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Firearm storage and shooting experience: Factors relevant to the practical capability for suicide

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A B S T R A C T

The capability for suicide is posited to facilitate the relatively rare transition from suicidal ideation to suicidal behavior, although the operational definition of the construct continues to evolve. The Three Step Theory proposes that capability is multifaceted and includes practical capability for suicide, defined as comfort with and access to lethal means. Empirical examinations of this construct are thus far limited. Two previous studies have examined the association between firearm storage and shooting experience and common measures of capability for suicide. This study expands the generalizability of previous findings by investigating the relationship between capability for suicide, firearm storage practices, and experience shooting a firearm in a sample of 300 American firearm owners. We found that individuals who store their firearms unsafely (loaded, in a non-secure location, or without a locking device) and who have greater experience shooting firearms have significantly higher capability for suicide. These findings extend the evidence for the construct of practical capability as it relates to firearms and highlight the need for firearm-specific means safety measures to prevent suicide.

In 2015, suicide was the tenth leading cause of death in the United States (US), accounting for 44,193 deaths (CDC, 2017). Almost 50% of these deaths were caused by firearms (CDC, 2017). Firearms are the most lethal method of suicide, with an 85–91% fatality rate (Miller et al., 2004; Vyrostek et al., 2004). Research has repeatedly demonstrated an association between firearm ownership and death by suicide beyond the effects of covariates such as demographics, depression, and previous suicidal behavior (Anestis and Houtsma, 2017; Miller et al., 2007, 2013, 2015, 2016; Opoliner et al., 2014). Furthermore, risk for suicide is higher if firearms are stored unsafely (Brent, 2001; Khazem et al., 2016).

The capability for suicide, a construct described in both the Interpersonal Theory of Suicide (ITS; Joiner, 2005) and Three Step Theory of Suicide (3ST; Klonsky and May 2015), may provide a lens through which to better understand the link between firearms and suicidality. According to the ITS and 3ST, an individual must have both the desire and the capability for suicide in order to die by suicide. The 3ST posits that capability comprises dispositional, acquired, and practical components. Dispositional capability is shaped by genetic predispositions to pain tolerance and fearlessness about death; acquired capability is influenced by repeated exposure to painful and/or provocative stimuli that lead to a habituation to pain and an increased fearlessness about death; and practical capability refers to logistical factors that make it easier for an individual to attempt suicide—including comfort and experience with lethal means such as firearms (Klonsky and May 2015).

A limited number of studies exploring how firearms are associated with traditional components of the capability for suicide have been published. Khazem et al. (2016) examined the relationship between firearm storage and capability in a sample of firearm-owning National Guard personnel and found unsafe firearm storage practices (loaded and unsecured) were significantly associated with heightened fearlessness of death. Another study utilized a community sample from a state with high rates of firearm ownership and found prior experience shooting a firearm was associated with a range of capability-related factors (Anestis and Capron, 2017).

Although both studies provide support for how practical capability may influence suicide risk, the generalizability of the findings is limited. Khazem et al. (2016) focused on military personnel, a population that receives extensive training using firearms and is more likely to be exposed to combat relative to civilians. Such experiences could further increase habituation to pain and death (Bryan et al., 2010a, 2010b), leading military personnel to be more fearless about death than the general population (Khazem et al., 2016). Furthermore, individuals who opt to join the military may enter with elevated baseline levels of fearlessness about death and pain tolerance compared to those who...
choose not to join the military. Indeed, military personnel exhibit stable capability for suicide pre- and post-deployment and demonstrate higher levels of capability compared to civilians with a history of multiple suicide attempts (Assavedo et al., 2017; Bryan et al., 2016; Bryan et al., 2010b). Additionally, although Anestis and Capron (2017) recruited from Mississippi, a state with high rates of firearm ownership, not all participants were firearm owners and all participants were recruited from the same state. Overall, both studies provide a preliminary understanding of the extent to which firearm storage and shooting experience contribute to practical capability for suicide in military and civilian populations. The aim of this study was to expand the generalizability of previous findings by examining if more established components of the capability for suicide are associated with newly formulated components conceptualized as practical capability—firearm storage practices and shooting experience—in a national sample of civilian firearm owners. Consistent with previous findings, we expected that the practical capability components of unsafe firearm storage practices and the number of times an individual has fired a gun would be positively associated with capability for suicide. Such findings would be consistent with the notion that access to and experience with lethal means play an important role in increasing the risk for death by suicide, providing further support for the construct of practical capability.

1. Method

1.1. Participants

The sample consisted of 300 American firearm owners recruited via Amazon’s Mechanical Turk (mTurk) program, a web-based service matching human workers to a variety of online tasks. The study was advertised as applicable to firearm owners only. Participants were required to be adults residing in the US and to own at least one firearm. To increase confidence in the quality and validity of responses, this study was restricted to individuals who had at least an average 95% approval rating on past projects and had completed at least 100 projects on mTurk. Additionally, three quality control questions were included in the protocol; failure to answer any of these questions correctly resulted in immediate expulsion from the study. The quality of data collected through mTurk has been shown to be comparable with data collected through other means (Shapiro et al., 2013). The relevant Institutional Review Board provided approval prior to the onset of the study and participants gave informed consent prior to beginning the study. Participants were compensated with $6 following the completion of the online survey.

