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What I have is what I am: Differences in demographics, suicidal thoughts and behaviors, and firearm behavior and beliefs between firearm owners who do and do not primarily identify as firearm owners

Michael D. Anestis*, Claire Houtsma

University of Southern Mississippi, United States

ABSTRACT

Non-legislative forms of means safety (i.e., safe firearm storage practices) have been promoted as a way to reduce elevated suicide risk found among firearm owners. However, evidence suggests that some firearm owners are less willing than others to engage in these practices. The current study aimed to understand factors that differentiate firearm owners' beliefs and behaviors that are relevant to suicide risk by examining differences between individuals for whom firearm ownership represents a central aspect of identity (i.e., primary firearm owners) versus firearm owners who primarily identify with some other demographic or occupational characteristic. Results of main analyses revealed that primary firearm owners were more likely to be male, were less likely to have experienced suicidal ideation, were less likely to store their firearms safely across a number of storage methods, and were less open to means safety across all storage methods. These findings highlight demographically which firearm owners may be more likely to view firearm ownership as central to their identity and also suggest that this identification may be associated with beliefs and behaviors that increase suicide risk. Future firearm suicide prevention efforts should focus on culturally competent discussions and messaging to find common ground with firearm owners and to increase the salience of suicide among firearm owners.

Firearms play a disproportionate role in American suicide (Anestis, 2018). Despite being utilized in less than 5% of all suicide attempts, firearms accounted for 51% of all suicide deaths in the United States (US) in 2016 (Centers for Disease Control and Prevention [CDC], 2017), due in large part to the uniquely high lethality rate of the method (Miller et al., 2004; Vyrostek et al., 2004). Although research has repeatedly demonstrated that firearm ownership does not cause individuals to become suicidal (e.g. Khazem et al., 2016), a litany of studies has demonstrated that firearm ownership is associated with death by suicide, even when considering the effects of other important factors, such as mental illness, access to care, poverty, and veteran status (Anestis and Houtsma, 2017; Miller et al., 2007, 2013; 2015, 2016; Opoliner et al., 2014). Furthermore, the risk for suicide conferred by firearm ownership increases substantially when firearms are stored unsafely (e.g., Brent, 2001), with safe storage involving a combination of factors including storing firearms unloaded, separate from ammunition, in a secure location (e.g. gun safe, lock box), with a locking device (e.g. trigger lock, cable lock) in place.

Despite evidence that firearm ownership does not prompt suicidal thoughts to emerge (Khazem et al., 2016), the method for suicide nonetheless appears to be a valuable target for suicide prevention efforts. Means safety – an approach that renders specific methods for suicide less deadly or less available for suicide attempts – has been shown to result in substantial and sustainable reductions in suicide rates across the globe and across suicide methods (e.g. Jin et al., 2017; Knipe et al., 2017; Lubin et al., 2010; Saeheim et al., 2017). With respect to firearms in particular, most of the research highlights the association between legislation regulating firearm ownership and suicide rates (e.g., Alban et al., 2018; Anestis and Anestis, 2015; Anestis et al., 2017a,b; Jehan et al., 2018; Kaufman et al., 2018; Kivisto and Phalen, 2018).

Although the evidence appears to support the utility of at least certain forms of legislation with respect to suicide rates, the plausibility of implementing such legislation in highly conservative, high firearm ownership states remains open to question and, as such, efforts have been made to promote non-legislative forms of means safety. Safe storage within the home and temporary storage away from home during crises, although currently lacking with respect to effectiveness data, have thus become prominent components of emerging efforts at suicide prevention focused specifically on firearms (e.g., Barber et al., 2017). Although such efforts appear to have promise, there is also evidence that some groups are less willing to engage in these means safety practices. For instance, recent studies have highlighted males, individuals with conservative political beliefs, and individuals who have never known anyone who died by suicide as less open to means safety to prevent their own suicide attempt or a suicide attempt by another individual with access to their firearm(s) (Butterworth and Anestis, 2018; Daruwala et al., 2018). Similarly, recent evidence suggests that

* Corresponding author. School of Psychology, University of Southern Mississippi, Hattiesburg, MS 39406, United States.
E-mail address: michael.anestis@usm.edu (M.D. Anestis).

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those who maintain inaccurate beliefs about suicide – that firearm ownership and storage are not related to suicide risk and that individuals prevented from using a specific method for suicide are likely to simply utilize another method – and who have never experienced suicidal thoughts are less willing to engage in means safety (Anestis et al., 2018a,b).

Such findings highlight the importance of better understanding factors that differentiate the beliefs and behaviors of some firearm owners from those of others. One potentially important variable in this respect is the extent to which firearm ownership is conceptualized as a central component of an individual's identity. This variable is a relatively vague construct that we conceptualize as assessing whether an individual selects their identity as a "firearm owner" as *most* representative of who they are, when given a list of other self-endorsed characteristics that are relevant to them. Such a question obviously requires an individual to endorse a hierarchy of characteristics within which one variable stands above the others – a choice that may not accurately reflect the complex nature of an individual's identity – however, it also represents an opportunity to assess the relative importance of firearms to different individuals within the firearm owning community. Although to our knowledge this variable has not been directly assessed, relevant findings demonstrate its potential utility. For instance, Kalesan et al. (2015) reported that individuals exposed to firearm culture – defined as a culture within which firearms are a prominent and frequent component of social interactions – are more than twice as likely to own firearms. Similarly, Brown et al. (2014) reported that White Americans residing within "honor cultures," cultures within which defense, strength, and toughness are heavily emphasized, are more likely to die by suicide using a firearm than by any other method, even when accounting for the accessibility of firearms. Although membership within a specific culture is not necessarily indicative of an individual's conceptualization of his or her identity and these findings did not directly assess centrality of firearm ownership to an individual's identity, these results provide a preliminary basis upon which to anticipate that centrality of firearm ownership may influence an individual's views of, access to, and behavior with firearms, including extreme outcomes like death by suicide. Indeed, Kahan & Braman (2003) describe a cultural theory for firearm risk perceptions, suggesting that social norms dictate which risks an individual finds the most salient (e.g., risk of death by suicide versus risk of home invasion), thereby influencing their stance on firearm safety measures and perhaps their behaviors with firearms. According to Kahan and Braman (2003), these culturally-based norms explain more variance in firearm risk perception than demographic characteristics often associated with firearm ownership (e.g., political party affiliation).

