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Claire Houtsma  
*University of Southern Mississippi*

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THE ROLE OF MASCULINITY IN THE DEVELOPMENT OF CAPABILITY FOR  
SUICIDE

by

Claire Houtsma

A Dissertation  
Submitted to the Graduate School,  
the College of Education and Human Sciences  
and the School of Psychology  
at The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

Approved by:

Dr. Michael Anestis, Committee Chair  
Dr. Daniel Capron  
Dr. Joye Anestis  
Dr. Richard Mohn

---

Dr. Michael Anestis  
Committee Chair

---

Dr. Sara Jordan  
Director of School

---

Dr. Karen S. Coats  
Dean of the Graduate School

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## ABSTRACT

Males account for over two-thirds of suicide deaths annually. Additionally, more than 50% of American suicide deaths annually are firearm-related. Suicide risk is elevated within firearm owning households and men are more likely to own firearms, which suggests that male firearm owners are at disproportionate risk for suicide. Prior research has argued that certain stereotypically male traits (e.g., lack of help-seeking) may explain sex differences in suicide death; however, this remains a poorly understood phenomenon. Male gender norms (e.g. physical toughness, self-reliance) may contribute to the development or expression of capability for suicide, primarily through their impact on behavior. The current study attempted to clarify sex differences in suicide death by examining sex differences in capability for suicide among male and female firearm owners. A structural equation modeling approach was utilized to test proposed and alternative theoretical models, which examined at the impact of sex, masculine norm adherence, and the interaction of both, on latent capability constructs. Results revealed that neither the proposed nor alternative measurement model converged, suggesting that latent capability variables were not appropriately measuring their intended constructs. An exploratory path analysis assessing relationships between observed variables provided some preliminary support for the existence of sex differences across indicators of capability, as well as the influence of masculine norm adherence on capability. Overall, these results indicated that capability for suicide is a complex construct not easily captured by existing measurement tools. Limitations to the current study's design preclude strong inferences regarding the relationships between sex, masculine norm adherence, and indicators of capability for suicide. However, exploratory findings offer

insight regarding potentially fruitful areas for further exploration. Future directions and potential interventions are discussed.

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## DEDICATION

I would like to dedicate this dissertation to my mom (Anita Houtsma), dad (Neil Houtsma), and sister (Ashley Kopeikin), as their support, encouragement, and validation is what got me through graduate school. Thank you for all the long phone calls, visits, care packages, and check-ins, they mean more than you know. I'd also like thank my friend and fellow graduate student, Laura Hansen, for her invaluable input, assistance, and support in navigating the ups and downs of graduate school.

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## CHAPTER I - INTRODUCTION

### Background

Suicide is the tenth leading cause of death in the U.S. (Centers for Disease Control and Prevention [CDC], 2017). Of the 47,173 American suicide deaths in 2017, approximately 78% were men (CDC, 2017). This is a pattern that has been well-documented across time. More specifically, it has been found that women attempt suicide at a higher rate than men, but men die by suicide at a higher rate than women (Canetto & Sakinofsky, 1998). Many possible explanations for this discrepancy have been explored in the literature, including the use of more lethal suicide methods among men (i.e., firearms; Canetto & Sakinofsky, 1998). The disproportionate use of firearms among men is certainly noteworthy given that firearms accounted for just over half of all suicide deaths in 2017 (CDC, 2017). Importantly, suicide risk has been found to be particularly elevated within firearm owning households (e.g., M. Anestis & Houtsma, 2017; Miller et al., 2013, Miller et al., 2015), firearms used in suicide attempts are more likely to be household firearms (Miller, Azrael, Hemenway, 2002; Kellerman et al., 1992), and men are more likely to own firearms (Parker, Horowitz, Igielnik, Oliphant, & Brown, 2017). This suggests that risk for suicide is disproportionately distributed among firearm owners, particularly male firearm owners; however, research has not adequately examined mechanisms of risk within this group.

Other explanations for sex differences in suicide death include the sociocultural belief that suicide is “masculine” and the decreased likelihood for men to seek treatment for depression or suicidal ideation relative to women (Canetto & Sakinofsky, 1998; Vogel & Heath, 2016). All of these explanations have merit and are supported by

research; however, they may simply be indicators of an underlying process that influences differences in suicide risk. Specifically, the extent to which an individual subscribes to and lives in line with sociocultural masculine norms may, through various mechanisms, meaningfully contribute to observed sex differences in suicide death. Exploration of this topic may lead to a more thorough understanding of both male and female suicide death and may assist researchers in developing novel prevention strategies. However, extant research on this topic has largely failed to integrate these explanations into the framework of a modern theory of suicide, thus limiting our ability to make meaningful predictions and truly understand underlying mechanisms of risk.

One way to conceptualize this problem is to examine suicide risk through the lens of the Three-Step Theory (3ST; Klonsky & May, 2015). The 3ST takes an ideation-to-action approach to understanding suicide, meaning that it conceptualizes the development of suicidal ideation and the progression from ideation to suicide attempt, as distinct processes. Specifically, the 3ST posits that suicidal ideation develops when an individual experiences psychological pain *and* feels hopeless that the pain will decrease or cease (Klonsky & May, 2015). Furthermore, Klonsky and May (2015) posit that suicidal ideation becomes more severe if an individual's perceived connectedness (to others, a job, a role, etc.) is interrupted or is outweighed by their experience of psychological pain and hopelessness. However, it is believed that these factors alone are insufficient for an individual to transition to suicidal behavior. It is also necessary for an individual to possess capability for suicide - an ability to combat the innate, biological drive for life - in order to engage in a suicide attempt (Joiner, 2005; Klonsky & May, 2015).

The 3ST describes three distinct components that comprise an individual's overall capability for suicide: dispositional, acquired, and practical capability. Dispositional capability refers to an individual's genetic predisposition for high pain tolerance and low fear of death, pain, and injury. Individuals who are genetically predisposed to have lower pain sensitivity or who possess diminished fear responses to pain or death are likely to have an increased ability to engage in suicidal behavior. Indeed, recent research by Smith and colleagues (2012) using a sample of male twins appears to support the role of genetics in capability for suicide. Acquired capability, a construct originally developed by Joiner (2005), refers to an individual's habituation to pain, fear, and death through repeated exposures to painful and/or provocative life events (e.g., physical abuse, non-suicidal self-injury). It is believed that such habituation allows an individual, over time, to become more comfortable with the concept of death and to develop the physical pain tolerance necessary to engage in suicidal behavior, should they develop suicidal ideation (Joiner, 2005). Several studies have demonstrated that acquired capability distinguishes between ideators and attempters, further supporting its role in suicidal behavior (Chu et al., 2017; Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Finally, practical capability refers to an individual's knowledge of, access to, and fluency with lethal means that can be used in a suicide attempt (Klonsky & May, 2015). Practical capability can take many different forms, such as owning a lethal weapon, working in an environment that requires knowledge of lethal items, or general exposure to lethal methods. Recent research appears to support the role of practical capability in suicidal behavior. For example, numerous studies demonstrate that owning a firearm significantly increases risk for death by suicide (e.g., M. Anestis &

Houtsma, 2017; Miller et al., 2013, Miller et al., 2015; Hamilton & Kposowa, 2015; Brent et al., 1991), a risk which extends to all members of a household (Miller, Swanson, & Azrael, 2016). Additionally, individuals working in certain professions that involve access to, knowledge of, and fluency with lethal means demonstrate elevated suicide rates, such as veterinarians who frequently perform animal euthanasia (Witte, Correia, & Angarano, 2013).

Importantly, the rate at which individuals report suicidal ideation is far greater than the rate of non-lethal and lethal suicidal behavior (Van Orden et al., 2010), suggesting that even though many individuals think about suicide, not all are capable of acting on those thoughts. This highlights the role of capability for suicide in determining who will engage in suicidal behavior. Understanding the different mechanisms driving the development of capability for suicide is crucial to identifying those most at risk for suicidal behavior and may also offer opportunities for prevention. Given that firearms account for more than half of all suicide deaths in the U.S. (CDC, 2017) and that firearm ownership increases risk for death by suicide (e.g., M. Anestis & Houtsma, 2017), it may be especially important to understand how capability develops in the firearm owning population.

Masculinity may contribute to the development of capability for suicide in several ways. Masculinity involves typically male gender roles or norms of behavior that are socially constructed and reinforced (Addis & Cohane, 2005; Eagly & Wood, 2012), but which also have evolutionary and biological foundations (Kruger & Nesse, 2006; Eagly & Wood, 2012; Ristvedt, 2014). Themes of masculinity include an emphasis on physical toughness, absence or suppression of emotion, excessive focus on success, power, and

competition, homophobia, rejection of femininity, and self-reliance (Addis & Cohane, 2005). Importantly, these masculine norms go beyond traditional sex differences (i.e., one's biological sex assigned at birth). Because they are socially constructed they can be developed and expressed by any individual, regardless of their gender identity. Due to changing social norms in modern society, women are increasingly likely to obtain traditionally male-occupied positions (e.g., management jobs, etc.) and endorse masculine norms and associated behaviors (England, 2010; Granato, Smith, & Selwyn, 2015; Twenge, 2001; Eagly & Wood, 2012). Indeed, there appears to be a great degree of variability in masculine gender norm adherence, as well as considerable overlap between men and women (Mahalik et al., 2003; Ristvedt, 2014). Identification with certain groups or cultures who place a high emphasis on masculinity may also lead individuals to develop stronger adherence to masculine norms. For example, themes observed within gun culture appear to align with masculine norms, such as the belief that firearms enable one to demonstrate strength, protection, and independence (O'Neill, 2007; Stroud, 2012; Stroud, 2016). Development of and identification with these themes of masculinity is believed to occur in early childhood and continues to be shaped and reinforced throughout childhood into adulthood (Eagly & Wood, 2012; Burns & Mahalik, 2011). The dynamic ways in which masculinity develops and is expressed may influence all components of capability for suicide, primarily through its impact on behavior.

### Masculinity and Acquired Capability

Acquired capability for suicide is thought to develop within the context of repeated exposures to events that serve to increase pain tolerance and decrease fear of death (Joiner, 2005), so it can reasonably be assumed that any trait or quality that



increases an individual's likelihood of such exposures will heighten their acquired capability. Masculine norms of dominance, power, toughness, and suppression of emotion, among others, may drive individuals to engage in painful and provocative experiences in an effort to either demonstrate these masculine qualities or, in some instances, to silence those who might challenge these qualities (Reidy, Smith-Darden, Cortina, Kernsmith, & Kernsmith, 2015; Cohn & Zeichner, 2006; Parrott & Zeichner, 2003). Accordingly, extant research has found that various forms of masculinity are associated with engagement in aggressive and violent behavior (Levant, Wimer, Williams, Smalley, Noronha, 2009; Baugher & Gazmararian, 2015; Reidy et al., 2015; Cohn & Zeichner, 2006; Parrott & Zeichner, 2003), as well as substance use (Courtenay, 2000; Snell, Belk, & Hawkins, 1987; Kulis, Marsiglia, & Hecht, 2002), each of which have also been associated with increased acquired capability for suicide and/or suicidal behavior (Van Orden et al., 2008; Bryan et al., 2010; Liu, Case, & Spirito, 2014). Given the dearth of research directly examining the relationship between masculinity and acquired capability, it may be informative to understand the ways in which masculinity relates to these associated behaviors.

For example, high levels of masculine gender role stress (MGRS; Eisler & Skidmore, 1987) - the distress a man experiences when he perceives that his masculine identity is threatened - and distress related to the perception that one is "sub-masculine" are associated with both hypothetical and self-reported past perpetration of violence (Baugher & Gazmararian, 2015; Reidy et al., 2015). Findings regarding the relationship between masculinity and aggression have also held in laboratory settings. Cohn and Zeichner (2006) found that both masculine identity (men's attitudes about and conformity

to traditional masculine norms as measured by the Conformity to Masculine Norms Inventory; Mahalik et al., 2003) and gender role conflict (the extent to which men experience conflict related to meeting masculine norm expectations, measured by the Gender Role Conflict Scale; O'Neil, Helms, Gable, David, & Wrightsman, 1986) were associated with aspects of behavioral aggression on a competitive reaction time task, such as delivering more extreme shocks to a fictitious opponent and for longer durations (Cohn & Zeichner, 2006).

The robust relationship between masculinity and aggression is significant, given that experience with aggressive behavior is believed to be one route through which an individual can become accustomed to physical pain and fear of death (Joiner, 2005). In fact, Reidy, Dimmick, MacDonald, and Zeichner (2009) found that electrical shock pain tolerance was significantly associated with trait aggression and that this relationship was moderated by sex, such that the relationship was significant among men, but nonsignificant among women. Moreover, this relationship between pain tolerance and trait aggression became nonsignificant when hypermasculinity - the extent to which men adhere to masculine ideals (Mosher & Sirkin, 1984) - was accounted for in the model, suggesting that pain tolerance and trait aggression may represent byproducts of intense adherence to traditional masculine ideals (Reidy et al., 2009). Similarly, in a laboratory-based study, Berke, Reidy, Miller, & Zeichner (2016) found that men who received fictitious gender-threatening feedback after task performance demonstrated greater activation of aggression-related cognitions and exhibited significantly higher pain tolerance (measured with a pressure algometer) than did men who received non-gender-threatening feedback. Overall, these findings appear to support the notion that adherence

to masculine norms can influence aggression and impact physical pain tolerance.

Although these findings do not directly examine the relationship between masculinity and acquired capability, they provide compelling indirect support for this association.

Examining sex differences in acquired capability may be another way to approximate the impact of masculinity on acquired capability. Notably, research has demonstrated that, overall, men have significantly higher pain tolerance and lower fear of suicide (Alabas, Tashani, Tabasam, & Johnson, 2012; M. Anestis, Bender, Selby, Ribeiro, & Joiner, 2011), men consistently endorse higher levels of exposure to painful and provocative life events (Granato et al., 2015), and also report higher levels of acquired capability for suicide, as measured by the Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008; M. Anestis et al., 2011; Witte, Gordon, Smith, & Van Orden, 2012). These findings appear to support the relationship between male sex and acquired capability; however, these studies seem to have used only dichotomous sex descriptors in their examinations, thus limiting our ability to understand what it is about being male that may lead to these differences.