1.2. Materials

Demographic information, experience shooting firearms, and firearm storage practices were all assessed using items designed for this study and piloted in a number of previous studies (Anestis and Capron, 2017; Butterworth et al., 2017; Khazem et al., 2016). The items examined in this study are a subset of a larger pool of items contained in the original survey. With respect to experience firing a gun, participants were asked to rate approximately how many times they had shot a gun. Response options were comprised of 0 (Never), 1 (Once or twice), 2 (More than twice, but less than 100 times), and 3 (At least 100 times). With respect to firearm storage practices, participants were asked to respond whether items applied to them; response options were simply yes/no. Participants were asked the following questions: “Do you store your gun (s) in a secure location (e.g. a locked gun safe) or a non-secure location (e.g. a bedside table)?”, “Do you use a locking device (e.g. a trigger lock) on your gun(s) when not in use?”, and “Do you store your gun(s) loaded?” Survey instructions requested that participants select certain options to ensure that responses reflected the highest storage risk option. For example, if a participant endorsed owning six firearms, one of which was stored unlocked, they were instructed to respond “unlocked.”

Capability for suicide was assessed using the Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008), a 20-item scale assessing individuals’ fear of bodily harm, pain, and death. Items are scored from 0 (Not at all like me) to 4 (Very much like me), with higher scores indicating greater fearlessness about death. The ACSS has exhibited strong psychometric properties in past studies (Bender et al., 2011; Ribeiro et al., 2014). Internal consistency in this sample was good ($\alpha = 0.88$).

1.3. Data analytic plan

Our analyses consisted of one analysis of covariance (ANCOVA) and two hierarchical linear regressions. Covariates included in the ANCOVA and in each regression were determined through univariate associations with the independent and dependent variables using chi squared analyses and analyses of variance (ANOVA). Based on these analyses, gender, marital status, military status, and living situation (alone or with others) were included as covariates in all analyses. ANCOVA was used first to examine the relationship between capability for suicide and safe versus unsafe firearm storage. This storage variable was coded dichotomously such that individuals must have endorsed storing a firearm unloaded, in a secure location, and with a locking device to be classified as storing it safely; thus loaded, non-secure, or unlocked firearm storage was coded as unsafe. These variables reflect the core tenants of safe firearm storage and are widely used in the literature (Grossman et al., 2005; Houtsma et al., 2016). In the ANCOVA, partial $\eta^2$ was used as the index of effect size ($\eta^2$; small = 0.01, medium = 0.06, large = 0.14).

Hierarchical linear regression was then used with a differently coded firearm storage variable to identify the degree of safety employed. This storage variable aggregated participant responses regarding the three firearm storage practices of interest such that scores of 0, 1, 2, or 3 indicated how many of the safe storage measures were employed, with higher numbers indicating safer storage. Last, a regression was used to identify the relationship between capability for suicide and number of times an individual has fired a gun.

In the first regression, covariates were entered in Step 1 and safe storage was entered in Step 2. In the second regression, covariates were entered in Step 1 and number of times an individual has shot a gun was entered in Step 2. For each regression, $F$ squared was used as the index of effect size ($f^2$; small = 0.02, medium = 0.15, large = 0.35).

2. Results

The sample consisted of 300 American firearm owners (53.0% male; 82.4% White; 92.0% heterosexual; $\mu$ age = 36.11, age range = 20–69). Approximately half (46.7%) of participants reported residing in the Midwest region of the US, with the remainder reporting living in the South (19.3%), Northeast (16.3%), or West (16.0%). With respect to participant history of suicidality, 19.7% reported lifetime suicidal ideation, 6.3% endorsed having made a suicide plan, and 5.0% reported a suicide attempt. Participants most commonly (60.7%) endorsed owning only one firearm, although the number of firearms owned ranged from one to twenty. Almost the entire sample (98.6%) reported storing firearm(s) at home; 45.3% did not use a locking device (e.g., trigger lock), 35.7% stored at least one firearm loaded, and 29.3% stored at least one firearm in a non-secure location (e.g., in a bedside table). Table 1 provides all demographic information for this sample.

2.1. Firearm storage and capability

Results from the ANCOVA conducted using a dichotomous safe/unsafe firearm storage variable indicated that firearm owners who reported storing a firearm unsafely (loaded, in a non-secure location, or...
without a locking device) had significantly higher ACSS scores than those who reported storing a firearm safely ($b = 3.555; \text{95\% CI} = 0.20$–$6.91; p = .038, R^2 = 0.132; \eta^2 = 0.02; \text{Table 2}).