One interpretation of these results is that firearm ownership represents a defining aspect of the identity of some firearm owners moreso than for others and that the extent to which firearm owners identify as such (rather than identifying as a military veteran who happens to own a firearm, for instance) may influence how they view and behave with firearms, particularly when receiving messages about firearms from individuals perceived as outsiders. Indeed, in a political environment within which conversations regarding firearms may be perceived by some as an attack on Constitutional rights or even on larger cultures in general, it may be that individuals who primarily identify as firearm owners will develop and maintain entrenched ideas that run counter to empirical evidence as a way to defend against perceived threats to their way of life. This notion is consistent with the underlying theory driving motivational interviewing (Miller, 1983), which notes that when individuals are pushed to adjust behaviors or beliefs they themselves have not proposed changing, the natural and likely response is to increase the strength with which they embrace resisting change. This is also consistent with the cultural theory described by Kahan and Braman (2003), which argues that using empirical evidence to dispute risks related to firearms is ineffective, as individuals' beliefs related to firearms and firearm safety measures depend upon the social meanings they associate with these factors, making empirical data far less compelling. As such, if individuals who primarily identify as firearm owners engage in riskier firearm storage behavior, perhaps due to a belief that firearms are not related to suicide risk or due to a social norm-driven association between accessible firearms and safety, presenting data in a combative manner through the voice of an individual perceived as an outsider (e.g. a non-firearm-owning academic or health care provider) will likely prove ineffective as a means of prompting behavior change.

In an effort to better understand the extent to which identifying primarily as a firearm owner (as opposed to owning a firearm but primarily identifying with an occupation or demographic characteristic) differentiates firearm owners from one another on variables potentially relevant to suicide, we utilized data from a large cross-sectional online study developed to test within and between group differences in risk among several understudied groups considered to be at elevated risk for suicide (e.g. law enforcement officers, military veterans, veterinarians). Individuals who took part in this study were provided with an opportunity to examine a list of groups and to select which one(s) they belong to. They were then subsequently provided with an opportunity to select which group, if any, they primarily identify with. In this sense, the sample provided an opportunity to examine differences between firearm owners who primarily identify as firearm owners (referred to henceforth as "primary firearm owners") versus those who identify more readily with another classification. Based on findings discussed above, we anticipated that primary firearm owners would be more likely to be male and conservative and less likely to have been exposed to suicide loss or to have experienced suicidal ideation. We also anticipated that primary firearm owners would store their firearms less safely and be less open to means safety to prevent their own suicide attempt or a suicide attempt by another individual with access to their firearms. In an effort to provide additional preliminary data related to the notion of primary firearm ownership, we also conducted a number of exploratory analyses examining demographic differences between primary and non-primary firearm owners. Results consistent with our hypotheses would indicate that primary firearm owners tend to differ demographically from non-primary firearm owners and that, due to lack of exposure to loss or experience of ideation, may view suicide as less salient. These results would further indicate that primary firearm owners tend to store their firearms less safely and are less open to changing their behavior in an effort to prevent suicide, perhaps in part due to the lack of salience of suicide. Given that primary firearm ownership has not previously been considered within psychological science, our study thus has the opportunity to provide a preliminary understanding of the extent to which centrality of firearms to an individual's conceptualization of who they are represents a factor relevant to suicide risk. In addressing this gap, our work highlights the heterogeneity of the broader firearm owning community while simultaneously emphasizing one particular facet of firearm ownership that may play a role in blunting the effects of suicide prevention efforts centered on firearms. As such, the importance of developing culturally competent and effective messaging delivered by credible stakeholders would be highlighted as a vital component of suicide prevention efforts aimed at this particular high risk group.

1. Method

1.1. Participants

Participants were 375 firearm owners recruited as part of a study assessing suicide risk across a range of groups at elevated risk for death by suicide who provided valid data as determined by quality assurance items described below (full sample size = 1,417; full sample size with valid data = 779; see Fig. 1 for a participant flow chart; see below for a description of the specific groups). Participants ($_{m}$age = 32.73, standard deviation = 9.93) were primarily male (62.1%), White (89.8%),

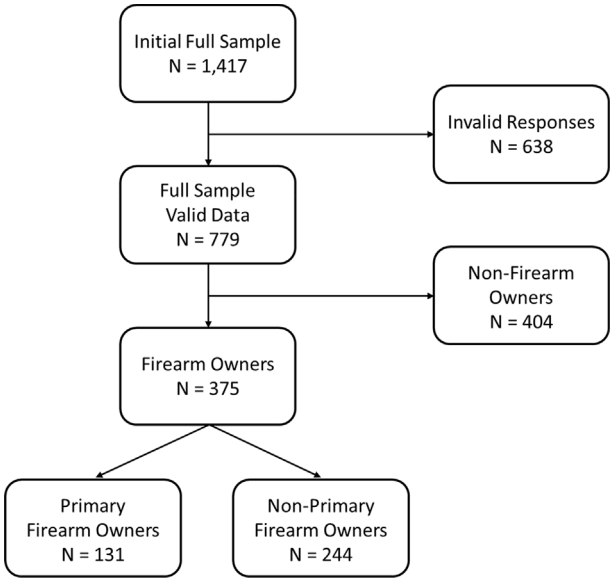

Fig. 1. Study flow from full sample to the sample utilized within the primary analyses.

heterosexual (89.3%) and employed full-time (80.3%). The majority of the sample reported being married (56.8%). Several specific groups recruited for the broader study require graduate education (e.g. veterinarians, psychologists) and, as such, education and income levels were relatively high. Nearly one-quarter of the sample (24.0%) reported having received a doctoral degree, 8.8% a professional degree, 8.8% a master's degree, 20.0% a bachelor's degree, 7.5% an associate's degree (academic or occupational), 19.2% some college, 6.7% a high school diploma or GED, and 1.3% some high school. In terms of income, 40.4% reported annual earnings above $100,000, 34.8% between $50,000 and $100,000, and 24.8% $50,000 or less.

