

## Desirability of Personalized Guns Among Current Gun Owners



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**Introduction:** Personalized guns are touted as a technology that could substantially reduce fire-arm-related deaths. However, limited research has examined the desirability of personalized guns among current gun owners or the factors influencing the likelihood of purchase if personalized guns were available.

**Methods:** A nationally representative online survey of U.S. gun owners was conducted in 2016 to examine their knowledge and perceived likelihood of purchasing a personalized gun and concerns regarding the technology and cost. Analyses were conducted in 2018. Descriptive statistics were generated, and logistic regression models were used to determine which characteristics were associated with respondents who reported being likely to purchase a personalized gun.

**Results:** Among current gun owners, 48% had heard of personalized guns, and 79% thought licensed dealers should sell both traditional and personalized guns. Only 5% reported that they were very likely, and 13% were somewhat likely, to purchase a personalized gun with radio frequency identification technology that added \$300 to the price. A total of 70% reported concerns about whether the technology would work when needed, and 56% reported concerns about price. Respondents who reported safe storage practices for all their guns had a 50% higher likelihood of being a likely purchaser (AOR=1.50, 95% CI=1.05, 2.14). Respondents whose storage practices were influenced by a gun safety training course had a 52% higher likelihood of being a likely purchaser (AOR=1.52, 95% CI=1.06, 2.19).

**Conclusions:** Current gun owners expressed modest interest in purchasing personalized guns with radio frequency identification technology. Because gun owners interested in personalized guns appear more safety conscious, the potential benefit of personalized guns in these homes may be limited.

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### INTRODUCTION

Current estimates suggest that approximately one third of U.S. adults own guns, and these individuals are owning an increasing number of guns.<sup>1</sup> Household-level gun ownership has long been associated with increased risk of injury and death<sup>2–5</sup>; personalized guns have been discussed as a design option to reduce the risk of gun-related injuries. Personalized guns are guns that will function for an authorized user alone. There are several technologies that could be used to personalize a gun. However, much of the current focus is on radio frequency identification (RFID)

technology with at least one personalized gun ready for market.<sup>6</sup> RFID is used to connect a gun to a specific bracelet, watch, ring, or other small wearable device.<sup>7</sup> A user must wear the accompanying device to use the gun. Biometric scanners that identify an authorized user's fingerprint are another potential technology, similar to the fingerprint readers on smartphones.

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Personalized guns have long been touted as a technology that will reduce firearm-related deaths by rendering guns inoperable for unauthorized users.<sup>8–11</sup> In particular, the potential benefits of this technology are often described in the context of shootings occurring as a result of children and adolescents gaining unauthorized access to a firearm. Suicide is the second leading cause of firearm death among those aged 10–19 years; in 2016, suicide accounted for nearly 40% of deaths by firearms in this age group.<sup>12</sup> More than 100 children and adolescents aged 19 years and younger died of an unintentional shooting in 2017.<sup>13</sup> Curious children or distraught adolescents who find firearms stored in an unsecured manner would be unable to injure themselves or others if those guns were personalized. A preventable death analysis has estimated that as many as 37% of firearm deaths could be prevented if a firearm was personalized.<sup>9</sup> In addition, personalized guns could not be used against police if they were disarmed during a struggle, and stolen guns could be rendered inoperable, which has the potential to reduce homicide.

Although prior research has indicated that most Americans favor gun designs that render guns inoperable for children, this research was conducted more than 15 years ago.<sup>14</sup> A recent survey found that 60% of non-gun owners who were planning to purchase a gun in the next year were “willing to consider” buying a personalized gun.<sup>15</sup> However, that survey did not address the respondents’ willingness to pay for a gun with personalized technology relative to a traditional gun.

Despite decades of conversation about the potential benefits of personalized guns, the market for personalized guns among current gun owners is unclear. This study seeks to answer this question by estimating the desirability of personalized guns among a nationally representative sample of current gun owners, exploring concerns regarding price and functionality, and adding to the understanding of what factors might influence gun owners’ decisions to purchase a personalized gun.

## METHODS

### Study Sample

To inform the development of a national survey of gun owners’ attitudes, focus groups were conducted with gun owners in Texas. Four focus groups with a total of 21 adult gun owners were conducted in early 2015. Participants were recruited via convenience sampling at a Texas gun show and through a social network of gun owners. To be included in the focus groups, individuals had to be adults who lived in Texas and were current gun owners. The focus group discussion guide included several open-ended questions with relevant probes and subquestions, such as whether they had heard about personalized guns, how gun owners they know are talking about them, and whether gun owners would want to

buy them or not. Additional details on the development of the survey and data collection are published elsewhere.<sup>16</sup> A web-based national survey was fielded using the survey research firm GfK Knowledge Networks (GfK) between March 15 and April 13, 2016. To ensure that only current gun owners completed the survey, every respondent was asked at the start of the survey whether they personally owned guns. The completion rate for the survey, the proportion of individuals who were randomly selected for the survey and who completed it, was 67%, and the final sample size was 1,444 people. This research was approved by the Johns Hopkins Bloomberg School of Public Health IRB.