Results from the regression examining the degree of safe storage indicated that less safe firearm storage practices were associated with higher ACSS scores ($b = 0.112; p = .045; f^2 = 0.01$). The covariates accounted for 11.9% of the variance in ACSS scores, with storage practices accounting for an additional 1.2% of the variance (Table 2).

### 2.2. Gun firing and capability

The number of times an individual has fired a gun was significantly and positively associated with ACSS scores ($b = 0.205; p < .001, f^2 = 0.05$). The covariates accounted for 11.9% of the variance in ACSS scores, with number of times an individual has fired a gun accounting for an additional 3.9% of the variance (Table 2).
3. Discussion

This study sought to expand upon previous findings regarding the association between firearm storage and experience shooting a gun and capability for suicide. Results supported our hypotheses; unsafe firearm storage and increased experience firing a gun were associated with increased capability for suicide. These findings provide additional evidence for the conceptualization of firearm storage and shooting experience as elements of practical capability for suicide and highlight the necessity of firearm-specific means safety.

As evidenced by this and previous studies, access to and unsafe storage of firearms are associated with elevated suicide risk through the practical capability for suicide (Houtsma and Anestis, 2017; Khazem et al., 2016). This finding held true when the firearm storage variable was coded both dichotomously and continuously. This similarity across coding methods indicates minimal difference between these methods of assessing the safety of firearm storage. It is important to note that the effect size for firearm storage was quite small, meaning that this effect was not as pronounced as in prior results (Anestis and Capron, 2017).

Firearm ownership, access, or unsafe storage do not cause suicidal ideation (Miller et al., 2009). Instead, risk is conferred in that if suicidal ideation develops, a readily accessible firearm increases the odds of death. Indeed, firearm ownership may increase the likelihood of future suicidal behavior in those with current suicidal ideation and unsafe firearm storage moderates the relationship between suicidal ideation and self-reported likelihood of future suicide attempt (Houtsma and Anestis, 2017; Khazem et al., 2016). Similarly, firearm shooting experience does not cause suicidal ideation, instead increasing practical capability for suicide through the increased comfort and familiarity with a highly lethal means, and potentially as a painful and provocative event (Anestis and Capron, 2017; Bender et al., 2011). Suicide is inherently difficult and fear-provoking. It necessitates surmounting humans’ basic self-preservation instinct and requires fearlessness about death and an ability to approach and remain engaged with pain in pursuit of death (Ribeiro et al., 2014). Unsafe firearm storage and high amounts of shooting experience may increase practical capability for suicide simply because an individual with this access to and comfort with firearms has 1) the ability to easily obtain a highly lethal means and 2) the knowledge to use it effectively, decreasing some of the difficulty and fear typically associated with suicide.

There are several limitations to our study. First, the measures used were self-report, meaning that these data may not be as reliable as more objective measures. Second, the data were cross-sectional, precluding any conclusions about directionality and causality. Third, our sample may not be entirely representative of American any conclusions about directionality and causality. Third, our sample were self-report, meaning that these data may not be as reliable as more measures. Fourth, only firearm owners who are also mTurk workers may not be representative of US owners who are also mTurk workers may not be representative of US firewall owners overall, additionally, our sample was comprised of a majority of individuals residing in the Midwest (46.7%). Fourth, only one measure of capability for suicide was used in this study and this measure did not differentiate between acquired and practical capability. Fifth, variables such as children in the home and other factors that may influence firearm storage were not assessed. Sixth, the variable assessing number of times an individual has fired a gun had somewhat arbitrarily constructed response options, however, given the dearth of empirical precedence, we determined these categories to be representative of common experiences individuals have shooting firearms. An individual who has shot a firearm once or twice likely held and fired the gun briefly on a single occasion. An individual who attended a firearm safety training and/or visited a firing range once or twice would likely have used multiple magazines of ammunition, and depending on the type of firearm and the magazine capacity, a range of more than 1–2 but less than 100 times seems like a viable manner to capture that limited range of firearm shooting experience. An individual who has visited a firing range many times has likely shot a gun hundreds of times. Last, items regarding storage of firearms included descriptors such as “secure” and “non-secure,” introducing the potential for socially desirable responding or other issues.

Despite these limitations, this study constitutes an important contribution to the literature by providing evidence for the generalizability of previous findings regarding the relationship between firearm storage and shooting experience and capability for suicide in a national sample of US firearm owners. Our results enhance the understanding of and evidence for the construct of practical capability as it relates to firearms. These findings highlight the need for firearm-specific means safety measures to prevent suicide.

Declarations of interest for authors SB and SD

None.

Declarations of interest for author MA: Author M.A. has received income in the past year as an independent consultant from a private organization conducting research on the association between firearms and suicide. Author M.A. has also received honorariums and speaking fees for research presentations related to means safety and suicide. Author M.A. has also received funding from the Department of Defense through the Military Suicide Research Consortium (MSRC) (grant number: W81XWH-16-2-0003) for a clinical trial examining the efficacy of lethal means counseling as a suicide prevention tool within the National Guard. Lastly, Author M.A. has a book on firearms and suicide published in 2018, which will result in personal income.

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