Several studies have expanded upon these findings by directly examining the relationship between masculine traits and components of acquired capability. In their meta-analysis examining the influence of masculine gender role on sex differences in pain tolerance, Alabas and colleagues (2012) found that individuals with greater endorsement of masculine gender role and greater endorsement of masculine stereotypes regarding pain tolerance (i.e., belief that they were less sensitive to pain than the average man) displayed higher pain thresholds and pain tolerances on experimental pain induction tasks. Within two undergraduate samples, Witte and colleagues (2012) assessed the

impact of stoicism and sensation-seeking, two types of personality traits that have been associated with male gender role (Jansz, 2000; Addis & Cohane, 2005; Cross, Cyrenne, & Brown, 2013; Öngen, 2007), on pain insensitivity and fearlessness about death. The authors found that the effect of sex on pain insensitivity was indirect through stoicism and the effect of sex on fearlessness about death was indirect through sensation-seeking (Witte et al., 2012). These findings indicate that stereotypically masculine personality traits account for the relationship between sex and acquired capability, further supporting the notion that adherence to masculine norms drives the development of acquired capability. Granato and colleagues (2015) examined the relationship between various forms of gender role conflict (GRCS; O'Neil, Helms, Gable, David, & Wrightsman, 1986) - the extent to which one experiences conflict due to adherence to a variety of male gender role norms - and acquired capability within a sample of undergraduate males and females. Results demonstrated that adherence to the male gender norms of success, power, and competition, as well as the norm of restrictive emotionality were directly and indirectly related to acquired capability through exposure to painful and provocative life events (Granato et al., 2015). Furthermore, these relationships were not moderated by sex, indicating that for both males and females, adherence to masculine norms was associated with heightened acquired capability (Granato et al., 2015). Taken together, these findings support the notion that masculinity may, to some extent, drive the development of acquired capability through its effects on behavior. What remains less clear is how masculinity impacts observed sex differences in acquired capability and to what extent this is particularly impactful within at-risk groups, such as firearm owners.

## Masculinity and Practical Capability

Practical capability for suicide is thought to increase when an individual has in-depth knowledge of, comfort with, and access to lethal means that can be used in a suicide attempt (Klonsky & May, 2015). This is not to say that individuals only develop practical capability with suicide in mind. Rather, it is believed that certain environmental conditions and contextual factors, such as pre-existing knowledge of accessible means, lend themselves to facilitating the transition to suicidal behavior, should suicidal ideation develop. Therefore, a trait or set of traits that leads an individual to seek out knowledge of, develop comfort with, or have access to lethal means could reasonably heighten practical capability. Firearm-specific forms of practical capability are particularly important to consider, given that firearms are the most commonly utilized lethal means for suicide (CDC, 2017).

Firearm ownership is a salient form of practical capability, especially in the U.S. where it is estimated that 40% of American citizens either own firearms or live in firearm-owning households (Parker et al., 2017). Owning a firearm makes it exceedingly accessible to an individual and, as has been previously discussed, is associated with significantly increased risk for death by suicide (e.g., M. Anestis & Houtsma, 2017; Miller et al., 2013). Another factor influencing firearm availability, and therefore practical capability, is storage. Among both civilian and military suicide decedents, studies have found that storing firearms unsafely (e.g., unlocked, loaded) is associated with an increased likelihood of death by firearm suicide, rather than another method (Shenassa, Rogers, Spalding, & Roberts, 2004; M. Anestis, Khazem, & Anestis, 2017). Furthermore, findings within two populations possessing elevated capability for suicide –

suicide attempt survivors and military personnel – indicate that these aspects of firearm-specific practical capability may facilitate action-oriented thoughts regarding suicidal behavior (Houtsma, Butterworth, & Anestis, 2017; Houtsma & Anestis, 2017; Khazem et al., 2016). More specifically, within a sample of suicide attempt survivors, Houtsma and Anestis (2017) found that owning a firearm strengthened the relationship between current suicidal thoughts and self-perceived likelihood of engaging in a future suicide attempt. Similarly, within a sample of military personnel, storing a firearm unsafely (i.e., loaded and in a non-secure location) was associated with fearlessness about death and strengthened the relationship between current suicidal thoughts and self-perceived likelihood of engaging in a future suicide attempt (Khazem et al., 2016). As these forms of practical capability appear to influence suicidal behavior, it is important to understand what may contribute to their development.

A notable consideration is that subscription to masculine norms may prompt firearm ownership and influence decisions related to the accessibility of firearms. Indeed, many researchers have viewed firearm ownership itself as an expression of masculine values, such as strength and independence (O’Neill, 2007; Stroud, 2012; Cukier & Sheptycki, 2012). Carrying concealed handguns, a practice which increases firearm availability across contexts and is more common among male firearm owners, is also associated with masculine values. Following interviews with 20 male firearm owners, Stroud (2012) identified several masculine themes associated with the choice to carry a concealed firearm, including reassurance that one can defend oneself regardless of age or loss of physical strength, security from being dominated by others in “vulnerable” situations, and the ability to protect one’s family. These themes have clear links to

masculine norms, such as strength, dominance, and self-reliance, and concealed carrying of a handgun allows men to embody these norms, regardless of whether they actually use the firearm for one of these imagined purposes (Stroud, 2012). Similarly, interviews with female firearm owners reflect that women's choice to concealed carry is associated with masculine themes of strength and self-reliance; however, these themes often appear to be expressed by women in a more socially-acceptable manner (i.e., "mama bear protecting her cubs"; Stroud, 2016, p. 80).

Other studies have linked masculine norm adherence with motivations for firearm ownership and accessibility. For example, two-thirds of Americans report that protection is a major reason they own a firearm (Parker et al., 2017). Protecting oneself and one's family is a stereotypically masculine drive with evolutionary roots (Kruger & Nesse, 2006; Cukier & Sheptycki, 2012), and firearm ownership may be an acceptable and effective way to perform this norm. Belief in self-reliance may be another important masculine norm driving firearm ownership and accessibility. In her examination of a related construct, the cultural value of individualism – defined as "pursuing one's material goals in a self-reliant fashion" - Celinska (2007, p. 232) found that holding stronger individualistic beliefs was associated with firearm ownership and opposition to firearm permits. Although notable given that a variety of demographics and political views were accounted for in analyses, individualistic beliefs were associated with only a 5% increased likelihood of firearm ownership and 10% increased likelihood of opposition to firearm permits, whereas other factors such as male sex were associated with significantly higher odds ratios (Celinska, 2007). These findings suggest that belief

in self-reliance may play a small but meaningful role in the choice to own a firearm and in the opposition to measures that would limit access to firearms.

Similarly, firearm owners appear generally unwilling to change their storage practices to make firearms less accessible. In a sample of male and female U.S. firearm owners, M. Anestis, Butterworth, and Houtsma (2018) found that those who store their firearms unsafely (i.e., loaded, unlocked, or in a non-secure location) were significantly less willing than those who store their firearms more safely to increase safe storage to prevent their own or another's suicide. Regardless of current storage practices, firearm owners in this sample appeared generally unwilling to engage in this protective behavior change (M. Anestis et al., 2018). Interestingly, men who identify more strongly with masculine norms appear to display a similar pattern when it comes to other simple protective behaviors. For example, men who endorse higher levels of masculine beliefs are less likely to wear seat belts (Courtenay, 2000), are more likely to engage in high-risk sex without a condom (Noar & Morkoff, 2002; Levant et al., 2009), and are less likely to engage in a host of protective health behaviors (e.g., see a doctor for a medical problem, get a physical exam, conduct self-examinations, take vitamin supplements; Levant et al., 2009). Among those who identify with masculine norms, engagement in protective behaviors such as safe firearm storage may be a sign weakness or vulnerability, which would be inconsistent with their masculine self-view.

Other components of American culture, such as gun culture, may intersect with masculinity to influence firearm ownership and accessibility. Indeed, Cukier and Sheptycki (2011) describe American gun culture as the normalization of firearms as a symbol for American values, which is inextricably tied to notions of masculinity and



male identity. Gun culture appears to influence the perceived acceptability of firearm ownership and accessibility through a variety of mechanisms. For example, early socialization into gun culture is significantly related to firearm ownership (Cukier & Sheptycki, 2011). Similarly, Kalesan, Villarreal, Keyes, and Galea (2015) found that exposure to social gun culture – social norms promoting firearm ownership and engagement in firearm-related activities – was associated with a 2.25-fold increase in firearm ownership. Gun culture is also transmitted through media. For example, movies and television frequently reinforce the relationship between masculinity and firearms, often portraying the heroism of White men (Cukier & Sheptycki, 2011). Perhaps the most active propagator of American gun culture is the National Rifle Association (NRA). Through their communication channels (e.g., commercials, “Armed Citizen” column, etc.), the NRA seeks to enculturate and normalize firearm ownership primarily by increasing fear of crime and invoking the American ‘right to bear arms’ (Cukier & Sheptycki, 2011; O’Neill, 2007). These communications also reinforce the relationship between masculinity and firearms by highlighting that masculine norms (e.g., strength, power, independence, etc.) can be achieved by anybody through vigilance and action (O’Neill, 2007).

Subscription to masculine norms may also lead to increased risk-taking behavior (Addis & Cohane, 2005), which can influence both acquired and practical capability. When such behaviors involve firearms, it can impact practical capability by making an individual more comfortable with using firearms. For example, M. Anestis & Capron (2017) found that the number of lifetime experiences shooting a firearm was associated with markers of capability for suicide (e.g., pain tolerance, fearlessness about death,

lifetime suicide attempts) within a sample of community members in a high gun ownership state (Mississippi). Similarly, Butterworth, Daruwala, and M. Anestis (2018) found that American firearm owners who have more lifetime experience shooting a firearm and who store their firearms unsafely (loaded, in a non-secure location) had higher levels of capability for suicide. Notably, men in particular appear to engage in risky firearm-related behaviors. For example, a 10-year retrospective examination revealed that the majority of individuals who died playing Russian roulette, a dangerous activity during which an individual points a loaded revolver (typically only loaded with one cartridge) at his/her head and pulls the trigger, were White males (Shields, Hunsaker, & Stewart, 2008). It is worth noting that the overrepresentation of males engaging in these risky firearm-related behaviors may, at least in part, simply reflect the demographic characteristics of U.S. firearm owners (Parker et al., 2017). Regardless, these types of firearm-related risk taking activities may be more highly valued among groups who identify with masculine norms (e.g., Braswell & Kushner, 2010) and serve to decrease fear of death while simultaneously increasing one's practical knowledge and comfort with using firearms. Importantly, the aforementioned factors influencing practical capability may converge within individuals in certain professions that require the use of firearms and which also encourage adherence to masculine norms, such as the police force (Franklin, 2005; Prokos & Padavic, 2002) and the military (Burns & Mahalik, 2011; Braswell & Kushner, 2010). Notably, both of these professions are associated with elevated rates of firearm suicide (Westefeld, Gann, Lustgarten, & Yeates, 2016). Overall, the literature appears to support the notion that masculinity may impact the development of practical capability through increasing the accessibility and acceptability of firearms,

and through increasing individuals' comfort with using firearms. However, the impact of masculinity on the development of practical capability among women remains unclear and further research within firearm owning populations is needed to clarify the extent to which masculinity influences sex differences in firearm-specific practical capability.

### Masculinity and Dispositional Capability

Dispositional capability is considered elevated when an individual possesses traits predisposing him or her to heightened physical pain tolerance and low fear of death or bodily harm (Klonsky & May, 2015). Such traits may also cause an individual to be more behaviorally disinhibited, thereby increasing the likelihood that an individual will engage in painful and provocative life experiences that serve to further habituate him or her to pain and fear (Kruger & Nesse, 2006; Witte et al., 2012). The relevance of dispositional capability to suicide risk is notable given findings indicating that certain personality traits represent endophenotypes for suicidal behavior (e.g., Mann et al., 2009) and that both genetic effects and non-shared environmental experiences influence acquired capability (Smith et al., 2012). Importantly, these inherent traits may be most pronounced, or perhaps only expressed, under certain circumstances, such as in the presence of high levels of masculinity. Indeed, one study found that greater endorsement of masculine gender traits in early adulthood was associated with increased mortality later in life among both men and women, even when accounting for unhealthy behaviors (e.g., smoking, risk taking; Ristvedt, 2014; Lippa, Martin, & Friedman, 2000). Furthermore, Lippa and colleagues (2000) found that endorsement of masculine gender traits influenced the relationship between sex and mortality, such that mortality rates were highest among the most masculine men and lowest among the least masculine women,

with low masculinity men and high masculinity women having similar mortality rates. Such findings suggest that masculinity impacts risk of mortality, possibly by amplifying sex-linked biological traits. To fully understand sex differences in mortality and dispositional capability, as well as the ways that masculinity may influence such differences, we must first consider the role of evolution.

Sex differences in mortality rates have long been documented in the literature, with males consistently displaying higher rates than females (e.g., Kruger & Nesse, 2006). Kruger & Nesse (2006) argue that these sex differences are best understood by considering the impact of natural selection, as well as how these differences are influenced by environmental factors (e.g., culture). Sexual selection is an important evolutionary route by which sex differences appear to have developed. Across species, males must often compete to obtain a mate, which can involve fighting other males or engaging in a variety of risk taking behaviors. These traits have been selected for among males due to benefits in terms of increasing access to resources, promoting social status, and competing for mates – all of which serve to increase reproductive success – despite the fact that such behaviors can lead to injury or premature death (Kruger & Nesse, 2006). Additionally, human females are discriminating in choosing a mate because they are looking not only for good genes, but also protection, resources, and paternal investment. Thus, male traits aligning with those qualities are also shaped by female mate selection (Kruger & Nesse, 2006). Furthermore, longevity has been more adaptive for females than males throughout evolution, due to females' larger role in bearing children and raising them into adulthood (Kruger & Nesse, 2006). As a result, females may have developed more sensitive fear reactions and pain perception in order to increase their

chances of identifying and avoiding threat. Indeed, women generally exhibit lower pain thresholds and tolerances than men in experimental pain induction studies (e.g., Alabas et al., 2012). For males on the other hand, it may have been more adaptive to have diminished fear responses and pain sensitivity, so as to promote continued engagement in risk taking that facilitates reproduction.