Participants reported owning an average of 9.37 firearms (standard deviation = 18.77; range = 1–214). A large majority (85.9%) reported owning a handgun, 64.5% reported owning a shotgun, 74.7% reported owning a rifle, and 4.5% reported owning "other" types of firearms. Nearly all firearm owners (96.2%) reported storing the firearms at home, with 47.7% reporting that their firearms are stored in a gun safe, 22.9% that their firearms are stored using a locking device (e.g. trigger or cable lock), 42.4% that their firearms are stored unloaded, and 27.5% that their firearms are stored separately from ammunition.

1.2. Procedure

Participants were recruited to take part in a voluntary online survey aimed at better understanding suicide risk across a diverse set of groups not typically studied within scientific research. Recruitment took place across a number of online forums, including Reddit, Facebook, and email-based listservs. Specific recruitment messages were largely tailored to specific groups, so as to enable posting on forums geared towards particular populations (e.g. sub-Reddits specifically focused on military veterans). Participants provided informed consent prior to participation and all procedures were approved by the relevant Institutional Review Board prior to the onset of data collection. Upon providing informed consent, all participants then answered two questions. The first asked the participant to endorse all groups from a list of which he or she is a member. These groups included military veterans, active duty military, elite military (special forces), military spouse or dependent, law enforcement, firefighter, EMT/paramedic, older adult (age 65+), first-time mother, nurse, psychologist, social worker, veterinarian, manufacturing industry employee, farm worker, oil rig worker, miner, fisherman, lumberjack, gun owner, transgender, and other (with space to specify the nature of the other group(s)). Participants were then asked to select which, if any, of these groups they most identify with. Participants were then routed to a series of questions unique to the group they specified as their primary membership, with those who selected "none of the above" being routed out of the study. Upon completing the group specific items, participants who had selected a primary membership were then all routed to a series of common data elements. All items described below and utilized within these analyses were drawn from the common data elements.

This study was designed to better understand how suicide risk varies both within and across specific groups, with the obvious limitations that not all possible groups were assessed and recruitment across groups could not be held even. An additional primary aim of this design, reflected in this particular set of results, was to understand how specifically and primarily identifying with particular groups (as opposed to identifying as a member of a specific group, but not considering it a primary component of one's identity) may be associated with specific aspects of suicide risk.

1.3. Measures

Nearly all items utilized within these results were designed specifically by the research team; however, several assessment tools with more comprehensive data on their psychometric properties were also administered as part of the study.

Demographic characteristics were assessed utilizing questions designed by the study team and utilized across a range of samples in prior studies within our laboratory.

Lifetime suicidal ideation, suicide plans, preparatory behavior for suicide, and suicide attempts were assessed using the Self-Injurious Thoughts and Behaviors Interview, Self-Report, Short Form (SITBI; Nock et al., 2007). The SITBI has frequently demonstrated strong psychometric properties and has been administered across ages in both civilian and military samples (e.g. Bryan et al., 2013; Cha et al., 2010; Nock and Mendes, 2008).

Firearm ownership and current storage practices, openness to means safety, and firearm and suicide beliefs were assessed using items designed by the research team. Several of these items have been previously used by the research team; however, others have been adapted from previously used items in order to assess additional information or in an effort to refine wording. If individuals indicated that they did not own any firearms, they were then not administered the items described below and were not included in these analyses. Firearm ownership was assessed by asking "how many guns do you own?" Participants were then asked "what type(s) of gun(s) do you own?" and they then checked all applicable examples, including an option for "other," with space to describe the type of firearm not listed in our answer choices. To assess current storage practices, participants were asked a series of yes/no questions regarding whether their firearms are stored in specific ways. They were told that, if at least one firearm is not stored in that manner, they should select "no." This design choice was made in order to ensure that answers reflected the least safely stored firearm(s) for each respondent. The storage practice questions assessed whether firearms were stored at home, stored in a gun safe, stored using a locking device (trigger or cable lock), stored unloaded, and stored separately from ammunition.

Openness to means safety questions then assessed the extent to which participants were open to storing their firearms in each of the five ways mentioned above in order to prevent (a) their own suicide attempt or (b) a suicide attempt by "a loved one or someone who lives with you" (e.g. "Are you open to storing your gun(s) in a safe to prevent a suicide attempt by yourself?"). Individuals who endorsed already using a specific storage method were not asked whether they were open to using that method in the future. The questions were thus administered in a manner to avoid classifying those who already store their firearms safely as being averse to safe storage. Scores on each item

ranged from 0 ("Not at all open") to 4 ("Extremely open").

Finally, beliefs about firearms and suicide were assessed using items designed by the research team. Specifically, participants were asked about the associations between firearm ownership and suicide risk and between firearm storage and suicide risk (e.g. "To what extent do you think owning a gun is related to suicide risk?") as well as whether they believe in means substitution ("To what extent to you agree with the statement: 'if someone wants to die by suicide and you prevent them from using a specific method, they will simply find another way to die?'"). For each of these items, scores ranged from 0 ("Not at all) to 4 ("Extremely").

1.4. Data analytic procedure

For analyses examining between group differences (primary firearm owners versus non-primary firearm owners) on continuous outcomes, analyses of variance (ANOVAs) were utilized. In each case, partial eta squared was utilized as an index of effect size. For analyses examining between group differences on group membership within dichotomous outcomes, chi-squared analyses were utilized. In each of these analyses, phi was utilized as an index of effect size.