### Measures

The survey examined respondents’ knowledge and attitudes about personalized guns. First, respondents were asked whether they were familiar with personalized guns. If they responded *no*, they were presented the following paragraph describing personalized guns: *One of the ways that guns can be made to fire only for its authorized user is through radio frequency identification (RFID) where the user wears a bracelet, watch, or ring that activates a gun to fire when the gun is within reach of those activating devices. Guns with this technology are often called personalized or child-proof guns.* Second, all respondents were then asked to select which types of guns licensed dealers should offer for sale: *personalized only, traditional only, or both.*

Third, gun owners’ likelihood of purchasing a personalized gun was measured by asking how likely they would be to purchase a personalized gun if the RFID safety feature added \$300 to the price: *If a personalized or childproof pistol with radio frequency identification (RFID) safety technology was available for purchase and the safety feature added \$300 to the price of the gun without the personalized feature, how likely would it be that you would purchase the gun with the safety feature?* Respondents were presented with a 5-point Likert scale from *extremely likely* to *very unlikely*. If respondents did not report being likely to purchase a personalized gun, the same question was asked with the additional price lowered to \$200 and the same response options.

Finally, respondents were asked to rate their level of concern about the technology working when needed and the price of personalized guns on a 5-point Likert scale from *very concerned* to *very unconcerned*.

### Statistical Analysis

All results were analyzed using weights constructed by GfK that adjust the sample for known selection deviations and survey non-response to generate a nationally representative sample. Descriptive statistics were generated to describe knowledge and desirability of personalized guns among current U.S. gun owners. Logistic regression was used to estimate which factors increased the odds of reporting being a likely purchaser of a personalized gun with RFID technology. Regression models included covariates available in the profile of respondents: sex, any child in the home, number of guns owned, whether the respondent only owned handguns, income, education, age, marital status, race/ethnicity, having served as active duty military, region of the U.S., and living in a metropolitan statistical area. Models also included responses to survey items related to firearm storage, factors that influenced storage behaviors,<sup>16</sup> and concerns regarding the price and reliability of personalized guns.

All analyses were conducted using the *svy* command in Stata SE, version 14.2.

## RESULTS

**Table 1** presents the results of the descriptive statistics of gun owners' perspectives on personalized guns. Forty-eight percent of current gun owners had heard of personalized guns, and 79% thought that licensed gun dealers should sell both traditional and personalized guns. When asked how likely they were to purchase a personalized gun with RFID technology that added \$300 to the price, 5% reported being extremely likely and 14% were somewhat likely. When the added price was dropped to \$200, an additional 3.5% were either extremely likely (0.5%) or somewhat likely (3%) to purchase a personalized gun with RFID technology (results not shown). Among all gun owners, 70% were very or somewhat concerned that the technology would work when needed, and 56% were very or somewhat concerned about the price.

**Table 2** presents the results of the bivariate and multivariable regression models on characteristics associated

with reporting being a likely purchaser of a personalized gun with RFID technology. After controlling for socio-demographic characteristics, engaging in safe storage practices for all guns (AOR=1.50, 95% CI=1.05, 2.14) and reporting that storage practices were influenced by a gun safety course (AOR=1.52, 95% CI=1.06, 2.91) both increased the likelihood of being a likely purchaser of a personalized gun with RFID technology that added \$300 to the price. Additional analyses that expanded the outcome variable to include those who reported being a likely purchaser if the personalized technology added \$200 to the price of the gun produced similar findings on correlates of interest in purchasing (results not shown).

## DISCUSSION

In this national survey of attitudes among current gun owners, there was high support for federally licensed firearms dealers having personalized guns available for sale, but most gun owners surveyed

**Table 1.** Attitudes on Personalized Guns Among a National Sample of Gun Owners, 2016 (n=1,444)

Response	n (%) <sup>a</sup>
Have you heard of personalized or "childproof" guns?	
Yes	693 (48)
No	737 (51)
What types of guns should dealers have for sale?	
Personalized only	101 (7)
Traditional only	159 (11)
Both traditional and personalized	1,141 (79)
If available, how likely are you to purchase a personalized gun with RFID technology that added \$300 to the price?	
Extremely likely	72 (5)
Somewhat likely	202 (14)
Neither likely or unlikely	347 (24)
Somewhat unlikely	245 (17)
Very unlikely	549 (38)
How concerned are you that the personalized gun technology will work when the gun is needed?	
Very concerned	505 (35)
Somewhat concerned	505 (35)
Neither concerned or unconcerned	260 (18)
Somewhat unconcerned	72 (5)
Very unconcerned	58 (4)
How concerned are you about the price of personalized guns?	
Very concerned	347 (24)
Somewhat concerned	462 (32)
Neither concerned or unconcerned	260 (29)
Somewhat unconcerned	72 (6)
Very unconcerned	58 (7)

<sup>a</sup>For questions that do not sum to 100, the remaining percent were "refused to answer."  
RFID, radio frequency identification.