Overall, these selection processes appear to lead to a male predisposition for behavioral risk taking. Importantly, research has found that external causes of death resulting directly from an individual's behavior (e.g., accidents, suicide) significantly contribute to sex differences in mortality (Kruger & Nesse, 2006), suggesting that risk taking traits may contribute to sex differences in dispositional capability and suicide death. Kruger and Nesse (2006) also noted that social and cultural norms may significantly influence risk taking behaviors that lead to sex differences in mortality. For example, they reported that social norms that promote risk taking, emotional suppression, and physical toughness among males may impact the behaviors displayed, noting that further research is necessary to understand what social/cultural factors may moderate sex differences in mortality (Kruger & Nesse, 2006).

Indeed, in modern society certain masculine norms, such as physical toughness, dominance, and success, power, and competition, may prompt or increase engagement in risk taking behavior, which can in turn facilitate the development of capability for suicide. In concurrence with Kruger and Nesse's (2006) evolution-based assertions, risk taking and similar traits appear to be disproportionately represented among men. In their meta-analysis of sex differences in risk taking behavior, defined as propensity to engage in behaviors that may lead to negative outcomes, Byrnes, Miller, and Schafer (1999)

found that males were significantly more likely to engage in risk taking behaviors than were females across a wide variety of risk domains (e.g., drinking/drug use, driving recklessly, gambling, willingness to participate in a potentially dangerous experiment). The authors suggested that the relatively higher level of risk taking among males may be motivated by males' lower level of arousal and the sociocultural belief that risk taking is a valued masculine behavior (Byrnes et al., 1999). Similarly, in their meta-analysis of sex differences in sensation-seeking, defined as a propensity to engage in new or intense experiences, Cross and colleagues (2013) found that males have consistently exhibited significantly higher levels of sensation-seeking than females over time. The authors argue that findings of stable sex differences in sensation seeking supports the notion that such differences in personality trait expression have an evolutionary basis; although, they agree that sociocultural beliefs regarding masculine norms can also influence such trait expression (Cross et al., 2013).

In fact, several studies have attempted to examine whether identification with masculine norms influences sex differences in such traits. For example, a study examining gender role and sensation seeking among Turkish undergraduates found that men exhibited higher levels of sensation seeking than women, but individuals endorsing masculine or androgynous (i.e., high in masculine and feminine traits) gender role orientation had significantly higher levels of sensation seeking than those endorsing feminine gender role orientation, regardless of sex (Öngen, 2007). In a meta-analysis examination of a conceptually related trait, pain sensitivity, Alabas and colleagues (2012) reported that greater identification with masculine gender role was associated with higher pain threshold and pain tolerance on experimental pain tasks. This may indicate that

inherent sex differences in sensation seeking and pain sensitivity are influenced by identification with masculine norms. The tendency to engage in risk taking or sensation-seeking behaviors is relevant to the development of all three forms of capability.

However, due to the argument that these trait-like propensities have an evolutionary basis, it is possible that these behaviors are driven by an inherently low arousal level, high tolerance for pain, and an innate desire to engage in risky behaviors, which may be initiated and/or increased in the presence of high levels of masculinity. These factors make such traits most relevant to dispositional capability.

Relatedly, certain psychopathic personality traits are believed to stem, in part, from a genetic predisposition towards low fear, are more prevalent among males than females, and share similar externalizing sequelae to other traits, such as sensation seeking (J. Anestis et al., 2016; Harrop et al., 2017; J. Anestis, Anestis, & Preston, 2018; Neumann, Schmitt, Carter, Embley, & Hare, 2012). Several studies have examined these personality traits in relation to components of capability for suicide. For example, J. Anestis and colleagues (2016) found that psychopathy traits characterized by callousness and low fear were significantly related to self-reported acquired capability for suicide within a sample of undergraduates. Conversely, psychopathy traits characterized by impulsivity and behavioral disinhibition were significantly related to proxy measures of acquired capability (i.e., physical aggression and self-harm) within an incarcerated sample (J. Anestis et al., 2016). These findings suggest that both categories of psychopathic traits (i.e., callousness/low fear and behavioral disinhibition) may contribute to capability through different pathways, with callous traits contributing to low

fear of death/bodily harm and disinhibition traits contributing to pain tolerance through increased engagement in painful and provocative events (J. Anestis et al., 2016).

These potential relationships were also examined by Harrop and colleagues (2017), who found that boldness – characterized by low fear response and sensation seeking – among undergraduates, as well as interpersonal-affective and impulsive-antisocial psychopathic personality traits – characterized by low fear and disinhibited behavior, respectively – among military service members, were associated with self-reported capability for suicide. Notably, however, no personality traits demonstrated associations with physical pain tolerance as measured by a pressure algometer (Harrop et al., 2017). Building upon these findings, J. Anestis and colleagues (2018) examined the associations of psychopathic personality traits to indicators of capability for suicide (e.g., self-reported acquired capability for suicide, self-reported exposure to painful and provocative events, experience and comfort handling firearms, etc.) among male and female firearm owners. They found that boldness was significantly associated with all capability indicators, meanness – characterized by low empathy, callousness, etc. – was associated with some indicators, and male participants reported higher levels of boldness and meanness. Both boldness and meanness are psychopathic personality traits that fall under the umbrella of interpersonal-affective traits and are believed to be related to one another through a shared genetic bias towards low fear responsivity (e.g., diminished physiological fear response, diminished amygdala response; Patrick, Fowles, & Krueger, 2009). Taken together, these findings suggest that interpersonal-affective personality traits may represent indicators for dispositional capability, as they are considered



phenotypic expressions of genotypic low reactivity to fear and/or threat (Patrick et al., 2009; J. Anestis et al., 2018).

Furthermore, findings from several studies suggest that masculinity may amplify psychopathic personality traits. For example, Reidy and colleagues (2013) found a positive association between masculine norm adherence and psychopathy within a sample of undergraduate males, and Neumann and colleagues (2012) found that cultural masculinity was significantly associated with self-reported psychopathy within a global sample of females. Notably, in a study examining the impact of gender and gender role adherence on relationships between psychopathic personality traits and forms of aggression, Preston, Watts, Anestis, & Lilienfeld (2018) found that interpersonal-affective traits were positively associated with masculine gender role adherence. Additionally, they found that masculine gender role adherence moderated the relationship between impulsive-antisocial traits and physical aggression above and beyond the influence of gender on this relationship, meaning that impulsive-antisocial traits were most strongly associated with physical aggression at high levels of masculinity (Preston et al., 2018). These findings provide support for the possible amplifying effect of masculinity on dispositional traits such as psychopathic personality traits. Further investigation is necessary to clarify whether masculine norm adherence modifies the relationship between sex and these personality traits.

#### Current Study

Sex differences in suicide rates remain poorly understood, despite the fact that they have been consistently observed globally and within the U.S. (Canetto & Sakinofsky, 1998). Several explanations have been posited for these differences,

including the possibility that masculine ideals contribute to death by suicide (Canetto & Sakinofsky, 1998; Payne, Swami, Stanistreet, 2008). However, previous examinations have failed to integrate these explanations into a modern theory of suicide and to consider how these ideals may also influence female suicide death. Moreover, these explanations have gone largely untested within a particularly at-risk group for suicide: firearm owners. Based on the broad literature base discussed, it appears that there is theoretical and empirical support for the notion that sex differences in capability for suicide (i.e., acquired, practical, and dispositional; Klonsky & May, 2015) may contribute to sex differences in suicide death. There also appears to be evidence indicating that the extent to which an individual subscribes to and lives in line with sociocultural masculine norms may amplify development or expression of capability, further contributing to observed differences in suicide death.

The current study sought to address gaps in our understanding of sex differences in suicide risk by examining sex differences in capability for suicide within a sample of firearm owners. The current study also sought to clarify the moderating effect of adherence to masculine norms, among both men and women, in the relationship between sex and capability for suicide. It was hypothesized that there would be a positive relationship between sex and capability for suicide, such that individuals reporting male biological sex would have higher levels of all forms of capability for suicide (i.e., acquired, practical, dispositional). It was also expected that masculinity would moderate this relationship, such that adherence to masculine norms would strengthen the relationship between sex and capability. It was expected that this effect would be stronger for male firearm owners versus female firearm owners, as males are more likely to

endorse masculine norms (e.g., Mahalik et al., 2003) and are likely to exhibit higher levels of capability (e.g., Van Orden et al., 2008).

Importantly, this study did not attempt to conclusively explain sex differences in suicide death. Rather, it attempted to clarify sex differences in capability for suicide, which is considered prerequisite for lethal suicidal behavior (Klonsky & May, 2015), as well as clarify the impact of masculine norms on the relationships between sex and forms of capability. Findings that support these hypotheses would suggest that sex differences in suicide death may be explained, at least in part, by higher levels of capability among males. Furthermore, if adherence to masculine norms moderates this relationship, it would indicate that masculine norms impact development and/or expression of capability across sexes and may possibly amplify risk for suicide by making individuals more capable of acting on suicidal thoughts, should they develop. Such findings may improve our understanding of sex differences in suicide death and may provide a starting point for the development of novel interventions designed to reduce risk.

## CHAPTER II - METHOD

### Participants

Participants were 200 U.S. firearm owners recruited online through social media, online forums, listservs, and other internet sites. An a priori sample size was estimated to determine the minimum sample size needed for the current study. In order to calculate this, an anticipated effect size was determined based on previous findings. Prior research has found small to medium effect sizes for sex differences in acquired, practical, and dispositional capability indicators ( $d \geq 0.30$ ; J. Anestis et al., 2018). Furthermore, prior research has found small to medium effect sizes for relationships between measures of masculinity and capability correlates, as well as the moderating effect of masculinity measures (e.g., Alabas et al., 2012; Cohn & Zeichner, 2006). Therefore, both small and medium effect sizes were used when estimating an a-priori sample size. When a small effect size was used, a sample size of 1,258 participants was suggested. When a medium effect size was used, a sample size of 200 participants was suggested (Soper, 2018). According to Kline (2005), the median sample size among studies using structural equation modeling (SEM) is 198 participants and a sample size of 200 participants is considered “large” for SEM. Given prior research supporting medium effect sizes, prior research suggesting that a sample size of 200 is adequate, as well as financial and logistical limitations, a sample size of 200 participants was collected for the current study. To ensure close to equal representation of the sexes within the current sample a quota was set in the survey software, which allowed up to exactly 100 participants identifying as “male” and 100 participants identifying as “female” to complete the survey. Participants who completed the survey were given the opportunity to submit their

name and email address to receive a \$5 Amazon gift card as compensation for participation in the study. It was anticipated that White males would be overrepresented in this study, as evidence from the Pew Research Center indicates that White men are particularly likely to own firearms, relative to other demographic groups in the U.S. (Parker et al., 2017).

Following data cleaning procedures (described in Results section), there were three variations of the dataset, with sample sizes ranging from 145 to 151. The information presented below represents the most inclusive version of the dataset, which included 151 participants identifying as firearm owners residing in the U.S. The sample was comprised primarily of participants who identified that both their biological sex (59.6%) and gender identity (59.6%) were male. The majority of participants identified as White (82.8%), with smaller proportions identifying as Hispanic/Latino(a) (37.7%), Black (9.3%), and Asian/Pacific Islander (0.7%). Participants were permitted to endorse more than one racial identity, allowing for representation of biracial and multiracial backgrounds. Participant ages ranged from 25-57 ( $M = 33.45$ ;  $SD = 5.17$ ), the majority identified as heterosexual (97.4%), and most participants reported that they were currently married (75.5%). Furthermore, 61.6% of the sample reported that their highest level of completed education was a Bachelor's degree, the vast majority reported that they were employed full-time (98.0%), and just over half of the sample reported a total annual family income of \$100,000 or less (51.0%). See Table 1 for full demographic information across all three versions of the dataset.

Table 1

*Demographic Information by Dataset*

	Dataset 1	Dataset 2	Dataset 3		Dataset 1	Dataset 2	Dataset 3
n	145	148	151		145	148	151
$M_{age}(SD)$	33.59 (5.19)	33.51 (5.18)	33.45 (5.17)	Employment			
Sex				Unemployed	2.1	2.0	2.0
Male	57.9	58.8	59.6	Part-Time	0	0	0
Female	42.1	41.2	40.4	Full-Time	97.9	98.0	98.0
U.S. Citizen				Annual Family Income			
Yes	100	100	100	\$0-\$10,000	0	0	0
No	0	0	0	\$10,001-\$25,000	0	0	0
Firearm Owner				\$25,001-\$50,000	6.9	6.8	6.6
Yes	100	100	100	\$50,001-\$75,000	26.2	27.0	27.8
No	0	0	0	\$75,001-\$100,000	16.6	16.9	16.6
Gender Identity				Greater than \$100,000	50.4	49.4	49.0
Male	57.9	58.8	59.6	Highest Education			
Female	42.1	41.2	40.4	High School Diploma/GED	0.7	0.7	0.7
Race				Some college	12.4	12.2	11.9
White	82.1	82.4	82.8	Associate's Degree	20.7	20.9	21.2
African American	9.7	9.5	9.3	Bachelor's Degree	61.4	61.5	61.6
Hispanic/Latino	39.3	38.5	37.7	Master's Degree	3.4	3.4	3.3
Asian/Pacific Islander	0.7	0.7	0.7	Professional or Doctoral Degree	1.4	1.4	1.3
Orientation				Current Military Service			
Heterosexual	97.2	97.3	97.4	Yes	6.9	6.8	6.6
Gay/Lesbian	2.8	2.7	2.6	No	93.1	93.2	93.4
Bisexual	0	0	0	Veteran			
Other	0	0	0	Yes	25.5	25.0	25.2
Marital				No	74.5	75.0	74.8

Table 1 Continued

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Never Married	19.3	20.3	21.2
Married	77.2	76.4	75.5
Separated	0.7	0.7	0.7
Divorced	2.8	2.7	2.6

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*Note:* information displayed in percentages

## Measures

### *Exogenous Variables*

#### *Predictor*

Sex. Participants were asked to respond to a single item asking them to identify their biological sex assigned at birth. Response options included, “male,” “female,” “intersex,” and “other.” For the purposes of the current study, only responses of “male” and “female” were utilized in analyses, making sex a dichotomous variable.