Three quality assurance items were included in the protocol. One item asked participants to indicate if they had ever utilized a computer. The other two items were embedded within other questionnaires and asked the participants to endorse a specific answer. In total, 933 participants correctly answered the item related to using a computer, 3 indicated they had never used a computer and were thus excluded, and 481 failed to answer the item. The second question resulted in 745 correct answers, 59 invalid responses, and 623 missing responses. The third item resulted in 666 correct answers, 4 invalid responses, and 747 missing responses. All invalid and missing items were considered invalid, resulting in 630 participants with no invalid responses, 149 with 1 invalid response, 146 with 2 invalid responses, and 482 with 3 invalid responses. Individuals who endorsed "none of the above" as their primary affiliation were not administered any other questions and, as such, all 121 individuals who endorsed this option had missing data for each of the three quality assurance items and those individuals are included in the numbers reported above. All participants who provided invalid entries or failed to answer 2 or more quality assurance items were excluded from all analyses, resulting in 628 invalid response profiles.

2. Results

General group affiliations for the full sample and primary firearm owners as well as primary affiliation among firearm owners who did not primarily identify as firearm owners, are available in Table 1.

2.1. Demographic variables

Results indicated that firearm owners who primarily identified as firearm owners were younger (30.12 vs 34.13; $F = 14.44$, $p < .001$; ${}_p\eta^2 = 0.04$) and less educated ($F = 57.41$, $p < .001$, ${}_p\eta^2 = 0.13$) but did not report lower annual incomes ($F = 2.10$, $p = .148$, ${}_p\eta^2 = 0.01$). Primary firearm owners were also more likely to be male (96.1% vs 45.0%; $\chi^2 = 93.99$, $p < .001$, $\varphi = 0.50$). Differences also emerged with respect to race/ethnicity ($\chi^2 = 13.51$, $p = .009$, $\varphi = 0.19$), marital status ($\chi^2 = 30.04$, $p < .001$, $\varphi = 0.28$), and area of residence ($\chi^2 = 9.45$, $p = .009$, $\varphi = 0.16$). Based on an examination of standardized residuals, no specific group comparisons were statistically significant, but the results indicate that primary firearm owners were more likely to endorse "other" (7.7% vs 2.5%; standardized residual = 1.9) and more likely to endorse Black (2.3% vs 0.0%; standardized residual = 1.9) as their race/ethnicity. Primary firearm owners were more likely to have never been married (53.4% vs 26.2%; standardized residual = 3.4) and less likely to be currently married (41.2% vs 65.2%; standardized residual = −2.4), and were marginally more likely to live in suburban areas (61.1% vs 45.1%; standardized residual = 1.7) and less likely to live in rural areas (22.1% vs 35.2%; standardized residual = −1.8) than were firearm owners whose primary affiliation was not related to firearm ownership. Primary firearm owners were also less likely to have children (26.2% vs 47.5%; $\chi^2 = 16.15$, $p < .001$, $\varphi = -0.21$); however, among those with children, primary firearm owners were no less likely to have children living in the home (35.9% vs 42.4%; $\chi^2 = 1.50$, $p = .220$, $\varphi = -0.06$). With respect to political party affiliation, primary firearm owners differed from non-primary firearm owners ($\chi^2 = 27.57$, $p < .001$, $\varphi = 0.27$), with primary firearm owners less likely to identify as Democrat (7.0% vs 22.6%; standardized residual = −2.8) and more likely to identify as "other" (30.2% vs 12.3%; standardized residual = 3.1).

With respect to exposure to suicide and lifetime experience of suicidal thoughts and behaviors, primary firearm owners were not significantly less likely to endorse having known someone who died by suicide (74.8% vs 82.8%; $\chi^2 = 3.39$, $p = .066$, $\varphi = -0.10$). Primary firearm owners were less likely to have ever experienced suicidal ideation (42.0% vs 61.1%; $\chi^2 = 11.02$, $p = .001$, $\varphi = -0.18$) or to have engaged in preparatory behavior for suicide (9.9% vs 18.7%; $\chi^2 = 4.31$, $p = .038$, $\varphi = -0.11$). No significant differences emerged on lifetime suicide plans (17.3% vs 26.5%; $\chi^2 = 3.46$, $p = .063$, $\varphi = -0.10$), lifetime aborted suicide attempts (10.7% vs 15.9%; $\chi^2 = 1.65$, $p = .199$, $\varphi = -0.07$), lifetime interrupted suicide attempts (10.8% vs 16.0%; $\chi^2 = 1.61$, $p = .204$, $\varphi = -0.07$), or lifetime suicide attempts (6.3% vs 9.2%; $\chi^2 = 0.80$, $p = .370$, $\varphi = -0.05$). These results are available in Table 2.

2.2. Firearm behavior and beliefs

Results indicated that primary firearm owners endorsed owning a higher mean number of firearms (14.59 vs 6.68; $F = 15.08$, $p < .001$; ${}_p\eta^2 = 0.04$). Primary firearm owners were also less likely to store their firearms away from home (0.8% vs 5.3%; $\chi^2 = 4.92$, $p = .027$, $\varphi = -0.12$), to use a locking device (16.8% vs 26.5%; $\chi^2 = 4.29$, $p = .038$, $\varphi = -0.11$), to store their firearms unloaded (29.0% vs 49.6%; $\chi^2 = 14.79$, $p < .001$, $\varphi = -0.20$), or separate from ammunition (19.1% vs 32.0%; $\chi^2 = 7.10$, $p = .008$, $\varphi = -0.14$). No differences emerged with respect to storing firearms in a gun safe (44.3% vs 49.6%; $\chi^2 = 0.97$, $p = .326$, $\varphi = -0.05$).

With respect to means safety, primary firearm owners were less open across all behaviors. Specifically, they were less open to storing firearms away from home to prevent their own ($F = 37.27$, $p < .001$; ${}_p\eta^2 = 0.09$) or someone else's suicide attempt ($F = 78.91$, $p < .001$; ${}_p\eta^2 = 0.17$). They were also less open to storing firearms in a gun safe to prevent their own ($F = 46.48$, $p < .001$; ${}_p\eta^2 = 0.11$) or someone else's suicide attempt ($F = 25.70$, $p < .001$; ${}_p\eta^2 = 0.07$). Primary firearm owners were less open to using a locking device to prevent their own ($F = 67.64$, $p < .001$; ${}_p\eta^2 = 0.15$) or someone else's suicide attempt ($F = 69.43$, $p < .001$; ${}_p\eta^2 = 0.16$). They were also less open to storing firearms unloaded to prevent their own ($F = 54.91$, $p < .001$; ${}_p\eta^2 = 0.13$) or someone else's suicide attempt ($F = 55.95$, $p < .001$; ${}_p\eta^2 = 0.13$). Lastly, primary firearm owners were less open to storing firearms separate from ammunition to prevent their own ($F = 57.24$, $p < .001$; ${}_p\eta^2 = 0.13$) or someone else's suicide attempt ($F = 53.69$, $p < .001$; ${}_p\eta^2 = 0.13$).

