall population (Kilpatrick et al., 2013), and even more so among the military population, whether veterans or active-duty service members (Reardon et al., 2014; Thomas et al., 2010). Moreover, both PTSD

and IED were found to be associated with violent behaviors towards self, including suicide or self-harm behaviors (Ben-Ya'acov & Amir, 2004; Coccaro, 2000; Fanning et al., 2016; McCloskey et al., 2008; Panagioti et al., 2009) and towards others such as through domestic violence or other assaults (Beckham et al., 1997; DeLisi et al., 2017; Felthous et al., 1991).

Although PTSD and IED share significant common behaviors, there are few studies on their association among civilian and military populations (Fanning et al., 2016; Reardon et al., 2014). Moreover, hardly any studies attempted to explore the potential repercussions PTSD-IED comorbidity could have among active-duty service members. While multiple studies on trauma, anger and impulsive aggression were funded by the U.S. government in the past two decades, the approach has been entirely different towards the scientific exploration of firearm ownership and its potential association with psychiatric disorders. In fact, the U.S. legislator discouraged such research; the Dickey Amendment (named after former representative Jay Dickey [R, AR]), a provision in the Omnibus Consolidated Appropriations Act of 1997 largely prevented federal agencies such as the Centers for Disease Control and Prevention (CDC) from conducting research on the issue (Kellerman & Rivara, 2013; Rivara et al., 2018). This provision was ratified in law periodically, for example through the Consolidated Appropriations Act of 2012. The result of these legislative restrictions, as suggested by Rostron (2018), is that key federal agencies like the CDC avoided researching the issue altogether. However, in 2018 U.S. Congress (Congress) clarified the law to allow for research on guns and violence and the 2020 Omnibus Consolidated Appropriations Act provided funds for such research (Wen & Sadeghi, 2020).

Similarly, Congress prohibited the collection of records on the lawful ownership of firearms by service-members for personal purposes, with the exception of suicide risk (e.g. National Defense Authorization Act for Fiscal Year 2013). Thus, the past decade's

comprehensive legal restrictive approach taken by the legislative branch to discourage data gathering in connection with firearm ownership made it extremely difficult for scientists to explore gun violence and by extension the relationship between gun possession and mental health (Kellerman & Rivara, 2013; Rivara et al., 2018; Rostron, 2018; Wen & Sadeghi, 2020).

Despite the considerable dearth of research on the issue for the reasons stated, data from several studies conducted throughout the past three decades suggest that the combination of anger and impulsive aggression becomes especially hazardous when firearms are also involved (Freeman & Roca, 2001; Kellerman et al., 1993; Studdert et al., 2020; Swanson et al., 2015). A recent groundbreaking longitudinal study by Studdert et al. (2020) found a clear relationship between gun ownership and suicide among the civilian population in California. There is some data to indicate that mental disorders are substantial risk factors in connection with suicide (Goldney, 2015; Gradus, et al., 2010), and that they are estimated to increase the risk of suicide eight-fold, on average, as indicated by a systematic review conducted by San Too et al. (2019) which reviewed 13 unique studies on the issue conducted between 2000 and 2018. In addition, not only did suicide numbers in the U.S. increase in the past decade, reaching 14.2 suicides per 100,000 individuals in 2018 (American Foundation for Suicide Prevention, 2020), but there is also a significant increase in the use of firearms as a method of suicide (CDC, 2019). However, there is dearth of scientific research on whether mental health disorders can correlate with or predict the personal possession or use of firearms.

Table 1 and Table 2 below chart the increase in deaths caused by suicide and homicide respectively by firearms from 2007 to 2019 (in two-year increments) based on information retrieved from the CDC, (2019). Specifically, the cases of suicide using firearms have increased by 30% from 2007 to 2018 (CDC, 2019; National Safety Council, 2019).