#### *Moderator*

Conformity to Masculine Norms Inventory (CMNI-46; Parent & Moradi, 2009). The CMNI-46 is a 46-item questionnaire designed to assess the extent to which an individual adheres to traditional masculine norms. Participant responses are recorded on a 4-point Likert scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*). Items on the CMNI-46 can be used to create subscale scores that reflect categories of masculine gender roles, including Winning, Emotional Control, Risk-Taking, Violence, Power Over Women, Playboy, Self-Reliance, Primacy of Work, and Heterosexual Self-Presentation. The CMNI-46 has demonstrated good to excellent reliability across subscales and total score, as well as strong convergent and discriminant validity (Parent & Moradi, 2011). A total score for the CMNI can be calculated by combining all subscale scores. In the original 94-item version of the CMNI, Mahalik and colleagues (2003) found that, although men scored significantly higher than females on CMNI total score and most subscales, there was notable variability in responses and overlap between men and women (Ristvedt, 2014). This suggests that the CMNI is an appropriate measure to use in samples of men and women, particularly due to the fact that item-level language does not



preclude women from responding (e.g., language is not sex-biased). The only language that appears somewhat sex-biased is the introductory statement to the CMNI, which reads “The following pages contain a series of statements about how men might think, feel or behave. The statements are designed to measure attitudes, beliefs, and behaviors associated with both traditional and non-traditional masculine gender roles.” This language may prime women to view item-content as being relevant to men, rather than to them personally. Therefore, the current study opted to omit this introductory statement, so that the CMNI instructions begin with, “Thinking about your own actions, feelings and beliefs, please indicate how much you personally agree or disagree with each statement...”. Internal consistency within the current sample was .76 in datasets 1 and 2, and .77 in dataset 3.

### *Endogenous Variables*

#### *Acquired Capability Latent Variable Indicators*

Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008). The ACSS is a 20-item self-report questionnaire that assesses the extent to which an individual believes that he or she is pain tolerant and unafraid of death or dying. Participants record their responses on a 5-point Likert scale ranging from 0 (*not at all like me*) to 4 (*very much like me*). The ACSS has demonstrated strong convergent and discriminant validity in past research (Van Orden et al., 2008; Bender, Gordon, Bresin, & Joiner, 2011) and good internal consistency within a sample of firearm owners (J. Anestis et al., 2018). Within the current sample, the ACSS had an internal consistency of .42 in dataset 1, .41 in dataset 2, and .40 in dataset 3.

Painful and Provocative Events Scale (PPES; Bender et al., 2011). The PPES is a 25-item self-report questionnaire measuring participants' exposure to potentially painful and/or fear-provoking life experiences (e.g., victim of physical abuse). Participants are asked to indicate how often they have had each experience on a scale ranging from 1 (*never*) to 5 (*20 or more times*). Recent research has called into question the psychometric properties of the PPES (Poindexter, Nazem, & Forster, 2017; Teismann et al., 2015); however, no other measure has yet been developed to assess exposure to painful and provocative events. Furthermore, the PPES has been utilized in a variety of populations and has demonstrated positive associations to ACSS total scores and pain tolerance measurements (e.g., Franklin, Hessel, & Prinstein, 2011; Granato et al., 2015). Additionally, the PPES has demonstrated adequate internal consistency within a sample of firearm owners (J. Anestis et al., 2018). Within the current sample, internal consistency was .80 in dataset 1 and .79 in datasets 2 and 3.

#### *Practical Capability Latent Variable Indicators*

Firearm Storage Practices. Participants were asked to respond to four items, with binary response options (i.e., yes/no), to assess their current firearm storage practices. The following questions were asked: "Do you store your firearm(s) in a gun safe or lock box?", "Do you use a locking device (e.g., cable lock) on your firearm(s) when not in use?", "Do you store your firearm(s) unloaded?", and "Do you store your firearm(s) in a different place than you store ammunition?" Participants were instructed to consider all of their firearms and to respond to each item based on their least restricted firearm. For example, if a participant stored all his firearms in a gun safe except for his concealed carry handgun, then he would respond "No" to the first item because he owns at least one

firearm that is not stored in a gun safe. Responses to these three items were totaled to create a composite storage score, with higher scores indicating safer storage practices. These items have been utilized in several previous studies (Khazem et al., 2016; M. Anestis & Capron, 2017; Butterworth, Houtsma, J. Anestis, & M. Anestis, 2017; Butterworth et al., 2018). Internal consistency was .86 across all datasets.

Social Gun Culture (SGC; Kalesan et al., 2015). Participants' exposure to SGC was measured using 4 items originally developed by YouGov (a nonpartisan research group) and which were utilized in the previously discussed study by Kalesan and colleagues (2015). Participants were asked to respond to the following questions using binary response options (i.e., yes/no): "My social circle would think less of me if I didn't own a gun," "My family would think less of me if I didn't own a gun," "My social life with friends involves guns," and "My social life with family involves guns." Responses to these items were totaled to create a composite score, with higher scores indicating higher exposure to social gun culture. Previous research has demonstrated a strong association between SGC and firearm ownership (Kalesan et al., 2015). Internal consistency was .77 in datasets 1 and 2, and .76 in dataset 3.

#### *Dispositional Capability Latent Variable Indicators*

UPPS-P Impulsive Behavior Scale (UPPS-P; Lynam, Smith, Whiteside, & Cyders, 2006; Whiteside & Lynam, 2001; Cyders & Smith, 2007). The UPPS-P is a 59-item self-report questionnaire designed to assess five different personality pathways to impulsive behavior. Participants are asked to respond to each item on a 4-point Likert scale ranging from 1 (*Agree Strongly*) to 4 (*Disagree Strongly*). Subscales of the UPPS-P include negative urgency, positive urgency, lack of premeditation, lack of perseverance,

and sensation seeking. For the purposes of the current study, the sensation seeking subscale was utilized, as it measures an individual's dispositional preference for stimulating and exciting experiences. The UPPS-P subscales have demonstrated good to excellent internal consistencies, as well as good convergent and divergent validity (Whiteside & Lynam, 2001; Cyders & Smith, 2007). Importantly, multimethod assessments of these five different pathways to impulsive behavior have found that they are distinct from one another and that each has correlates with different components of risky behavior (Smith et al., 2007; Whiteside & Lynam, 2001; Cyders & Smith, 2007). Therefore, examination of individual UPPS-P subscales appears to be an acceptable approach. In the current sample, the sensation seeking subscale had an internal consistency of .87 in datasets 1 and 2, and .88 in dataset 3.

Triarchic Psychopathy Measure (TriPM; Patrick, 2010). The TriPM is a 58-item self-report questionnaire designed to assess phenotypic traits believed to underlie psychopathy, as outlined in the triarchic psychopathy model. These traits include boldness, meanness, and disinhibition. Participants record their responses on a 4-point Likert scale ranging from 0 (*True*) to 3 (*False*). Past research has found strong support for the convergent, construct, and discriminant validity of the TriPM across multiple populations (Sellbom & Phillips, 2013; Drislane, Patrick, & Arsal, 2014; Stanley, Wygant, & Sellbom, 2013; van Dongen, Drislane, Nijman, Soe-Agnie, & van Marle, 2017). The TriPM has also demonstrated good to excellent internal consistencies on all three trait scales within a sample of firearm owners (J. Anestis et al., 2018). Based on past research suggesting that interpersonal-affective traits demonstrate the strongest relationships with capability for suicide (e.g., Patrick et al., 2009; J. Anestis et al., 2018),

the boldness and meanness subscales were utilized as indicators of dispositional capability. The internal consistency for boldness was low across all versions of the dataset. Specifically, it was .07 in dataset 1, .08 in dataset 2, and .09 in dataset 3. Given this extremely low internal consistency, this indicator variable was not used in subsequent analyses. The internal consistency for the meanness subscale was .84 across all versions of the dataset.

### Procedure

A proposal was submitted to the University of Southern Mississippi Institutional Review Board. Following approval of this proposal, participants were recruited online via social media, online forums, listservs, and other internet sites. Participants were made aware of inclusionary criteria for participation, the use of validation checks in the study, and the compensation available for participation. Given that the focus of this study is on firearm owners, participation was limited to individuals who own at least one personal firearm. Validation checks were used to ensure that participants were carefully attending to survey content. These validation checks consisted of three items inserted into different portions of the survey that asked the participant to select a specific response (i.e., “Please select response option 5 – ‘very much like me’”) or prompted the participant to respond to a question that has only one correct response (i.e., “I have never used a computer before” with true/false response options). Prior to participation, participants were informed that if they fail 2 of 3 such validation checks, they would not be eligible to receive the \$5 Amazon gift card. All participants interested in completing the study were first directed to an electronic consent form, which included the aforementioned information. Consenting participants then completed a series of self-report

questionnaires. Following completion of the questionnaires, participants were given the opportunity to submit their name and email address to receive a \$5 Amazon gift card. To ensure that participant data was not linked to participant's identifiable information, all participants were presented a link following completion of the study, which took them to a separate survey where they provided a name and email address.

### Data Analytic Plan

To examine sex differences in capability and the moderating influence of masculinity, the current study utilized a structural equation modeling (SEM) approach. The proposed model utilized sex as a measured exogenous variable, predicting the endogenous latent variables of acquired capability, practical capability, and dispositional capability. Following recommended practices in SEM, no fewer than two measured variables, demonstrating theoretical and/or empirical associations with the constructs of interest, were used as indicators for each of these latent variables (Meyers, Gamst, & Guarino, 2013). The proposed model also included adherence to masculine norms as a measured exogenous variable, moderating the relationship between sex and latent capability variables (see Figure 1). Analyses were conducted in Mplus and a variety of fit statistics were consulted to determine model fit, including model chi square, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR; Kline, 2005; Hooper, Coughlan, & Mullen, 2008). Good model fit was determined by a non-significant ( $p > .05$ ) model chi-square,  $RMSEA < 0.08$ ,  $CFI \geq 0.90$ , and  $SRMR < 0.08$  (Kline, 2005; Hooper et al., 2008). If the interaction term is significant, path coefficients will be used to graph the relationship between sex and each latent capability variable, at high, mean, and low levels

of masculine norm adherence. High and low levels of masculine norm adherence will be determined based on 1.5 standard deviations above and below the mean score on the CMNI-46.

Additionally, an alternative model was tested to determine whether the proposed model demonstrated the best fit with the data. In this alternative model, the measured variable of sex predicted a single latent variable of capability, which was informed by 7 indicator variables. The measured variable of adherence to masculine norms also served as a moderator in the relationship between sex and the latent capability variable (see Figure 2). To determine which model was a better fit with the data, a chi-square difference test was utilized. This test compares the chi-square values of both models as well as the difference in degrees of freedom between the models. A significant chi-square difference test suggests that the proposed model is preferable, as it contains more free parameters. A non-significant chi-square test suggests that the models provide equal fit, making the more parsimonious alternative model preferable (Werner & Schermelleh-Engel, 2010).