**Table 2.** Factors Associated With the Likelihood of Current Gun Owners Purchasing a Personalized Gun

Characteristic	Bivariable analysis, OR (95% CI)	Multivariable analysis, AOR (95% CI)
Engages in safe storage practices for all guns	<b>1.84***</b> (1.31, 2.57)	<b>1.50*</b> (1.05, 2.14)
Storage practices influenced by gun safety course	<b>1.43*</b> (1.03, 1.99)	<b>1.52*</b> (1.06, 2.91)
Storage practices influenced by family discussions	<b>1.49*</b> (1.06, 2.09)	1.36 (0.92, 2.01)
Storage practices influenced by concerns about home defense	0.72 (0.52, 1.01)	0.78 (0.54, 1.12)
Concerned whether technology will work when needed	0.83 (0.58, 1.19)	0.79 (0.52, 1.22)
Concerned about price of technology	0.91 (0.65, 1.26)	0.93 (0.63, 1.35)
Any child in the home (under age 18 years)	<b>1.57*</b> (1.11, 2.22)	0.88 (0.50, 1.54)
Female	<b>1.74**</b> (1.24, 2.44)	1.43 (0.96, 2.14)
Living in metropolitan statistical area	<b>1.69*</b> (1.09, 2.61)	1.37 (0.85, 2.21)
Living in building with two or more apartments	<b>1.73*</b> (1.02, 2.93)	1.40 (0.77, 2.52)
Household size	<b>1.18**</b> (1.06, 1.31)	1.40 (0.95, 1.35)
Served as active duty military	0.76 (0.50, 1.18)	0.95 (0.57, 1.57)
Own handgun(s) only	<b>1.70**</b> (1.19, 2.44)	1.19 (0.72, 1.97)
Number of guns owned (ref=1 gun)		
2–4 guns	0.75 (0.51, 1.10)	0.94 (0.58, 1.53)
5 or more guns	<b>0.47**</b> (0.30, 0.73)	0.69 (0.39, 1.21)
Age category, years (ref=18–29)		
30–44	1.34 (0.79, 2.29)	1.55 (0.85, 2.82)
45–59	0.70 (0.41, 1.19)	0.84 (0.44, 1.62)
≥60	<b>0.54*</b> (0.31, 0.93)	0.78 (0.39, 1.56)
Education category (ref=less than high school)		
High school	0.82 (0.40, 1.67)	1.14 (0.51, 2.54)
Some college	1.20 (0.60, 2.40)	1.55 (0.71, 3.37)
Bachelor's degree or higher	1.20 (0.60, 2.41)	1.41 (0.63, 3.16)
Marital status (ref=married)		
Widowed	0.66 (0.30, 1.58)	0.80 (0.29, 2.26)
Divorced	0.96 (0.53, 1.68)	1.06 (0.57, 2.03)
Separated	1.67 (0.37, 7.61)	1.79 (0.46, 6.90)
Never married	1.11 (0.68, 1.82)	0.99 (0.52, 1.88)
Living with partner	0.76 (0.32, 1.83)	0.58 (0.24, 1.42)
Income category (ref=<\$50,000)		
\$50,000–\$99,999	0.95 (0.64, 1.43)	0.75 (0.47, 1.20)
≥\$100,000	1.02 (0.67, 1.55)	0.89 (0.53, 1.49)
Race/ethnicity (ref=non-Hispanic white)		
Non-Hispanic black	<b>1.97*</b> (1.05, 3.70)	1.78 (0.87, 3.64)
Hispanic	<b>2.38**</b> (1.45, 3.92)	<b>1.96*</b> (1.11, 3.46)
Non-Hispanic other	<b>3.25**</b> (1.38, 7.64)	<b>2.59*</b> (1.08, 6.21)
Two or more races	0.97 (0.37, 2.51)	0.71 (0.25, 2.01)
Region (ref=New England)		
Mid-Atlantic	1.25 (0.39, 4.04)	1.43 (0.45, 4.57)
East–North Central	0.80 (0.25, 2.53)	0.99 (0.31, 3.13)
West–North Central	0.29 (0.07, 1.31)	0.33 (0.07, 1.56)
South Atlantic	1.32 (0.43, 4.08)	1.45 (0.47, 4.50)
East–South Central	2.07 (0.63, 6.85)	2.92 (0.88, 9.71)
West–South Central	1.67 (0.55, 5.03)	1.57 (0.52, 4.75)
Mountain	1.03 (0.30, 3.52)	1.14 (0.34, 3.84)
Pacific	2.42 (0.78, 7.54)	2.05 (0.66, 6.36)