With respect to beliefs, primary firearm owners endorsed significantly lower beliefs in an association between suicide risk and firearm ownership ($F = 23.87$, $p < .001$; ${}_p\eta^2 = 0.06$) or storage practices ($F = 19.21$, $p < .001$; ${}_p\eta^2 = 0.05$). They also endorsed significantly greater beliefs in means substitution ($F = 17.26$, $p < .001$; ${}_p\eta^2 = 0.04$). These results can be found in Table 3.

Table 1
Group identifications within the full sample and across subsamples.

	Primary membership among firearm owners who do not primarily identify as firearm owners	Group memberships of firearm owners who do primarily identify as firearm owners	Group memberships within the full sample[c]
	N = 244	N = 131	N = 779
	N(%)	N(%)	N(%)
Military Veteran	47 (19.3%)	9 (6.9%)	114 (14.6%)
Active Duty Military	31 (12.7%)	7 (5.3%)	86 (11.0%)
Elite Military (Special Forces)	7 (2.9%)	1 (0.8%)	10 (1.3%)
Military Spouse/Dependent	4 (1.6%)	0 (0.0%)	32 (4.1%)
Law Enforcement	26 (10.7%)	8 (6.1%)	49 (6.3%)
Firefighter	1 (0.4%)	3 (2.3%)	8 (1.0%)
EMT/Paramedic	3 (1.2%)	8 (6.1%)	24 (3.1%)
Older Adult (Age 65 +)	3 (1.2%)	0 (0.0%)	5 (0.6%)
First-Time Mothers	0 (0.0%)	0 (0.0%)	71 (9.1%)
Nurse	2 (0.8%)	2 (1.5%)	19 (2.4%)
Psychologist	4 (1.6%)	1 (0.8%)	24 (3.1%)
Social Worker	6 (2.5%)	1 (0.8%)	21 (2.7%)
Veterinarian	103 (42.2%)	0 (0.0%)	324 (41.6%)
Manufacturing Industry Employee	5 (2.0%)	15 (11.5%)	26 (3.3%)
Farm Worker	2 (0.8%)	5 (3.8%)	22 (2.8%)
Oil Rig Worker	0 (0.0%)	0 (0.0%)	0 (0.0%)
Miner	0 (0.0%)	0 (0.0%)	0 (0.0%)
Fisherman	0 (0.0%)	8 (6.1%)	14 (1.8%)
Lumberjack	0 (0.0%)	0 (0.0%)	1 (0.1%)
Firearm Owner	–	125 (95.4%)[a]	263 (33.8%)
Transgender	7 (2.9%)	2 (1.5%)	86 (11.0%)
Other	-[b]	13 (9.9%)	43 (5.5%)

[a] 6 individuals did not list "gun owner" as one of their affiliations but endorsed firearm ownership in a later firearm ownership question and then answered follow-up questions regarding their storage practices and beliefs. Those individuals are included in the primary analyses.
[b] "other" is not listed as an option for primary affiliation. Individuals who do not primarily identify with one of the listed groups select "none of the above."
[c] Only individuals who correctly answered at least 2 of 3 quality assurance items were included in this figure. Additionally, because all individuals who endorsed "none of the above" for their primary affiliation were excluded from further analyses, those 121 individuals were not included in this figure.

3. Discussion

This study sought to better understand how variables related to suicide risk differ among firearm owners who identify primarily as firearm owners versus those who own firearm(s) but primarily identify with some other occupational or demographic group. Consistent with hypotheses, primary firearm owners were more likely to be male and less likely to have experienced suicidal ideation, were less likely to store their firearms safely across a number of storage methods (i.e., away from the home, with a locking device, unloaded, and separate from ammunition), and were less open to means safety across all storage methods (i.e., storing firearms away from the home, in a gun safe, unloaded, separate from ammunition, or with a locking device) to prevent their own or someone else's suicide attempt. These findings suggest that primary firearm owners differ in meaningful ways from non-primary firearm owners. Although preliminary, these findings are noteworthy because they suggest that certain individuals may be more likely to view firearm ownership as a central aspect of their identity and further, that this identification may be associated with specific behaviors and beliefs that may directly or indirectly increase suicide risk (Brent, 2001; Khazem et al., 2016).

Primary firearm owners were more likely to identify as "other" and less likely to identify as Democrat relative to non-primary firearm owners. This finding suggests that primary and non-primary firearm owners differ in terms of political affiliation. Furthermore, this finding coheres well with Kahan and Braman's (2003) perspective, in that cultural orientations that shape beliefs and behaviors related to firearms may not align with the traditional American two party political system.

Results of exploratory analyses provided further support for notable differences between primary and non-primary firearm owners. For example, primary firearm owners were younger, less educated, were less likely to have ever been married, and were less likely to have children than non-primary firearm owners. Evidence indicates that having children in the home is sometimes associated with safer firearm storage practices (Azrael et al., 2000), suggesting that this particular demographic characteristic provides motivation to engage in means safety. That being said, among those with children, primary and non-primary firearm owners did not differ on the likelihood of having children living in the home. These demographic differences help clarify the type of individual who might regard firearm ownership as central to his or her identity. Importantly, the fact that primary firearm owners were significantly younger than non-primary firearm owners may help explain the other noted differences. Specifically, younger individuals have had less time to seek education, get married, and have children. Additionally, many of these demographic differences constitute meaningful roles that could be considered important to identity formation over time (e.g., becoming a spouse or parent). Therefore, it is possible that individuals who have not yet had the opportunity to incorporate these roles into their lives are more likely to identify with salient culture-based characteristics, such as firearm ownership. Alternatively, individuals being raised within firearm culture may obtain firearms at younger ages because of their cultural importance. If this is the case, firearms may play a greater role in shaping identity, perhaps making such individuals less likely to pursue and/or identify with other roles.