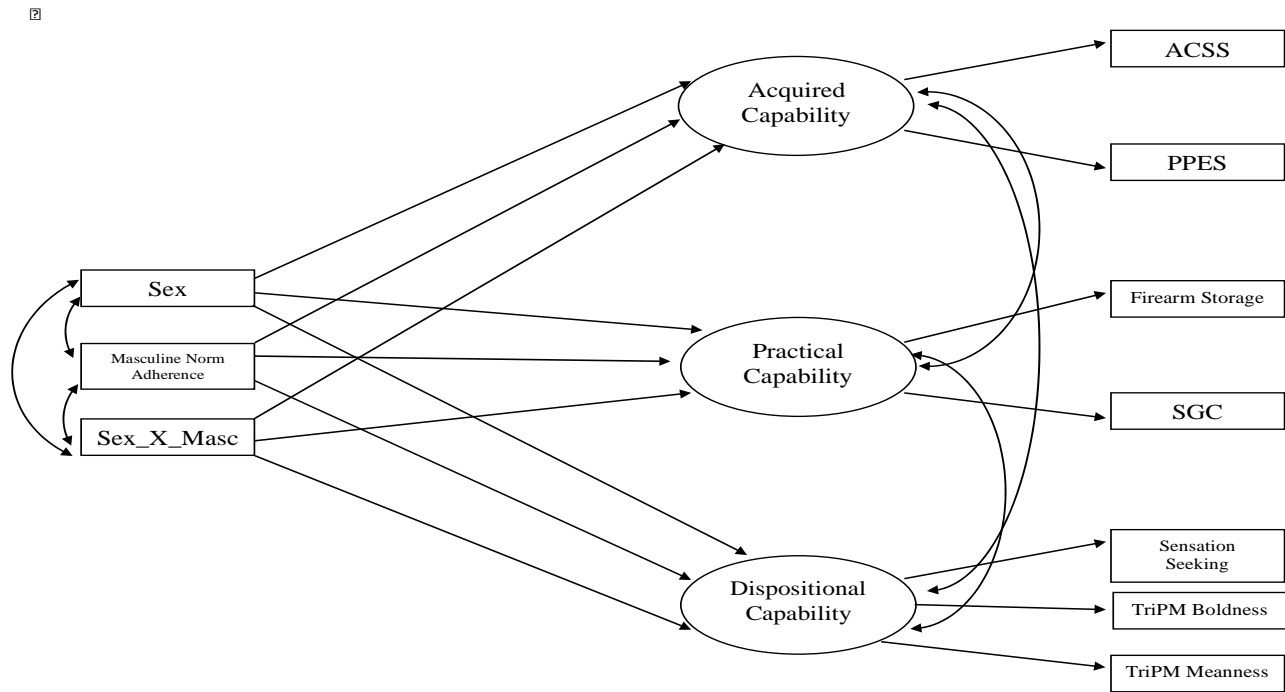


Figure 1. *Proposed Model*



□  
□  
□

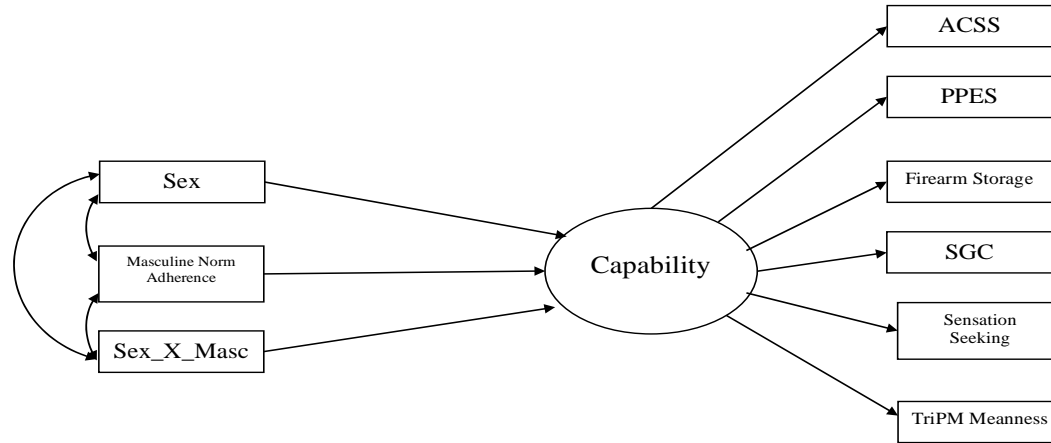


Figure 2. *Alternative Model*

## CHAPTER III - RESULTS

### Data Cleaning

Several steps were taken to ensure that only valid data would be used in analyses. First, all participants who did not pass 2 of the 3 validation checks embedded within the survey were not allowed to submit their name and email address for a gift card and were not included in analyses. Ten participants failed to pass validation checks; however, due to the survey logic, these participants were not counted towards the 200 participant quota, meaning that data from 200 participants remained after this stage of the data cleaning process. Given that these data were collected online, there was some concern that autonomous internet robots or “bots” may have been utilized to respond to the survey (Shanahan, 2018; Teitcher et al., 2015). As a result, several steps were taken based on recommendations from other researchers (Teitcher et al., 2015) to assess for the likelihood of this risk and to remove potentially invalid responses. Specifically, participant responses to open-ended, write-in questions were examined to identify illogical answers. For example, in response to an item asking participants to write about other firearm safety practices they employ, multiple participants wrote “concentrate on.” In addition to the fact that this is an illogical response to the question, multiple participants wrote identical responses suggesting that these participants were bots. Using this method of examination, thirteen participant responses were identified as highly suspicious and data from these participants were removed from analyses.

To account for careless responding to survey items, we utilized an inconsistent responding scale called the Triarchic Assessment Procedure for Inconsistent Responding (TAPIR; Mowle et al., 2017). This measure utilizes items from the TriPM to identify

inconsistent responding to item pairs that are typically highly correlated. The sum of the absolute value of the differences across item pairs indicates the degree of inconsistent responding present, with higher scores indicating more inconsistent responding. This measure has been found to strongly predict whether TriPM data is genuine or randomly generated, across both undergraduate and correctional samples (Mowle et al., 2017). For the purposes of the current study, we used the least stringent cut-score (13) on the TAPIR to determine which participants demonstrated extreme inconsistent responding. Based on results of these analyses, thirty-two participants demonstrated unacceptable levels of inconsistent responding and their data were therefore removed from analyses. Notably, six participants had a TAPIR cut-score above 13 *and* were determined to have unusable data for other reasons (e.g., suspected bots).

Although precautions were taken within the survey software to prevent participants from taking the survey more than once, an additional review of the data revealed a number of participants had attempted to take the survey multiple times, some of whom were prevented from proceeding due to embedded quota logic in the survey (e.g., 100 male firearm owners had already taken the survey, so subsequent participants identifying as male firearm owners were not allowed to participate). Based on matching IP addresses across attempts and examination of responses to the quota-relevant items on each attempt, ten of these participants appeared to determine why they were being prevented from proceeding with the survey because they changed their response to the quota item asking about biological sex from “male” to “female.” Given these suspicious circumstances, the data from all ten of these participants were removed from analyses.

Furthermore, there was one instance in which a participant completed the survey twice from the same IP address. Similarly, there were two instances in which individuals with identical names submitted requests for Amazon gift cards. These six sets of participant data were flagged as suspicious; however, it could not be conclusively determined that each of these participants had truly completed the study twice. As a result, three different versions of the dataset were created for analyses that would allow for both a conservative approach and a more inclusive approach. The first version of the data excluded all six of these participants' data, as well as all the aforementioned unusable participant data. This represented the most conservative approach and resulted in a sample size of 145. The second version of the dataset took a slightly less conservative approach and included only the data from these participants' first attempt at the survey (i.e., included three of the six sets of data), resulting in a sample size of 148. The final version of the dataset was the most inclusive, using all six of these participants' data, resulting in a sample size of 151.

#### Data Preparation

There was concern regarding criterion contamination, due to conceptual and possible item-level overlap between one of the exogenous independent variables and several of the dependent indicator variables. Specifically, subscales within the Conformity to Masculine Norms Inventory (e.g., Risk Taking subscale) shared some conceptual overlap with dependent indicator variables (e.g., Acquired Capability for Suicide Scale, TriPM Boldness). Consequently, confirmatory factor analyses (CFAs) were conducted to assess the extent to which overlap existed between items within the Conformity to Masculine Norms Inventory and items within each of the indicator

variables (i.e., Acquired Capability for Suicide Scale, Painful and Provocative Events Scale, firearm storage practices, exposure to social gun culture, Triarchic Psychopathy Measure [TriPM] – Boldness and Meanness subscales, and UPPS-P Impulsive Behavior Scale – Sensation Seeking subscale). In total, 21 CFAs were conducted across the three versions of the dataset. The objective of these analyses was to determine item-level overlap, not model fit, so only modification indices were examined. In each of the three versions of the dataset, results revealed that one item on the Conformity to Masculine Norms Inventory (CMNI) and one item on the Painful and Provocative Events Scale (PPES) demonstrated an extremely high modification index. Across all three versions of the dataset, this modification index number was between 38 and 44, and exceeded the next highest modification index number by between 18%-30% (see Table 2).

Furthermore, the CMNI item demonstrating high overlap with the PPES item was conceptually linked to the construct of acquired capability for suicide. This item stated, “I am disgusted by any kind of violence,” a statement which, when reverse-scored, bears similarity to the notion of fearlessness about death and willingness to engage in painful and provocative events. Therefore, there appeared to be theoretical justification for its removal from CMNI total score for main analyses. However, in each version of the dataset, this item demonstrated high overlap with a PPES item which stated, “Did you get a tattoo?” Although the overlap between the CMNI item and PPES construct made theoretical sense, the high overlap between these two *specific* items did not seem to justify damaging the integrity of the original measure by removing the CMNI item. The item pairing with the next highest modification index was the CMNI item stating, “I love it when men are in charge of women,” and the TriPM – Meanness subscale item stating,

“I don’t have much sympathy for people.” Importantly, this modification index was notably lower than the highest modification index and, furthermore, this item pairing appears to have little conceptual overlap with capability for suicide. Given that the content of the item pairings with the two highest modification indices did not appear theoretically related to capability for suicide, it was determined that no items would be removed from the CMNI for main analyses. See Table 2 for modification indices for the three highest item pairings across datasets.

Table 2

*Confirmatory Factor Analyses Examining Item-Level Overlap Between CMNI Total Score and all Indicator Variables – Modification**Indices*

	n	CMNI Item #	CMNI Item Content	Outcome Scale	Outcome Item #	Outcome Item Content	Modification Index
Dataset 1	145						
Highest		9 (r)	“I am disgusted by any kind of violence”	PPES	4	“Did you get a tattoo?”	38.922
Second Highest		44	“I love it when men are in charge of women”	TriPM	36	“I don’t have much sympathy for people”	32.905
Third Highest		7 (r)	“Winning is not my first priority”	TriPM	11 (r)	“I sympathize with others’ problems”	29.835
Dataset 2	148						
Highest		9 (r)	“I am disgusted by any kind of violence”	PPES	4	“Did you get a tattoo?”	41.187
Second Highest		44	“I love it when men are in charge of women”	TriPM	36	“I don’t have much sympathy for people”	32.355
Third Highest		7 (r)	“Winning is not my first priority”	TriPM	11 (r)	“I sympathize with others’ problems”	31.404
Dataset 3	151						
Highest		9 (r)	“I am disgusted by any kind of violence”	PPES	4	“Did you get a tattoo?”	43.847
Second Highest		20	“In general, I control the women in my life”	PPES	14	“Have you used intravenous drugs?”	33.676
Third Highest		44	“I love it when men are in charge of women”	TriPM	36	“I don’t have much sympathy for people”	33.492

Note: (r) = reverse scored item

As mentioned previously, the Boldness TriPM subscale exhibited extremely low internal consistencies across all datasets. This suggested that the variable was a poor indicator of the intended construct, making its inclusion theoretically and statistically unsound. As a result, it was excluded from analyses, leaving the TriPM Meanness subscale and the UPPS-P Sensation Seeking subscale as the indicators for Dispositional Capability.

Additionally, there was a very small amount of missing data across three indicator variables in the most inclusive dataset (n=151). Specifically, 8 of the 151 participants had one or more items with missing data on the ACSS, the PPES, and/or the TriPM Meanness subscales, constituting 0.85% missing data across all indicator variables. An examination of missing value patterns indicated that data were missing completely at random. In an effort to conserve sample size and statistical power, item-level linear trend at point data imputation was utilized for each indicator variable to replace missing values.

Additionally, it was important to ensure that all indicator variables had similar variances, so that all indicators were comparable to one another and any indicator could be constrained to a value of one in the SEM analyses. This was particularly important given that the indicator total scores in the present study were calculated on different scales (e.g., 4-point Likert versus binary response options). Therefore, the variance for each indicator variable was calculated. Then, each indicator variable total score was divided or multiplied by a constant value to achieve a variance value within the range of 4 to 10. These revised indicator total scores were used only in SEM analyses. Following data imputation and variance revision, all variables, other than the dichotomous sex variable,



were mean centered to reduce collinearity and to facilitate interpretation of results (Little, Card, Bovaird, Preacher, & Crandall, 2007).

#### Preliminary Analyses

Zero-order correlations, as well as means and standard deviations for all variables utilized in main analyses can be found in Table 3. For ease of interpretation, means and standard deviations were presented using non-centered versions of the variables.

Table 3

*Zero-Order Correlations and Descriptive Statistics*

	1	2	3	4	5	6	7	8	9	10
1. Sex	-									
2. CMNI total score	.24**	-								
3. TriPM Meanness	.19**	.77**	-							
4. UPPS-P – Sensation Seeking score	-.13	-.09	.19**	-						
5. ACSS total score	-.26**	-.09	.01	.17*	-					
6. PPES total score	-.27**	.00	-.04	.12	.09	-				
7. Social Gun Culture total score	-.07	.52**	.45**	-.01	.02	.00	-			
8. Firearm Storage total score	-.24**	-.41**	-.16	.40**	.24**	-.13	-.01	-		
9. TriPM Boldness	-.03	-.04	-.22**	-.32**	-.07	.07	-.04	-.28**	-	
10. TriPM Disinhibition	.18*	.68**	.87**	.35**	.02	-.09	.45**	-.05	-.37**	-
Mean/% Male	59.6%	1.44	26.47	2.82	39.45	40.65	1.50	1.30	30.15	26.55
Standard Deviation	-	.22	7.89	.49	6.04	8.44	1.47	1.53	3.43	10.12
Minimum	-	.72	0	1.67	16	25	0	0	22	1
Maximum	-	1.87	40.13	3.92	52	77	4	4	41	49

Note: \* =  $p < .05$ ; \*\* =  $p < .01$

## Main Analyses

To test the hypothesis that masculine norm adherence would moderate the relationship between sex and all forms of capability for suicide (i.e., acquired, practical, and dispositional), a structural equation model was examined using data from the most inclusive dataset ( $n=151$ ). A two-step modeling approach (Kline, 2005) was used to examine the fit of the proposed theoretical model. In the first step, a measurement model was conducted to assess how accurately the latent variables of Dispositional, Acquired, and Practical Capability measured their intended constructs. Results revealed that this measurement model did not converge. Next, a measurement model for the alternative model was conducted to determine if a single latent variable of Capability more accurately measured the construct of interest. However, the results revealed that this model also failed to converge. Due to the fact that neither the proposed nor the alternative models showed convergence at the measurement model level, the second step in the two-step modeling approach, which examines the structural component of the proposed and alternative models, is uninterpretable (Kline, 2005). However, these models were examined for posterity.