Note: Boldface indicates statistical significance (\* $p$ <0.05, \*\* $p$ <0.01, \*\*\* $p$ <0.001).

reported that they were unlikely to purchase one for themselves. Only 5% reported being extremely likely and 14% somewhat likely to purchase a personalized gun with RFID technology that added \$300 to the price. A large majority of gun owners (70%) were concerned about personalized guns working when they were needed, and 56% expressed concerns over the added cost for the technology. Models of personalized guns with RFID technology that are available to be sold on the market have an additional cost of personalization (including the wearable device) that will be closer to \$800–\$1,000. This higher cost may further drive down desirability. Given an increasing number of people who own guns for protection,<sup>1</sup> current and prospective gun owners may prefer traditional firearms that may be perceived to be more reliable and are also less costly.

The level of interest in personalized guns with RFID technology reported by current gun owners is modest. Given the durability of well-maintained firearms, low interest could affect the ability for personalized guns to permeate the market and deliver substantial safety benefits, particularly if they are introduced as a market option rather than a standard for all guns. Furthermore, respondents who already engage in safe storage behaviors for all their guns were significantly more likely to report being a likely purchaser of a personalized gun. Because safe storage practices limit unauthorized or unsupervised access to guns, the potential benefit of personalized guns in these homes may be limited.

Age, education, and income were not significantly correlated with the likelihood of purchasing a personalized gun with RFID technology in the multivariable model. This runs counter to the idea that younger individuals, or those with higher levels of education or income, may be more comfortable with personalized gun technology than others. In addition, though it was significant in the bivariable model, female respondents were no more likely than males to report being a likely purchaser of a personalized gun after controlling for other factors.

Of concern is the potential that individuals who never would have purchased a gun otherwise would do so if a personalized gun was available. In an interview with Forbes, Brian Weinberg, the cofounder of Safety First Arms, said the company created their personalized SMART 2 pistol to target people who do not currently own guns but might consider doing so if they felt safe.<sup>17</sup> This raises the question of whether individuals who would not have purchased a gun otherwise might do so if a personalized gun was available on the market. This is an important dimension of the personalized gun discussion that warrants further research.

## Limitations

This study has some limitations. Although the gun owners included in the focus groups were identified through attendance at gun shows and social networks and therefore may not be representative of the full spectrum of attitudes and beliefs of gun owners in the U.S., this survey did include a nationally representative sample of gun owners. Respondents were asked only about personalized guns with RFID technology. It is possible that other forms of personalization could be more acceptable among gun owners, such as fingerprint readers akin to those used on mobile phones. However, given the concern among gun owners about whether the technology will work when needed, alternative methods of personalization may be unlikely to make these guns more desirable. Even though the different modules of the survey were presented in a random order, the questions within each module were presented in the same order, which could bias the responses. In addition, questions were asked using the phrase “How concerned are you. . .,” which could have biased the responses toward a negative perception. The survey only asked about two price points for cost of the added technology; these price points are substantially lower than the current expected cost. However, this is likely to lead to the sample overestimating the desirability of personalized guns among current gun owners. In addition, the survey did not ask about a period during which the purchase would be made, so it is unclear what time frame respondents had in mind when answering the question. A description of personalized guns was only provided to respondents who were unfamiliar with the technology, so it is possible that not all respondents were thinking of the same technology. However, the questions specifically asked about increased cost for personalization by RFID technology. Although the survey asked about interest in purchasing a gun with RFID technology, it is important to note that this study was not a complete market analysis, which might yield different results. Respondents were not asked about their likelihood of purchasing a traditional firearm to use as a comparison to their interest in purchasing one with RFID technology. Future research should include gauging gun owner interest in purchasing traditional firearms as a comparison. Finally, sampling bias is a concern when conducting online surveys. However, GfK attempts to minimize this issue using probability-based sampling of households to create its panel, and respondents were not informed of the survey topic in the invitation to participate to reduce the likelihood that participation was influenced by views about guns or interest among respondents.

## CONCLUSIONS

The potential benefits from the introduction of personalized guns into the market are dependent upon their uptake by current and prospective gun purchasers. There is limited desirability for these guns among current gun owners, driven by concerns over the technology and cost. When personalized guns do become available, economies of scale are likely to drive down some of the costs associated with personalization provided the concerns regarding the technology can be overcome.

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