Table 1

Cases of Suicide by Firearms in the U.S 2007-2019 in Two-Year Increments

Suicide by Firearm		
Year	Death	Population
2019	23,941	328,239,523
2017	23,854	324,985,539
2015	22,018	320,635,163
2013	21,175	315,993,715
2011	19,990	311,556,874
2009	18,735	306,771,529
2007	17,352	301,231,297

Table 2

Cases of Homicide by Firearms in the U.S 2007-2019 in Two-Year Increments

Homicide by Firearm		
Year	Death	Population
2019	14,414	328,239,523
2017	14,542	324,985,539
2015	12,979	320,635,163
2013	11,208	315,993,715
2011	11,068	311,556,874
2009	11,493	306,771,529
2007	12,632	301,231,297

The situation is even more troubling in the active-duty military service members and veteran populations. Among active-duty service-members, suicide rate evaluated between 19.13 to 29.44 cases per 100,000 service members from 2006 to 2011, with 62% of these cases attributed to firearms (Anglemyer et al., 2016). Among veterans, the suicide rate is even higher, with 39.2 suicides per 100,000 veterans in 2014 (Veterans Affairs Office of Mental Health and Suicide Prevention, 2016) and over two thirds (67%) of these deaths resulting from firearm injuries.

Despite available data that make potential indirect connection between mental health and firearms, there are very few studies that specifically explore the relationship between PTSD, IED and gun ownership, and even fewer studies on these issues are conducted among the military population, despite its high exposure to and ownership of firearms (Harrell & Berglass, 2011; Hepburn et al., 2007; Stroebe, 2014). Such research is especially important among active-duty service members and veterans for several reasons. First, these populations are more vulnerable

than the civilian population, to developing PTSD and IED as part of their military service experience (Fanning et al., 2016, Jakupcak & Tull, 2005). Second, data clearly show that these populations own more firearms compared with civilian populations. As of 2017 nearly half of all veterans (one in two) owned one or more firearms (Cleveland et al., 2017) in comparison to three-in-ten American civilian adults (Parker et al., 2017). While there is no comprehensive and clear data on the rate of personal firearm ownership by active-duty service members, a recent study by Bryan et al. (2019) showed that among 1652 active-duty participants at least 35% reported owning at least one gun in their household.

Why should psychology research hypothesize that a diagnosis of PTSD or IED is more likely to show a tendency to privately own firearms? Of the relevant established theories, this paper will draw on two: the survival mode theory as posited by Chemtob et al. (1997), and the fear avoidance theory established by Foa et al. (1995). These theories are the most suitable for the research question at hand because they can be further extended to explain the decision to own firearms as a potential coping mechanism to address issues of jeopardized safety and perceived threats that, as this study suggests, are characteristic of both PTSD and IED.

The survival mode theory stipulate that a person with lower danger threshold who is more likely to interpret various situations in their environment as threatening will also tend to be relatively easily triggered by subjective perceptions of external threats (even with little evidence that such threat actually exists) and will give primacy to threat confirmation and as a result will be more likely to engage in action to deter the threat or engage in higher vigilance in order to survive (Chemtob et al., 1997; Novaco & Chemtob, 2002).

The fear avoidance theory suggests that individuals with PTSD and IED will defer to impulsive aggression and anger to unconsciously avoid emotions of fear, sadness, and anxiety

that a certain situation triggers (Reardon et al., 2014) because the latter emotions are viewed as threatening the life, survival, and well-being of the person. At their core, both theories posit that anger and impulsive aggression are used as part of IED and PTSD to ultimately ensure survival, or avoid death, in a chronic fragile perception of reality as filled with constant threatening scenarios. Within this context, it can also be argued that the decision to own a firearm in one's home or carry it in one's possessions is an act motivated by the need to ascertain safety and survival, which is likely stronger in a subjective perception of constant and continuous threat.

CHAPTER II

LITERATURE REVIEW

Theories of anger and impulsive aggression in PTSD and IED could be useful in understanding the common underlying premise of these disorders. These theories can similarly provide a substantive reasoning for why individuals who experience symptoms of PTSD and IED are more likely to own firearms in their households. Both the fear avoidance theory and the survival mode theory provide a logical and lucid rationale for the reaction-based cognitive, emotional, and behavioral processes that often characterize PTSD and IED (Kulper et al., 2015). This dissertation submits that the rationale in the core of these theories also explains the potential motivation behind the decision of active-duty military personnel with symptoms of PTSD and/or IED to privately own firearms, disorders that are arguably greater among this population relative to military personnel not diagnosed with either.