As expected, the full proposed model, wherein sex, CMNI total score, and the interaction of sex and CMNI total score were hypothesized to predict the latent variables of Dispositional, Acquired, and Practical Capability, did not converge. Unexpectedly, the full alternative model, wherein sex, CMNI total score, and the interaction of sex and CMNI total score were hypothesized to predict a single Capability latent variable, demonstrated convergence. Overall, the fit indices indicated poor model fit (chi-square [ $127.725$ ,  $df = 24$ ,  $p < .001$ ]; RMSEA =  $0.169$  [CI =  $.141$  to  $.199$ ]; SRMR =  $.111$ ; CFI =

0.661), with none of the fit statistics falling into acceptable ranges. As shown in Figure 3, the standardized model results indicated that sex was significantly, positively correlated with CMNI total score, and both sex and CMNI total score were positively associated with the interaction of sex and CMNI total score. Social Gun Culture and TriPM Meanness had significant, positive loadings on the latent Capability construct and firearm storage had a significant, negative loading. Furthermore, CMNI total score was significantly and positively associated with the latent Capability construct, and the interaction of sex and CMNI total was significantly and negatively associated with Capability. As those identifying with male biological sex were coded as 0, this may suggest that, consistent with hypotheses, males with stronger adherence to masculine norms display higher levels of capability for suicide. However, the lack of convergence at the measurement model level and the poor model fit at the structural model level prevent meaningful interpretation of these results.

Given that the measurement models did not converge in the most inclusive dataset, it was believed that testing these models in the less inclusive datasets would be unhelpful and unlikely to yield different results. The proposed and alternative measurement models appear to be misspecified, so it was determined that use of observed variables would provide more information regarding relationships between capability-relevant constructs and our exogenous predictors, sex and masculine norm adherence. Consequently, an exploratory path analysis model including these observed variables was examined in the most inclusive dataset (n=151).

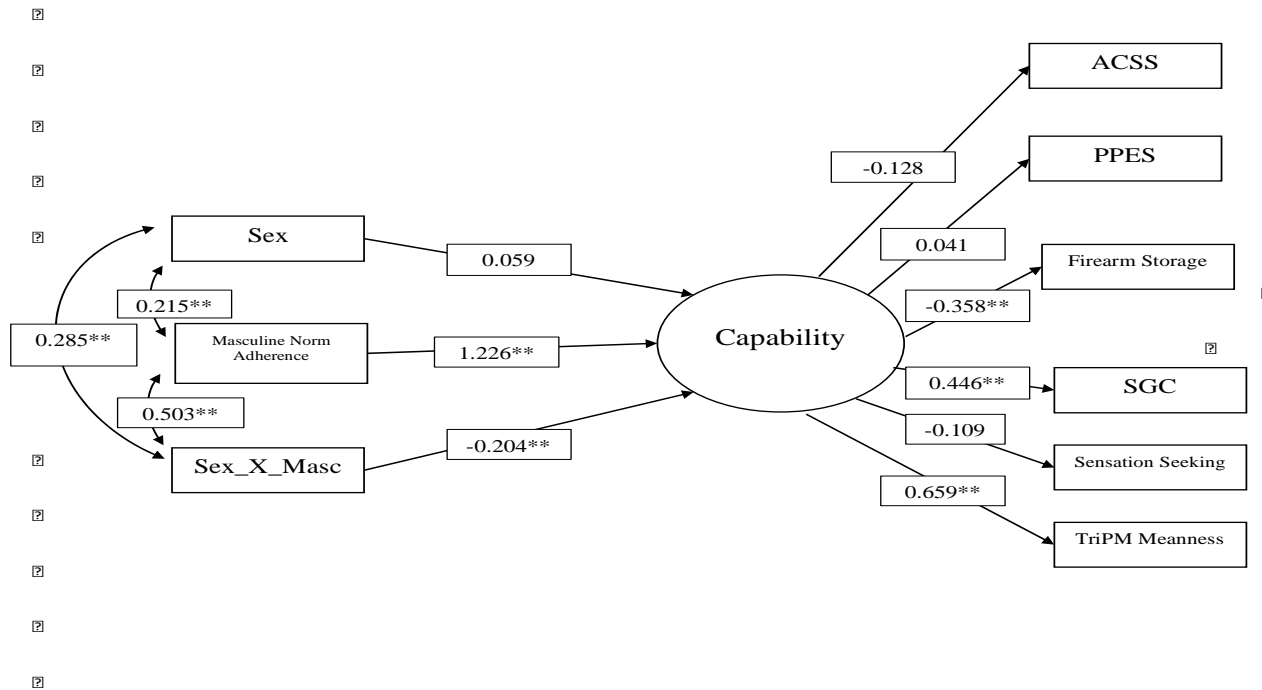


Figure 3. *Alternative Model – Standardized Model Results*

Note: \* =  $p \leq .05$ ; \*\* =  $p \leq .01$

## Exploratory Analyses

The relationships among observed variables were organized into a theoretical model that resembled the latent variable model, with sex, CMNI total score, and the interaction of sex and CMNI total score each predicting all six indicators of capability (i.e., UPPS-P Sensation Seeking subscale score, TriPM Meanness subscale score, ACSS total score, PPES total score, Social Gun Culture total score, and firearm storage total score; see Figure 4). Defining these relationships required the use of all degrees of freedom, resulting in a just-identified model. Consequently, fit statistics could not be utilized to assess the model's fit. Instead, the standardized model results were utilized to evaluate relationships between the independent and dependent variables (see Figure 5). Results revealed that sex was significantly associated with ACSS total score ( $\beta = -0.304$ ,  $p < .001$ ), PPES total score ( $\beta = -0.253$ ,  $p = .001$ ), and firearm storage total score ( $\beta = -0.154$ ,  $p = .045$ ). CMNI total score was significantly associated with TriPM Meanness subscale score ( $\beta = 0.767$ ,  $p < .001$ ), firearm storage total score ( $\beta = -0.440$ ,  $p < .001$ ), and Social Gun Culture total score ( $\beta = 0.663$ ,  $p < .001$ ). The interaction of sex and CMNI total score was significantly associated with ACSS total score ( $\beta = 0.209$ ,  $p = .022$ ), PPES total score ( $\beta = -0.208$ ,  $p = .023$ ), and Social Gun Culture total score ( $\beta = -0.218$ ,  $p = .006$ ).

□

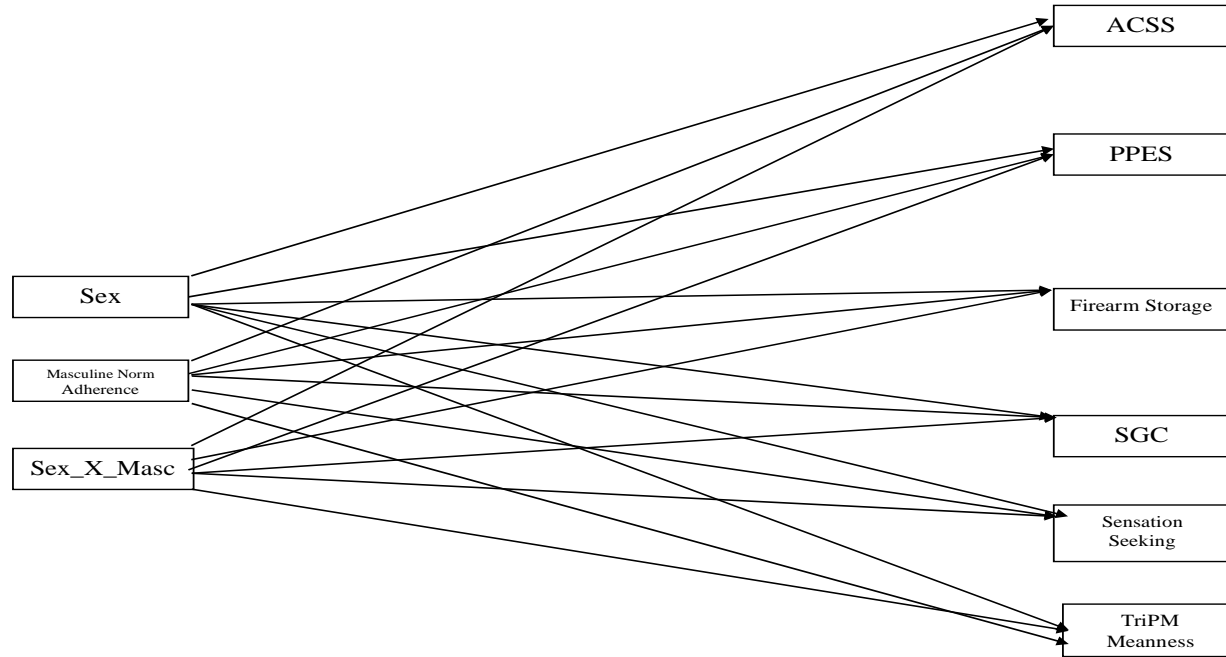


Figure 4. *Exploratory Path Analysis Model*

Inspection of standardized results from the path analysis also indicated that several of the dependent variables were correlated with one another. Specifically, firearm storage total score was significantly associated with UPPS-P Sensation Seeking subscale score ( $r = 0.36, p < .001$ ), ACSS total score ( $r = 0.21, p = .009$ ), PPES total score ( $r = -0.20, p = .010$ ), TriPM Meanness subscale score ( $r = 0.20, p = .010$ ), and Social Gun Culture total score ( $r = 0.18, p = .021$ ). Additionally, TriPM Meanness subscale score was significantly associated with UPPS-P Sensation Seeking subscale score ( $r = 0.37, p < .001$ ) and ACSS total score ( $r = 0.18, p = .022$ ). Due to the fact that the model had zero degrees of freedom, no normalized residuals or modification indices were identified so no pathways could be added to improve model fit.



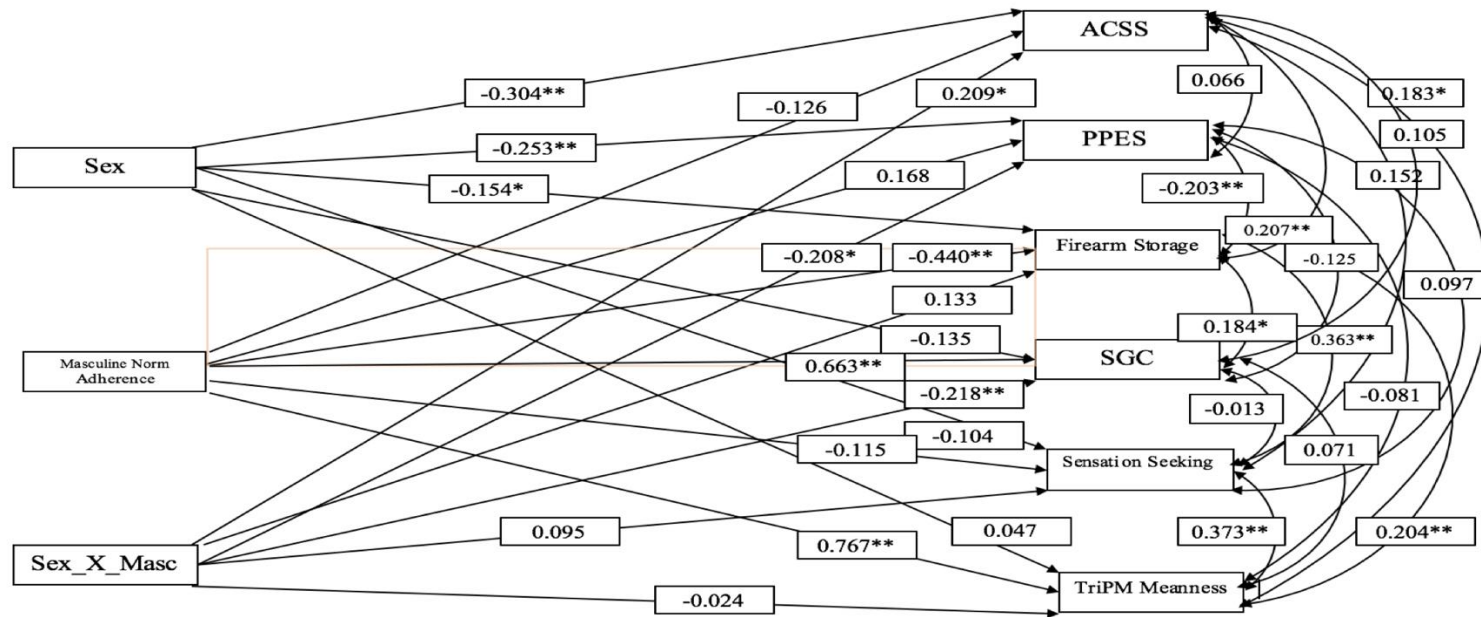


Figure 5. *Exploratory Path Analysis – Standardized Model Results*

Note: \* =  $p \leq .05$ ; \*\* =  $p \leq .01$

To aid in interpretation of the significant interaction results, analyses of variance (ANOVAs) were conducted to determine whether there were significant between group differences by sex at high, mean, and low levels of masculine norm adherence. High and low levels of masculine norm adherence were defined as CMNI total scores that were at least one standard deviation above or below the mean, respectively. Any CMNI total score between these values was considered to represent mean levels of masculine norm adherence. With regards to the finding that the interaction of sex and CMNI total score was significantly associated with ACSS total score, a series of ANOVAs revealed that there were significant between group differences on ACSS total score at low ( $F = 18.50$ ,  $p < .001$ ) and mean ( $F = 4.93$ ,  $p = .029$ ), but not high ( $F = 0.00$ ,  $p = .992$ ) levels of masculine norm adherence, with men endorsing significantly higher ACSS total scores than females at low and mean levels of masculine norm adherence. Furthermore, ANOVAs revealed that there was a significant between-group difference on PPES total score by sex at mean ( $F = 9.62$ ,  $p = .002$ ), but not at high ( $F = 2.85$ ,  $p = .111$ ) or low ( $F = 0.63$ ,  $p = .437$ ) levels of masculine norm adherence, again with males demonstrating higher PPES total scores than females at mean levels of masculine norm adherence. In contrast, and despite the significant path between the interaction of sex and CMNI total score found in the path analysis, ANOVAs indicated that between group differences were non-significant at high ( $F = 1.60$ ,  $p = .225$ ), mean ( $F = 2.95$ ,  $p = .089$ ), and low ( $F = 0.08$ ,  $p = .779$ ) levels of masculine norm adherence on Social Gun Culture total score. See Table 4 for a full listing of results and means for each group. These analyses were conducted to aid interpretation of the significant path analysis results. However, it must be noted that the ANOVAs considered these relationships in isolation, whereas the path

analysis considered all relationships simultaneously, which may have meaningfully impacted results. Consequently, the results of the ANOVAs should be viewed as a general interpretive tool, rather than conclusive findings.