The noted demographic differences may also help explain differences in suicide-related experiences and beliefs. Specifically, the fact that primary firearm owners were less likely to have experienced suicidal ideation themselves, endorsed lower beliefs in the relationship between suicide risk and firearm ownership or storage practices, and endorsed higher beliefs in means substitution. Individuals who identify strongly with firearm ownership are younger and younger individuals have less life experience on which to draw, thus limiting the salience and knowledge base surrounding outcomes such as suicide. Of note,

Table 2
Demographic statistics for firearm owners by primary affiliation (primary firearm owner vs primary other affiliation).

	Primary Affiliation		
	Firearm Owner	Other	
	Mean (SD) /% Yes	Mean (SD) /% Yes	
Age	30.11 (10.34)	34.13 (9.43)	$F = 14.44$; $p < .001$; $_p\eta^2 = .04$
Education	3.71 (2.06)	5.58 (2.38)	$F = 57.41$; $p < .001$; $_p\eta^2 = .13$
Annual Income	4.43 (1.91)	4.70 (1.58)	$F = 2.10$; $p = .148$; $_p\eta^2 = .01$
Sex (% Male)	96.1%	45.0%	$X^2 = 93.99$; $p < .001$; $\varphi = .50$
Race/Ethnicity			$X^2 = 13.51$; $p = .009$; $\varphi = .19$
White	83.1%	93.4%	
Black	2.3%	0.0%	
Hispanic/Latino(a)	4.6%	2.5%	
Asian/Pacific Islander	2.3%	1.6%	
Other	7.7%	2.5%	
Marital Status			$X^2 = 30.04$; $p < .001$; $\varphi = .28$
Never Married	53.4%	26.2%	
Married	41.2%	65.2%	
Divorced	3.8%	8.2%	
Widowed and Not Remarried	1.5%	0.4%	
Area of Residence			$X^2 = 9.45$; $p = .009$; $\varphi = .16$
Rural	22.1%	35.2%	
Suburban	61.1%	45.1%	
Urban	16.8%	19.7%	
Have Children	26.2%	47.5%	$X^2 = 16.15$; $p < .001$; $\varphi = -.21$
Children in Home (Among those w/Children)	35.9%	42.4%	$X^2 = 1.50$; $p = .220$ $\varphi = -.06$
Political Party Affiliation			$X^2 = 27.57$; $p < .001$; $\varphi = .27$
Republican	24.0%	29.2%	
Independent	38.8%	35.8%	
Democrat	7.0%	22.6%	
Other	30.2%	12.3%	
Known Someone Who Died by Suicide	74.8%	82.8%	$X^2 = 3.39$; $p = .066$; $\varphi = -.10$
Lifetime Suicidal Ideation	42.0%	61.1%	$X^2 = 11.02$; $p = .001$; $\varphi = -.18$
Lifetime Suicide Plan	17.3%	26.5%	$X^2 = 3.46$; $p = .063$; $\varphi = -.07$
Lifetime Preparatory Behavior for Suicide	9.9%	18.7%	$X^2 = 4.31$; $p = .038$; $\varphi = -.11$
Lifetime Aborted Suicide Attempt	10.8%	16.0%	$X^2 = 1.61$; $p = .204$; $\varphi = -.07$
Lifetime Interrupted Suicide Attempt	6.3%	9.2%	$X^2 = 0.80$; $p = .370$; $\varphi = -.05$
Lifetime Suicide Attempt	10.0%	13.2%	$X^2 = 0.72$; $p = .396$; $\varphi = -.05$

however, is that the mean difference in age between primary and non-primary firearm owners was statistically significant, but not very large (i.e., approximately 5 years). Therefore, this demographic difference may explain some, but likely not all of the differences across other variables. An alternative explanation may be that individuals who identify strongly with firearm ownership only perceive risks consistent with cultural norms surrounding firearms (Kahan and Braman, 2003). In other words, risk of firearm suicide may be viewed as a lesser concern, or perhaps not viewed as a risk at all, because other risks are more salient to firearm owners (e.g., predation by others, infringement on personal rights). Regardless, these differences between primary and non-primary firearm owners are important to consider given that maintaining inaccurate beliefs regarding firearms and suicide (Anestis et al., 2018a,b) appears to contribute to unwillingness to engage in means safety. Indeed, the current study adds to our knowledge in this area as primary firearm owners stored their firearms less safely and were less willing to engage in safer storage practices in the future when compared to non-primary firearm owners.

Contrary to expectations, primary and non-primary firearm owners did not differ with respect to the likelihood of having known someone who died by suicide. Daruwala et al. (2018) reported that knowing someone who had died by suicide was associated with a greater openness to means safety among American firearm owners and speculated that the salience of suicide is increased among loss survivors, rendering them more open to changing firearm-related behaviors as a suicide prevention tool. Although this may be the case, our results indicate that having lost someone to suicide is unrelated to whether or not a firearm owner views their firearms as a central component of their identity. Losing someone to suicide may prompt changes in how an individual thinks about the steps they might take in the future to prevent suicide, but it may not influence how they think about themselves as individuals. Given suicide loss touches individuals in all walks of life, this result perhaps should not have been surprising in that it simply reflects the fact that whoever you are and however you think about yourself, you are as vulnerable as anyone else to suicide loss.