Fear: The Mutual Preliminary Factor

Fear is a preliminary joint etiological marker of both PTSD and IED, and although fear is not the focus of this dissertation, research often associates it with anger, PTSD and IED (Lara et al., 2006; Reardon et al., 2014). Therefore, a brief review of the term within the context of these disorders is warranted. From an evolutionary perspective of psychology, it is suggested that fear is the preliminary emotion that "ignites" reactionary cognitive, emotional, and behavioral processes of anger and aggression among individuals with PTSD and IED (Johnson et al., 2012). In their meta-analysis study, neuroscientists Johnson et al. (2012) reviewed Pavlovian-type studies in animals in which fear was paired with a conditioned stimulus. The study showed how the conditioned fear memory was encoded into the animals' neurons which, in turn, increased neural activity in the "fear network" that includes the frontal cortex, amygdala, and

hippocampus. Johnson et al. (2012) further showed how the encoded fear negatively impacted efforts to extinguish fear in future episodes associated with the underlying fearful memory, effectively creating the chronicity of inability to extinguish the fear. From a neuroanatomical view, hyperactivation of the amygdala, a component of the limbic system that is activated in fear responses, was also identified among individuals diagnosed with IED, an anger-derived disorder (McCloskey et al., 2016). Fear is also the main trigger of the physiological survival mechanisms that characterize the "fight or flight" response which often also characterize physiological responses of anger (Milosevic & McCabe, 2015). Physiological reactions emblematic of PTSD include fast heart rate, hyperarousal, fatigue, and greater skin conductance (Gutner et al., 2010).

IED is similarly construed of physiological reactive symptoms associated with the fight or flight response such as racing heart, shortness of breath and tingling sensation (Kulper et al., 2015). From an evolutionary perspective fear and anger share a common purpose of survival given threatening situations rooted in the naturalistic impulse of the organism (whether human or animal) to protect the self from immediate threats to its survival. The survival mode theory and the fear avoidance theory are both primarily rooted in subconscious fear that ultimately turns into anger (Lamia, 2011). As will be described herein, both theories revolve around the individual's subconscious use of anger and aggression as means of suppressing original fear, reduce anxiety and ultimately ensure survival.

Theories of Anger and Impulsive Aggression in PTSD and IED

The Survival Mode Theory: When Anger Masks Fear

The survival mode theory was first introduced by Chemtob et al. (1988), to explain the following key symptoms among people with chronic PTSD: hyper-arousal, aggressive impulses, and anger. Chemtob et al. (1988) focused on violent-associated behaviors because they are interpreted as adaptive processes people diagnosed with PTSD are likely to use when facing danger with the subconscious purpose of reducing distress, anxiety or fear and ultimately ensuring survival (Novaco & Chemtob, 2002). Chemtob et al. (1988) identified three core factors that are prevalent in the presentation of individuals with PTSD compared with those without PTSD. First, they have higher potentiation of the threat-arousal node which is a chronic process that is triggered even when no objective threat is present. Second, because of threat-arousal state, people with PTSD are also prone to interpret objectively non-threatening situations as threatening. Third, as a result of chronic and frequent triggering of threat-arousal, people with PTSD will tend to inhibit or suppress alternative cognitive and behavioral processes that seek to keep threat low, and frequently defer to hyperarousal, irritability and anger.

Heightened sensitivity to danger is essential for survival in a combat zone, where a soldier is trained to notice any suspicious movement of people, and to be ready to swiftly pull out their gun and use aggression, when necessary, as well. Chemtob et al. (1988) submitted that such cognitive (e.g., suspicion) and behavioral (pulling out gun) reactions are essential to overcoming negative emotions of fear and anxiety and ultimately ensuring survival, and, moreover, that they become ‘second nature’ to the soldier through the cognitive processes of higher-order conditioning and generalization. In other words, through experience and repetition, the soldier neurocognitively adapts to interpret random people or subjects as potentially dangerous and

maintain alertness, suspicion, and aggression over prolonged periods of time. The problem begins, according to Chemtob et al. (1988), when these adaptive cognitive, emotional, and behavioral states turn to a "positive feedback loop" (p. 256). The chronic state of searching for, and detection of, ambiguous possible threats transfers from the combat environment to a non-combat setting, where there is no logical reason to be continuously 'on guard', and where such reactions of anger, heightened alertness and hyper-arousal are considered non-normative, maladaptive and often dysfunctional (Novaco & Chemtob, 2002).