Table 4

*Between Group Differences by Sex on ACSS, PPES, and Social Gun Culture Total Scores at Low, Mean, and High Levels of Masculine Norm Adherence*

	Male <i>n</i>	Female <i>n</i>	F	<i>p</i>	Male Mean	SD	Female Mean	SD
<b>ACSS</b>								
Low Masculine Norm Adherence	24	2	18.50	.000	3.51	5.65	-15.45	11.31
Mean Masculine Norm Adherence	49	53	4.93	.029	0.91	4.81	-1.59	6.38
High Masculine Norm Adherence	12	6	0.00	.992	-0.40	5.13	-0.43	4.06
<b>PPES</b>								
Low Masculine Norm Adherence	24	2	0.63	.437	-0.32	4.64	2.35	2.83
Mean Masculine Norm Adherence	49	53	9.62	.002	2.45	8.72	-2.75	8.19
High Masculine Norm Adherence	12	6	2.85	.111	3.75	9.13	-4.82	12.09
<b>Social Gun Culture</b>								
Low Masculine Norm Adherence	24	2	0.08	.779	-1.42	0.41	-1.50	0.00
Mean Masculine Norm Adherence	49	53	2.95	.089	0.25	1.23	-0.16	1.21
High Masculine Norm Adherence	12	6	1.60	.225	1.75	1.55	0.66	2.04

*Note:* All values were created using mean-centered variables

## CHAPTER IV – DISCUSSION

The purpose of this study was to improve understanding of sex differences in suicide risk by examining sex differences in capability for suicide within a sample of firearm owners. This study also sought to clarify the impact of masculine norm adherence on sex differences in capability. It was expected that sex would be associated with capability for suicide, such that males would display higher levels of all forms of capability. It was further expected that masculine norm adherence would moderate this relationship, meaning that the degree to which sex differences existed on capability would depend on the level of masculine norm adherence present (e.g., the gap between males and females would decrease at higher levels of masculine norm adherence). The results of this study largely failed to support hypotheses within the proposed latent frameworks, suggesting that capability for suicide is a complex, possibly heterogeneous construct that may be difficult to capture within a latent model. However, results of an exploratory path analysis model offer some insights regarding specific relationships between sex, masculine norm adherence, and indicators of capability for suicide among firearm owners that partially support hypotheses.

Contrary to hypotheses, neither latent model demonstrated convergence at the measurement model level, which indicates that the model is misspecified. There are several possible explanations for why this might be. First, the proposed models and chosen indicators may be fundamentally flawed and fail to capture the construct of capability for suicide. Although theory and prior empirical evidence were consulted in developing the two theoretical models that were tested, capability for suicide is a fairly new construct and our understanding of this construct is still developing, as evidenced by

changes in how capability has been viewed over the course of ten years (e.g., Joiner, 2005; Klonsky & May, 2015). Indeed, a number of different contributors to capability for suicide have been identified in recent years; however, we still have very limited understanding of which contributors hold the most weight, the mechanisms by which these contributors influence capability, and best methods of assessment for these contributors (May & Victor, 2018). Consequently, it is possible that the chosen indicators are poor representations of capability for suicide. An alternative explanation is that sample size limited our ability to detect convergence. As explained in the Results section, a number of participants were removed due to inconsistent responding, repeated attempts at completing the survey, and suspected bot activity. This left a smaller sample size than desired ( $n = 151$ ), which may have effected model integrity. In fact, it has been found that nonconvergence in confirmatory factor analysis models (CFAs) is more likely when sample size is 100-150 or less and when there are only two indicators per latent factor (Marsh & Hau, 1999; Kline, 2005). Relatedly, despite significant efforts to eliminate bots and unusable data points, some additional portion of the data may be flawed due to non-human and/or careless responding. Indeed, a combination of these factors may be at play, resulting in nonconvergence at the measurement model level. Notably, the alternative model had six indicators for one factor and still did not converge, suggesting that there is some misspecification in the model itself.

Despite the nonconvergence at the measurement model level, full structural models were explored for posterity. For reasons noted above, it was unsurprising that the proposed theoretical model failed to converge. However, it was surprising to find that the alternative model demonstrated convergence. A number of the significant relationships

found in this model did align with hypotheses. Specifically, Social Gun Culture and TriPM Meanness were positively associated, and firearm storage was negatively associated with Capability. Given that higher scores on firearm storage suggested safer storage practices, this suggests that these indicators were associated with Capability in expected directions.

The results related to sex, CMNI total score, and Capability were more difficult to interpret. CMNI total score was positively associated with the latent Capability construct, which is what would be expected according to hypotheses. Additionally, the interaction of sex and CMNI total score was negatively associated with Capability, which also would be expected according to hypotheses, suggesting that males (coded as zero) with stronger adherence to masculine norms display higher levels of capability. However, within this model sex and CMNI total score were positively correlated with one another, suggesting that females had high masculine norm adherence. To aid interpretation of these results, an ANOVA was conducted to determine whether there were significant between-group differences by sex on CMNI total score. Very surprisingly, there were significant between group differences ( $F = 8.41, p = .004$ ), with females ( $M = 0.06, SD = 0.16$ ) displaying higher levels of masculine norm adherence than males ( $M = -0.05, SD = 0.25$ ). This suggests that, among firearm owners, females may adhere more strongly to masculine norms than males. Although, this finding stands in contrast to some prior research suggesting that males have higher levels of masculine norm adherence (Mahalik et al., 2003), there has been very little research on masculine norm adherence among females and no research that has examined masculine norm adherence among female firearm owners. Furthermore, there appears to be some evidence to support that

masculine norm adherence is similar among men and women. For example, Granato and colleagues (2015) found that sex did not moderate the relationship between masculine norm adherence and acquired capability in a sample of undergraduates. As mentioned previously, the results of the full structural alternative model cannot be meaningfully interpreted due to poor model fit and failure for the model to converge at the measurement model level. However, the ANOVA results revealing significant differences in CMNI total score between males and females is an important and unexpected finding that may impact interpretation of exploratory analyses.

Given that neither model converged using latent variables for capability, the model was instead investigated using the observed capability indicator variables in a path analysis. The results of this analysis, although exploratory, partially aligned with hypotheses. For example, sex was negatively associated with ACSS and PPES total scores, suggesting that males had higher acquired capability and experience with painful/provocative events. Furthermore, a rough guideline based on Cohen's (1988) effect sizes for correlations suggests that these relationships have small to medium effect sizes (Kline, 2005). This supports previous research suggesting that males generally endorse higher levels of these variables (e.g., Van Orden et al., 2008; Granato et al., 2015) and indicates that biological sex may confer unique risk for these forms of capability for suicide.

Unexpectedly, sex was negatively associated with firearm storage total score, indicating that females were storing their firearms less securely than males. To aid interpretation of this finding, an ANOVA was conducted to determine if there were significant between group differences by sex on firearm storage. Again, surprisingly,



results revealed significant between group differences ( $F = 9.14, p = .003$ ), with females ( $M = -0.45, SD = 1.47$ ) endorsing less safe storage practices than males ( $M = 0.30, SD = 1.51$ ). This finding stands in contrast to prior research suggesting that males store their firearms less securely (e.g., Parker et al., 2017; Hamilton, Lemeshow, Londeree Saleska, Brewer, & Strobino, 2018). These two unexpected findings, that females had higher levels of masculine norm adherence and less safe storage practices than males, may be interpreted several ways. One possibility is that this sample is somewhat unique, in that the females who opted into this study endorsed a higher level of masculine norm adherence and fewer safe storage practices than would be expected based on prior research. It is possible that previous studies using samples with different compositions (e.g., undergraduates; Mahalik et al., 2003), potentially limited reach to average U.S. firearm owners (e.g., Amazon's Mechanical Turk; M. Anestis et al., 2018), or less current relevance (e.g., Behavioral Risk Factor Surveillance Survey from 2004; Hamilton et al., 2018), failed to capture the norms and firearm storage practices of female firearm owners. Alternatively, female participants in the current sample may have been reporting firearm storage practices for a firearm that belongs to a male family member (e.g., husband, father). Such participants may have believed firearm ownership extends to all members of the household, regardless of whether they were responsible for the care and storage of the firearm. This is a distinct possibility; however, some research suggests that non-firearm owners are more likely to report safer storage of a household firearm than are firearm owners, indicating that non-firearm owners may be less aware of the storage practices surrounding household firearms (Azrael, Miller, & Hemenway, 2000). Given the problems we encountered with bot activity and repeat attempts at taking the survey, a

third possibility is that a number of males successfully posed as females in order to complete the study and receive a gift card, thus skewing our results. In any case, results involving these variables should be considered carefully with these possible concerns in mind.

Other results from the path analysis appeared to support hypotheses. Specifically, CMNI total score was positively associated with TriPM Meanness and Social Gun Culture total scores, and negatively associated with firearm storage total score. These findings suggest that individuals with higher masculine norm adherence endorsed more psychopathic personality traits, greater exposure to social gun culture, and less safe storage practices, all of which aligns with the expectation that those with greater masculine norm adherence would have higher levels of dispositional and practical capability. Furthermore, these relationships all had medium to large effect sizes (Cohen, 1988; Kline, 2005). This aligns with some preliminary findings in prior research (e.g., Reidy et al., 2013; Preston et al., 2018; Stroud, 2012; Cukier & Sheptycki, 2011); however, this represents the first instance in which these relationships have been explored within a sample of firearm owners, lending some credibility to the notion that masculine norm adherence may influence the development and/or expression of certain dispositional and practical capability traits.

The path analysis results of the interaction of sex and CMNI total score offered some support for hypotheses. For example, this interaction was associated with ACSS total score, with a small to medium effect size (Cohen, 1988; Kline, 2005). Using the ANOVA results to aid interpretation, this suggests that males generally endorsed higher acquired capability than females; however, at high levels of masculine norm adherence,

the gap between men and women decreased. This pattern was hypothesized according to prior research and theory (e.g., Klonsky & May, 2015; Mahalik et al., 2003; Van Orden et al., 2008) and indicates that masculine norm adherence can moderate sex differences in the development and/or expression of some forms of capability for suicide.

The other significant interaction results were mixed. The interaction of sex and CMNI total score was negatively associated with PPES total score, with a small to medium effect size (Cohen, 1988; Kline, 2005); however, ANOVA results suggested that this was only true at mean levels, not at high or low levels of masculine norm adherence. This does not align with hypotheses and seems to suggest that having high or low levels of masculine norm adherence decreases the gap between males and females when it comes to engagement in painful and/or provocative events. This may indicate that more extreme levels of adherence to masculine norms (i.e., particularly high or low) considerably impacts engagement in painful and/or provocative events, such that typical sex differences in this area are decreased. So, those who have low masculine norm adherence engage in far fewer painful and provocative events, regardless of sex and, similarly, those with high masculine norm adherence engage in far more painful and provocative events, regardless of sex. Although possible, this explanation assumes that masculine norm adherence causes subsequent engagement in painful and provocative events. Given the cross-sectional nature of the study, we cannot assume this definitively. One consideration related to this finding is that the PPES contains a number of experiences believed to habituate an individual to pain and fear of death; however, not all of these experiences are voluntary and/or may not be strongly influenced by sex or masculine norm adherence (e.g., “have you been a victim of physical abuse?”; Bender et

al., 2011). Perhaps the small number of items that fall into this category skewed the results, making masculine norm adherence a weaker moderator in this relationship. Another important consideration is that there were far fewer participants who reported CMNI total scores that fell above or below one standard deviation from the mean (low masculine norm conformity,  $n = 26$ ; high masculine norm adherence,  $n = 18$ ). As a result, these ANOVAs are not well-powered to detect all differences that may exist, which could reasonably impact the results and interpretation of this finding.

The interaction of sex and CMNI total score was also negatively associated with Social Gun Culture total score, again with a small to medium effect size (Cohen, 1988; Kline, 2005), but ANOVA results revealed that there were no significant differences between males and females on social gun culture at high, mean, or low levels of masculine norm adherence. This finding may suggest that exposure to social gun culture is more equally distributed among males and females than might have been expected, and that sex and masculine norm adherence exert only slight influences on this process. When thinking about how firearm owners become exposed to social gun culture, this may make logical sense. Individuals are often raised within a family or community that promote similar values related to firearm ownership. Associated experiences and beliefs may therefore be inherited by all members of this community, regardless of sex and the extent to which one adheres to masculine norms. Alternatively, social gun culture may play a role in the development or strengthening of masculine norms. If social gun culture is present in an individual's early life (Cukier & Sheptycki, 2011), values within that social gun culture (e.g., responsible people own firearms for protection) may impact the extent to which an individual adheres to certain masculine norms as they develop (e.g., I should

rely on myself for protection). Indeed, in the current sample, the vast majority of male (85.6%) and female (90.2%) participants reported growing up in a family with firearms. Although this does not necessarily mean that these individuals were raised within a social gun culture, it provides some contextual support for this explanation. Furthermore, this may help explain why females in this sample endorsed higher masculine norm adherence. Yet another explanation is that there were far fewer females who endorsed particularly high or low masculine norm adherence, resulting in low cell count for females within the high and low masculine norm adherence comparison groups. This lack of variability among females compared with males may have contributed to non-significant findings. The fact that most females endorsed average levels of masculine norm adherence may indicate that female firearm owners subscribe more strongly to masculine norms than females in the general population (e.g., undergraduates; Mahalik et al., 2003), but tend not to be pulled towards the extremes (i.e., particularly high or low masculine norm adherence). At least among firearm owners, males may exhibit more variability in masculine norm adherence, perhaps due to increased salience of these norms and heightened exposure to various influences on these norms. If true, mean differences between male and female firearm owners at different levels of masculine norm adherence may provide less information.