Interestingly, primary and non-primary firearm owners did not differ in terms of their experiences with suicide planning and suicidal behaviors (i.e., various forms of suicide attempts). On the one hand, we might expect such experiences to make suicide more salient to primary firearm owners, which in theory should promote openness to means safety. On the other hand, given the high lethality of firearms when used in suicide attempts (Miller et al., 2004; Vyrostek et al., 2004), it is unlikely that lifetime suicide attempts within these two groups refer to attempts with a firearm. Consequently, this may indicate that the salience of *firearm suicide* is critical in influencing beliefs and behaviors related to firearms. The lack of differences between primary and non-primary firearm owners in terms of aborted and interrupted suicide attempts are more difficult to interpret, in part because these types of attempts have low base rates and also due to the fact that there are far fewer studies assessing these types of suicide attempts. It appears risk for these behaviors are equally distributed across firearm owners. Similarly, the comparable rates of suicide planning among primary and non-primary firearm owners suggests that planning is equally distributed among firearm owners. Indeed, Betz et al. (2011) found that, among those with suicidal ideation, firearm owners and non-firearm owners displayed similar rates of suicide planning. It is important to note, however, that firearm owners were more likely than non-firearm owners to develop suicide plans involving firearms (Betz et al., 2011).

Table 3
Firearm ownership, storage practices, and openness to means safety for firearm owners by primary affiliation (primary firearm owners vs other primary affiliation).

	Primary Affiliation		
	Firearm Owner	Other	
	Mean (SD) /% Yes	Mean (SD) /%Yes	
Firearm Ownership and Storage Practices			
Total Firearms Owned	14.59 (24.28)	6.68 (14.50)	$F = 15.08$; $p < .001$; $_p\eta^2 = .04$
Firearms Stored Away from Home	0.8%	5.3%	$X^2 = 4.92$; $p = .027$; $\varphi = -.12$
Firearms Stored in Gun Safe	44.3%	49.6%	$X^2 = 0.97$; $p = .326$; $\varphi = -.05$
Firearms Stored Using Locking Device	16.8%	26.2%	$X^2 = 4.29$; $p = .038$; $\varphi = -.11$
Firearms Stored Unloaded	29.0%	49.6%	$X^2 = 14.79$; $p < .001$; $\varphi = -.20$
Firearms Stored Separate from Ammunition	19.1%	32.0%	$X^2 = 7.10$; $p = .008$; $\varphi = -.14$
Means Safety to Prevent Own Suicide			
Store Away from Home	1.05 (1.24)	2.02 (1.58)	$F = 37.27$; $p < .001$; $_p\eta^2 = .09$
Store in a Gun Safe	1.58 (1.61)	2.69 (1.45)	$F = 46.48$; $p < .001$; $_p\eta^2 = .11$
Use Locking Device (e.g. trigger or cable lock	0.88 (1.35)	2.29 (1.68)	$F = 67.64$; $p < .001$; $_p\eta^2 = .15$
Store Unloaded	1.08 (1.48)	2.40 (1.71)	$F = 54.91$; $p < .001$; $_p\eta^2 = .13$
Store Separate from Ammunition	0.95 (1.42)	2.28 (1.71)	$F = 57.24$; $p < .001$; $_p\eta^2 = .13$
Means Safety to Prevent Suicide by Others			
Store Away from Home	1.63 (1.46)	2.96 (1.35)	$F = 78.81$; $p < .001$; $_p\eta^2 = .17$
Store in a Gun Safe	2.68 (1.45)	3.35 (1.07)	$F = 25.70$; $p < .001$; $_p\eta^2 = .07$
Use Locking Device (e.g. trigger or cable lock)	1.53 (1.57)	2.90 (1.49)	$F = 69.43$; $p < .001$; $_p\eta^2 = .16$
Store Unloaded	1.58 (1.63)	2.86 (1.55)	$F = 55.95$; $p < .001$; $_p\eta^2 = .13$
Store Separate from Ammunition	1.46 (1.59)	2.74 (1.61)	$F = 53.69$; $p < .001$; $_p\eta^2 = .13$
Firearm and Suicide Beliefs			
Firearm Ownership Associated with Suicide	0.55 (0.78)	1.07 (1.08)	$F = 23.87$; $p < .001$; $_p\eta^2 = .06$
Firearm Storage Associated with Suicide	0.60 (0.94)	1.13 (1.18)	$F = 19.21$; $p < .001$; $_p\eta^2 = .05$
Means Substitution	3.18 (0.97)	2.68 (1.18)	$F = 17.26$; $p < .001$; $_p\eta^2 = .04$

Perhaps then, primary and non-primary firearm owners do not differ in terms of suicide planning, but both groups may be more likely than non-firearm owners to develop plans involving firearms.

It should be noted that, in each of our analyses, we considered between group differences without including covariates in the model. In this sense, it is impossible for us to rule out third variables that might otherwise explain some or even all of our effects. For instance, given the sex differences between those who did and did not identify as primary firearm owners, it may be that our effects simply reflect differences between males and females. Alternatively, perhaps individuals who identify as primary firearm owners are also more likely to identify with honor cultures and perhaps that affiliation better explains our findings. Personality factors such as stoicism and psychopathy offer additional alternative explanations, as the low expression and/or experience of affect may influence decision making, firearm storage behavior, and worldviews. Future studies seeking to replicate and expand upon this preliminary work should thus ensure that their models include potential confounds in order to enhance confidence in the specificity of the proposed model and to better test whether primary firearm ownership represents a novel and incrementally useful variable or simply a repackaging of existing variables already considered within psychological science.