While Chemtob et al.'s (1988) theory of survival focuses on the unique cognitive processes of PTSD and does not address IED per-se, this dissertation submits that the survival mode theory can and should be applied to IED as well, for three main reasons. First, in their development of the theory, Chemtob et al. (1988) mainly focused on the threat-arousal, hyperarousal, and anger characteristics of the disorders (Chemtob et al., 1988; Novaco & Chemtob, 2002). These traits of chronic and heightened alertness and disproportionate explosive reaction to ambiguous possible threats are not only common traits of PTSD but are also the staples of IED. Thus, the relationship between anger and IED, too, can be explained through survival systems and the cognitive processing of threat. Second, research shows a significant correlation between the disorders and that trauma, in itself, could be a precursor to the development of IED (Rees et al., 2013; Scott et al., 2018). Third, recent studies show that PTSD and IED are of predictive value as they share common key symptoms revolving around anger (Fanning et al., 2016; Reardon et al., 2014; Wolf et al., 2010;).

The Fear Avoidance Theory: When Fear Turns to Anger

The fear avoidance theory, first postulated by Foa et al. (1995), seeks to explain certain chronic emotional, cognitive, and behavioral mechanisms behind the avoidance-related symptoms as part of PTSD. Despite the fact that both the fear avoidance theory and the survival mode theory focus on anger as part of PTSD, several important differences exist between these theories: While the survival mode theory focuses on hyperarousal-related symptoms of PTSD such as irritability and explosive anger (Chemtob et al., 1988), the fear avoidance theory suggests an explanation for avoidance-related symptoms of the disorder such as avoidance of internal or external stimuli, detachment and anhedonia (Foa et al., 1995). In addition, while the survival mode theory describes anger as the preliminary reaction and primary experience that occurs continuously as part of the hyperarousal reaction (Chemtob et al., 1988), the fear avoidance theory stipulates that fear, not anger, is the preliminary experience behind avoidance symptoms and that, in time, the fear transforms into anger as a defense mechanism aimed to avoid future trauma-related fears (Day, 2011; Foa et al., 1995). More specifically, the anger takes place in order to avoid trauma-related feelings of fear (Kleespies, 2016). Hence, as the survival mode theory suggests that anger is the result of the individual being constantly "on guard" and looking for possible threats around, the fear avoidance theory views anger as an "emotional avoidance strategy" to prevent the reexperiencing of fear (Day, 2011, p. 246).

The fear avoidance theory further submits that anger is a coping mechanism subconsciously used to numb sensations of fear which in turn trigger memories and stimuli related to the traumatic event (Feeny et al., 2000; Foa et al., 1995). For it is anger that allows people who went through physical and emotional painful experiences to avoid the unpleasant and fearful memories cognitively associated with the trauma and ultimately from reexperiencing the

trauma (Feeny et al., 2000; Foa et al., 1995). Some studies suggest that while fear is the predominant emotion following a traumatic event, in time the emotion decreases, clearing the way for anger to take over (Day, 2011). Other studies view the relationship between anger and fear as a dichotomous one within the context of the fight or flight response, where the fight represents the person's resort to anger and the flight represents the fear aspect of the behavioral response (Barlow, 2002; Olatunji, et al. 2010).

Regardless of the form in which fear and anger take place within the context of post traumatic behavior, whether concurrently or consecutively, research is arguably in agreement that both emotions play a major role in the presentation of PTSD and, moreover, that one emotion can predict the existence of the other as part of the disorder (Barnum & Solomon, 2019; Lara et al., 2006; Olatunji et al., 2010). Therefore, according to the fear avoidance theory, individuals with PTSD presentation will likely use anger in moments they perceive as threatening to their safety, as a fear avoidance mechanism that blocks thoughts and emotions such as fear, sadness, shame, or guilt associated with the trauma (Reardon et al., 2014; Sullivan et al., 2019).

Given that PTSD requires an index or complex trauma to exist which, in turn, leads to the need to avoid emotions of fear associated with the traumatic event, can the fear avoidance theory apply to IED, a disorder that does not require an index trauma? This paper submits that it can. According to Reardon et al. (2014) the same mechanisms that the theory applies to PTSD also explain anger as part of IED and that people with IED unconsciously manifest anger outbursts to avoid feelings of sadness or anxiety which are correlated with fear.