Finally, within the path analysis model a number of significant correlational relationships emerged, several of which were in expected directions. Firearm storage total score was negatively associated with PPES total score, with a small to medium effect size, and TriPM Meanness subscale score was positively associated with ACSS total score and UPPS-P Sensation Seeking subscale score, with small to medium and medium

effect sizes, respectively (Cohen, 1988; Kline, 2005). As would be expected, these findings suggest that less safe firearm storage practices were associated with higher engagement in painful and provocative events. Similarly, those who reported higher levels of meanness, characterized by low empathy and callousness, also reported higher levels of acquired capability and sensation seeking. These three results demonstrate associations between practical, acquired, and dispositional capability traits. Perhaps individuals who are prone to riskier behaviors (i.e., painful and provocative events) are more likely to engage in unsafe storage practices. Additionally, perhaps a genetic bias towards low fear responsivity (i.e., meanness; Patrick et al., 2009) plays a role in the development of self-reported fearlessness about death and high pain tolerance. This same trait may contribute to or exist alongside trait propensity for engaging in new, stimulating experiences (i.e., sensation seeking). These are all distinct possibilities; however, because these are only correlational relationships we cannot infer causality, nor can we elucidate how and in what contexts these capability traits relate to one another.

Other significant correlations within the path analysis model were in unexpected directions. For example, firearm storage total score was positively associated with ACSS total score, TriPM Meanness subscale score, Social Gun Culture total score, and UPPS-P Sensation Seeking subscale score, suggesting that safer firearm storage practices were associated with a variety of dispositional, acquired, and practical capability indicators. Furthermore, these relationships had small to medium and medium effect sizes, similar to the correlations that were observed in expected directions. Although counterintuitive, perhaps these results can be attributed to the overrepresentation of males reporting safe firearm storage practices in this sample. It may be that, in this sample, males engage in

safe firearm storage practices but demonstrate expected elevations across other capability indicators.

In addition to some unexpected findings, this study had several concerns regarding the reliability of some indicator measures. Most notably, the Boldness subscale of the TriPM had extremely low reliability, precluding its use in analyses. This is surprising given that another study examining TriPM Boldness in a sample of male and female firearm owners found an internal consistency of .84 for this subscale (J. Anestis et al., 2018). Upon further inspection, the means of TriPM subscales were also inconsistent with prior studies, suggesting that participants in the current sample responded somewhat differently to items within this measure. For example, in the current sample, the mean score for the Meanness subscale was 26.47, which is higher than means found in a male/female non-offender college sample ( $M = 13.19$ ), a male/female prisoner sample ( $M = 17.89$ ; Patrick, 2010), and a male/female firearm owner sample ( $M = 12.60$ ; J. Anestis et al., 2018). Additionally, the mean score for the Disinhibition subscale in the current sample ( $M = 26.55$ ) was higher than that found in two of these comparison samples (non-offender college,  $M = 15.12$ ; firearm owner sample,  $M = 14.27$ ; J. Anestis et al., 2018), but was still lower than the prisoner sample ( $M = 37.05$ ; Patrick, 2010). Finally, the mean score for the Boldness subscale in the current sample ( $M = 30.15$ ) was largely commensurate with the means found in the college sample ( $M = 33.70$ ; Patrick, 2010) and the firearm owner sample ( $M = 31.38$ ; J. Anestis et al., 2018). Unfortunately, no mean score was available from the prisoner sample.

Given these inconsistencies, additional steps were taken to rule-out researcher error in calculating TriPM scores and reliabilities. Scoring syntax was re-reviewed and

then TriPM data in the most inclusive dataset ( $n = 151$ ) were re-scored using the reviewed syntax. No changes were observed in mean scores across subscales or internal consistency calculations. The original survey was also re-reviewed to determine if there were any coding errors within the Qualtrics survey software or any errors in the way in which items were presented. No such errors were detected. As a result, these puzzling findings may be interpreted in a number of ways. Given the high mean scores across all TriPM subscales, it is possible that the current sample simply endorsed higher levels of psychopathic personality traits because other samples do not resemble them closely (e.g., college students, prisoners, firearm owners recruited through Amazon's Mechanical Turk). However, this does not necessarily explain the extremely low internal consistency found on the Boldness subscale. An alternative explanation is that undetected bots or inattentive participants accounted for the unusually high scores on the Meanness and Disinhibition subscales, as well as the low internal consistency on the Boldness subscale. Supporting this, there are more reverse-coded items on the Boldness subscale ( $n = 10$ ), compared with the Meanness ( $n = 5$ ) and Disinhibition ( $n = 2$ ) subscales. Furthermore, the TriPM was one of the longer measures used in this study and was viewed by participants nearer the end of the survey than the beginning. So, it is conceivable that participants (human or bot) were selecting higher scored response options, regardless of item-content, and that this had a greater effect on consistency within the Boldness subscale due to the higher number of reverse-scored items. If this is the case, results related to TriPM Meanness should be interpreted with extreme caution. This would also cause some concern regarding the quality of responses throughout the entire survey.



Relatedly, the internal consistency for the ACSS in the current sample ( $\alpha = .40$ ) was lower than has been found in a sample of male and female firearm owners ( $\alpha = .85$ ; J. Anestis et al., 2018). The explanations put forward for the TriPM may also be applied to this unusual finding; namely, that participants in this sample may differ in meaningful ways from previously studied samples of firearm owners, or inattentive/non-human responding may account for the low internal consistency observed on this measure. The latter explanation may be supported by the presence of a high number of reverse-scored items on the ACSS ( $n = 7$ ). In either case, this limitation decreases confidence in conclusions drawn about results involving ACSS total score. Replication of these findings in additional firearm owning samples will be necessary in order to clarify these relationships.

Data quality was certainly a concern throughout this study, especially given the amount of data screening and participant exclusion that was required. Despite safeguards against these problems on the front end (e.g., validation questions; use of survey software to prevent multiple attempts at completing the survey), quite a few inattentive and non-human responders were able to complete the survey, compromising the integrity of the data. Despite numerous actions taken during data cleaning (e.g., use of the TAPIR, thorough examination of write-in questions), it is possible that some remainder of the survey data was compromised by inattentive and/or non-human responders.

Unfortunately, this is a growing problem within online research (Shanahan, 2018) and our methods of detection need to catch up. Qualtrics, however, has added new features specifically for bot detection that can be embedded in surveys and may aid researchers seeking to replicate or expand upon the current study (“Captcha Verification

Question,” n.d.; “Fraud Detection,” n.d.). These tools use CAPTCHA (Completely Automated Public Turing Test to tell Computers and Humans Apart) and reCAPTCHA technology, which both function by using participant responses to detect potential bot activity. CAPTCHA technology in Qualtrics works by presenting participants with a task or challenge that is typically simple for humans but somewhat impossible for computers to complete (e.g., presenting an image including random letters and asking the participant to type out those letters to proceed; “Captcha Verification Question,” n.d.).

ReCAPTCHA technology in Qualtrics identifies bots by assigning a score indicating the likelihood that the data was completed by a human, but does not require the participant to interact directly with a specific task (“Fraud Detection,” n.d.). These two techniques would have been invaluable in the current study and are certainly worth incorporating in any future research on this topic that uses online data collection.

In addition to noted concerns regarding online data collection, the study itself is cross-sectional, which allows us only a momentary glimpse into what capability for suicide may look like among firearm owners. As a result, we cannot infer causality in any of these relationships. This may be particularly problematic considering the variables under investigation, as certain forms of capability (i.e., dispositional) are theorized to precede other forms of capability (i.e., acquired), and it is unclear how and when development of social norms (i.e., masculine norm adherence) may influence this process. Thus, future studies incorporating longitudinal designs may provide more information regarding the mechanisms by which different forms of capability develop, as well as clarifying which forms of capability confer the greatest risk. Similarly, future studies should consider alternative approaches to assessment of capability for suicide. As

noted by May & Victor (2018), current self-report methods are limited in their ability to capture the construct of capability, so novel behavioral methods of assessment may yield more useful results.

This study sought to elucidate sex differences in suicide risk by investigating sex differences in capability for suicide, as well as the moderating influence of masculine norm adherence. The fact that hypotheses were not supported in the proposed latent frameworks in some ways aligns with current thinking on capability for suicide: this construct is complex and requires new approaches to measurement in order to capture the construct more accurately (May & Victor, 2018). Despite the lack of support found for the latent models, some interesting and meaningful results emerged when variables were examined directly within a path model. Relationships between predictors (i.e., sex, masculine norm adherence, and the interaction of sex and masculine norm adherence) and observed capability indicators produced some evidence that sex and masculine norm adherence influence the development and/or expression of capability. Given concerns regarding data quality, strong inferences should not be drawn based on these results; however, this study provides some initial directions for future studies to continue exploring. Importantly, this is the first study that has attempted to examine the impact of sex and social gender norms on a broad set of capability variables, providing some insight into the relative importance of genetic predisposition and sociocultural beliefs in the development of capability. Continued exploration of this topic could yield valuable information regarding the different pathways by which capability develops and is influenced, which may help us better understand sex differences in suicide death.

If future research suggests that masculine norm adherence amplifies the development and/or expression of capability, it may also present opportunities for novel prevention and intervention methods to decrease suicide risk. Upstream prevention methods may be particularly potent. For example, a group of psychologists have piloted an evidence-based program that brings together small groups of boys to discuss the topic of masculinity (Clay, 2012). The goal of this program is to work with boys who have not been fully socialized to gender norms and help them gain interpersonal skills, develop introspection and insight, and generate a desire to help others. Although the current focus is only on boys, these psychologists and others have identified the value in including girls in this type of program; perhaps after the effectiveness of this pilot program has been evaluated and replicated (Clay, 2012).

Other interventions may prove useful, even after socialization to masculine norms has occurred. Several organizations and universities offer classes that assist men in unlearning unhelpful masculinities and constructing healthier ones (Campbell, 2017). These courses are designed to help men develop better self-awareness and modify unhelpful behaviors driven by masculine norms. Individuals who have taken such courses report gaining insight and making changes; however, no effectiveness studies have been conducted and, as of now, these groups appear limited to men (Campbell, 2017).

Another potential intervention may be the use of cognitive bias modification methodologies to alter interpretations biased by masculine norm adherence. This form of cognitive bias modification targets selective interpretations (CBM-I; MacLeod & Matthews, 2012), and could potentially be used to shift individuals' perspectives on behaviors related to specific pathways between masculine norms and capability. The

CBM-I involves presentation of an ambiguous term, image, or written description, which is followed by a word fragment that is typically biased towards either a positive or negative interpretation of the preceding information (MacLeod & Matthews, 2012). So, for example, a firearm owner may be presented with an image or description of a firearm being stored in a gun safe, which is followed by a word fragment such as PR-T-CT. This would likely lead the individual to complete the fragment as “PROTECT,” which may capitalize on the masculine norm of protection to shift interpretive bias towards safe storage as a positive behavior. Importantly, CBM-I has been primarily used to alter anxious cognitions (MacLeod & Matthews, 2012), so the proposed use of this methodology would require adjustment to previously established designs. To do this, substantial research would need to be conducted to determine if masculine norm adherence influences the development or expression of specific, malleable forms of capability. Then, it would be necessary to assess the validity, reliability, and effectiveness of a modified CBM-I. The clear disadvantage of this type of intervention is that it would require significant time and energy before a potentially effective tool could be created. The clear advantage is that such a tool would be very scalable, increasing reach and prevention benefits. Importantly, all aforementioned prevention and intervention strategies can be implemented in the absence of suicidal ideation, meaning that risk for suicide death may be decreased before thoughts of suicide develop. On the other hand, these types of interventions are voluntary and not widely available, so it is likely that many men would not opt in or would not have access to these potentially useful tools.

Another consideration is what clinicians can do when faced with suicidal clients for whom masculine norm adherence appears to heighten suicide risk. The American

Psychological Association (APA, 2018) recently released practice guidelines for clinicians working with men and boys that takes into consideration the impact of masculinity on psychological treatment. These guidelines encourage psychologists to understand how masculinity is defined within clients' contexts, to observe and help male clients integrate all aspects of their identities, which may include multiple masculinities that intersect with other dimensions of identity (e.g., race, sexual orientation), to promote healthy relationships for clients, including fatherly involvement with children, and to use therapeutic techniques that model effective communication, management of aggression, and use of empathy (APA, 2018). Learning from and adhering to these guidelines may help clinicians more effectively navigate masculinity within the context of suicide risk, allowing clients to become more aware of the impact that masculine norms may be having and providing the opportunity to reevaluate these norms through a different lens. Although these guidelines were designed for boys and men, the information can also be applied to female clients presenting with suicide risk that appears to be impacted by masculine norm adherence.

Although the current study failed to support main hypotheses, exploratory analyses offered novel, albeit cautiously interpreted, findings that shed some light on the ways in which sex, sociocultural gender norms, and capability relate to one another. This study represents a first step towards elucidating the complex pathways between these variables and identifies new areas for further exploration. Should future research replicate or expand upon the current findings, a number of potentially useful prevention and intervention tools exist that may serve to attenuate the effect of masculine norm adherence on capability for suicide. Many questions remain on this topic and continued

investigation is vital if we are to better understand sex differences in suicide death, particularly among firearm owners.

## APPENDIX A – IRB Approval Letter



### NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-18-142

PROJECT TITLE: The Role of Masculinity in the Development of Capability for Suicide

SCHOOL/PROGRAM: School of Psychology, Psychology

RESEARCHER(S): Claire Houtsma

Michael Anestis

IRB COMMITTEE ACTION: Approved

CATEGORY: Expedited

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

PERIOD OF APPROVAL: January 14, 2019 to January 14, 2020

Donald Sacco, Ph.D.  
Institutional Review Board Chairperson



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