An additional vital consideration in the design and interpretation of this study is our decision to develop a forced choice identity variable at all. In doing so, a cogent argument could be made that we are over simplifying the experiences and identities of the individuals taking part in our research and, furthermore, that we may be creating a category that lacks precision or perpetuates inaccuracies. Indeed, arguments along these lines have been made with respect to the assessment and conceptualization of race within psychological research (e.g. Helms et al., 2005) and it is important that we not make the same mistakes made within other areas of psychological science. Another reasonable and related concern is that, in creating a dichotomous forced choice, we overlooked the importance of strength of identity and, in doing so, created a situation in which an individual with a limited identity as a firearm owner who nonetheless looked at our list of possibilities and selected this option rather than "none of the above" was equated with an individual who strongly identifies as a primary firearm owner. Research within transgender samples, for instance, has demonstrated that strength of identity within a specific group is an important consideration and is vital in any effort to truly understand the experiences of diverse groups of individuals (e.g. Barr et al., 2016). We do not disagree with any of these contentions and acknowledge that our design leaves us open to such concerns. Nonetheless, in our effort to recruit a broad array of underrepresented individuals and parse apart the manner in which they identify with different aspects of their lives, we believe this assessment approach provided us the best opportunity to explore what we believe to be a heretofore ignored issue within the heterogeneous population of US firearm owners. Future work examining large samples of firearm owners should consider assessing the strength of identification across a range of groups, providing a more exhaustive list of options and utilizing feedback from firearm owners in the development of a list of potential identities. In the meantime, we believe these findings nonetheless highlight that, in addition to the risk inherent in simply having a firearm present, the degree to which an individual views the firearm as central to his or her identity is a vital consideration that may impact the way they interact with the firearm and their receptiveness to suicide prevention initiatives. In order to optimize the reach and effectiveness of suicide prevention tools, we need to ensure that the tools fit the needs of and resonate with the populations most in need of the particular service. In this sense, our findings highlight that there are components of the firearm owning community who may need to be considered more than they have been thus far.

Although the findings in this study represent a valuable first step in understanding how and why firearm owners differ in terms of demographics, as well as beliefs and behaviors related to firearms, there are several limitations that warrant discussion. As mentioned previously, there are a number of design characteristics that may have influenced

group identification and, therefore, the outcomes in this study. Importantly, the list of groups from which participants were able to choose was limited to the demographic and occupational identities of interest in a larger study. Therefore, it was not exhaustive nor necessarily representative of all US firearm owners. Furthermore, recruitment for this study was targeted, meaning that individuals were recruited using language specific to particular groups and in online locations that were specific to particular groups (e.g., posting the study link and requesting perspectives of firearm owners in a Reddit forum for firearm owners). As a result, participants may have perceived that they were expected to primarily identify with the demographic or occupational characteristic that the recruitment appeared to target. In this way, our sample of primary and non-primary firearm owners may include individuals who primarily identify with some other demographic or occupational characteristic, but who chose to identify in a certain way based on recruitment method. Relatedly, the concept of "primary firearm ownership" is relatively novel and, as such, there is less empirical and theoretical support to aid in study design, hypotheses, and interpretation. For this reason, it is essential that further research examines this variable to refine our understanding of primary firearm ownership and how it may or may not relate to suicide. Selection bias is another important consideration. Individuals who opt in to a voluntary research study may differ meaningfully from other firearm owners and, as such, may severely limit the generalizability of our findings to the broader firearm owning community. Many of our recruitment efforts focused on online communities that emphasize firearm ownership and the individuals who populate such sites and select in to a research study may be more inclined to express views and to endorse extreme views than are individuals less inclined to join such online communities or to opt into a voluntary survey. Another design limitation is the authors' use of self-created items to assess a number of outcome variables. The lack of psychometric data to support the validity and reliability of these items is problematic; however, examination of these variables is in its nascent stages and no validated measures currently exist to assess these constructs. These items were chosen because they have been used in several previous studies by the research team and have been refined over time to more accurately assess the outcomes of interest. Finally, in an effort to conduct a comprehensive examination and maximize the value of these contributions to a new area of investigation, we conducted a large number of analyses and did not use a statistical correction. This approach increases risk of Type 1 error, so it is important that readers use caution when interpreting the results. The largely uniformly significant results appear to support meaningful differences between primary and non-primary firearm owners. However, future studies should use more conservative statistical approaches to refine our understanding of differences between firearm owners.

These limitations notwithstanding, the results of this study shed light on the variability that exists among firearm owners. Although often regarded as a homogenous group, firearm owners represent diverse backgrounds, demographics, belief systems, and behaviors. This study highlighted primary firearm owner identity as a key factor that may help us understand differences in views and behaviors related to firearms. Based on results, firearm owners who view firearm ownership as a defining aspect of their identity may hold beliefs and engage in behaviors that put them at increased risk for suicide, such as storing firearms less safely (e.g., Brent, 2001; Khazem et al., 2016; Daruwala et al., 2018). The possible influence of age, lack of salience of suicide, and cultural orientation on such views and behaviors represent challenges to suicide prevention efforts. However, they also illustrate the importance of cultural awareness and competence in generating interventions with firearm owners. As highlighted by Kahan and Braman's (2003) cultural theory of risk, the values and practices that define an individual's identity inform what they view as factual. Similarly, the theory underlying motivational interviewing suggests that proposing change that does not originate from an individual's internal motivations will result in increased resistance to that change (Miller, 1983). Indeed, both theories are consistent with data indicating that the quality of an individual's intuitive judgment of the likelihood of a specific outcome (e.g. firearm suicide) and thus the importance of making relevant behavioral adjustments (e.g. utilizing safe firearm storage practices) depends heavily on that individual's opportunity to learn the actual probabilities of specific outcomes (e.g. firearm suicide in a home with readily accessible firearms). The value of these opportunities are enhanced when they occur in high validity environments with low uncertainty, which complicates the process with respect to firearm suicide, where the complexity and fluidity of risk naturally increase uncertainty dramatically and thus limit opportunities for ecologically valid learning (Kahneman and Klein, 2009). Given the perspectives of both theories and the supportive data, the use of empirical data regarding risk of firearm suicide to promote changes in beliefs and behaviors among primary firearm owners would likely be ineffective. Future suicide prevention efforts focused on this particularly at-risk group of firearm owners would benefit from engaging in culturally competent discourse on the topic of firearms, firearm storage, and suicide, and should incorporate the voices of individuals who represent the culture itself. Some researchers have already had success by partnering with firearm owners to prevent suicide (e.g., Vriniotis et al., 2015), but further efforts and evaluation of the efficacy of these interventions are necessary to promote large-scale change.

Author note

The lead author (MA) receives personal income from a book on the topic of means safety. He also receives consulting and speaking fees related to means safety and is the PI on a clinical trial examining the efficacy of means safety.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychires.2019.06.017.

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