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# MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„The complex causes of gun ownership in the U.S.-  
focus on trust“

verfasst von / submitted by

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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of  
Master of Science (MSc)

Wien, 2017 / Vienna 2017

Studienkennzahl lt. Studienblatt /  
degree programme code as it appears on  
the student record sheet:

A 066 840

Studienrichtung lt. Studienblatt /  
degree programme as it appears on  
the student record sheet:

Masterstudium Psychologie

Betreut von / Supervisor:

Univ.-Prof. Dr. Erich Kirchler

### **Vorwort**

Diese Masterarbeit basiert auf den Ergebnissen einer Umfrage, die 2016 in den USA durchgeführt wurde. Die Arbeit entstand unter Mitbetreuung durch Frau Linda Dezsö und in Kooperation zwischen mir (Daniel Schmidt) und zwei weiteren Master-Studierenden (Stephan Vanek und Kristina Rabe). Nach gemeinsamer Entwicklung des Fragebogens und gemeinsamer Datenerhebung wurden die Daten teilweise gemeinsam analysiert. Die Arbeiten unterscheiden sich in ihren Fragestellungen und sind damit auf unterschiedlichen theoretischen Überlegungen aufgebaut. In Stephan Vaneks Arbeit wurden Zusammenhänge von Angst und Waffenbesitz erarbeitet. Kistina Rabe schrieb über soziale Effekte in Zusammenhang mit Waffenbesitz und meine Arbeit untersucht Vertrauen als Prädiktor für Waffenbesitz. Die Masterarbeiten weisen teilweise idente oder sehr ähnliche Textpassagen auf, beispielsweise bei Methodenbeschreibung, Datentabellen, Literaturangaben und Appendix.

### **Abstract**

Why do people arm themselves and how do they differ from citizens without a gun at home? In this study (N=620) we further investigate these differences in the U.S. population with a particular focus on trust. Based on previous research we improve on measuring gun ownership and control for variables that are associated to affect gun ownership. This study uses binary logistic regression analyses to compare non-gun owners with varying gun ownership levels. Results indicate that the likelihood of owning a gun significantly increases with lower levels of trust. However, effects differ between various trust measurements. Findings suggest that mutual trust corresponding to strangers show strong negative effects not only in predicting households with guns but also on individuals that own a gun for defensive purposes.

*Keywords:* gun ownership, gun control, trust, trustworthiness, mutual trust

As stated in the Gun Violence Archive (2016), 53000 is the total number of gun-related incidents in the United States of America in the year 2015 alone. It includes deaths and injuries of intentional and accidental gun use but excludes 22000 annual gun-related suicides. This high number might not come as a surprise as the U.S.A. are known as one of the most heavily armed countries in the world with around half of the population reporting to have a gun in their household (Gallup, 2014). The number of U.S. citizens that have died by gunfire is higher than all casualties in all the conflicts and wars in the country's history since 1968 (Jacobson, 2013). Beyond these numbers, an increase in gun purchases is associated with an increased gun mortality rate, especially the number of suicides (Wintemute, Parham, Beaumont, Wright, & Drake, 1999). One may pose the question that if gun ownership is so clearly associated with gun-related deaths, why do U.S. citizens arm themselves? However, this paper only deals with gun-related homicides but not suicides.

According to Rosenfeld, Baumer, and Messner (2007), high homicide rates are associated to lower level of social trust in the focal population, which then results in an increased likelihood of people arming themselves. Other common reasons for acquiring firearms reach from protecting one's property or family, hunting or sport to job-related reasons. Also, as documented by Glaeser and Glendon (1998), gun ownership negatively correlates with trust in the Supreme Court. This can be interpreted as a form of political mistrust. Other studies have shown that mutual distrust (Hemenway, 2001) or fear of victimization (Kleck, Kovandzic, Saber, & Hauser, 2011) seem to predict gun ownership or the purchase of one reliably. Capitalizing on reported findings by Cao, Cullen, and Link (1997) as well as Hauser and Kleck (2012), we expect a positive association between the amount of fear and the likelihood of people owning guns for protective and defensive reasons.

This study aims to give an overview of important factors that are associated to predict if U.S. citizens arm themselves or not. To better investigate the reasons behind the acquisition of a firearm and differences between gun owners and non-gun owners we collected our data with an online survey aimed at U.S. citizens. Our findings show the importance of further increasing the precision in measuring gun ownership and present changes in these improvements. With a particular focus on trust, our results show besides other significant predictors that not all forms of trust measurements are equally strong suited as a predictor for our gun ownership measures.

### **Reviewing relevant literature**

From a broader perspective, reasons why U.S. citizens arm themselves could lie in the U.S. Constitution (U.S. Const. amend. II) as patriotism. The second amendment states the necessity of a regulated militia to maintain the security of a free state. Therefore the right of the people to keep and bear arms shall not be infringed. Hence, people arm themselves because it is their right to do so. Or, it becomes a social norm to arm yourself (Glaeser & Glendon, 1998) if there is a tradition of private retribution or low trust in the public justice system and hence, individuals are better off having a gun on their own to defend themselves. This view is supported by Kleck and Kovandzic's (2009) reporting that on city-level Characteristics surrounding gun ownership, higher homicide rates lead to an increase in gun ownership and places with more police per square mile should lower gun prevalence.

The fundamental interest of this exploratory study reported in this paper is to investigate the relationship between trust and gun ownership. Following findings of Glaeser, Laibson, Scheinkman, and Soutter (2000), we included two questions that were aimed to elicit actual trusting behavior in the past. Such questions have high correlations to incentive compatible trust-game outcomes (Glaeser, Laibson, Scheinkman, & Soutter, 2000), which can be considered one of the better trust measurement methods today. Behaviorally oriented literature differentiates between trust and trustworthiness. Different to trust as the intention to accept vulnerability to a trustee based on positive expectations of his or her actions, trustworthiness is a trustee's ability, benevolence, or integrity (Colquitt, Scott & LePine, 2007). Or, trust in a standard trust game is measured by the actual amount of money the trustor gives to a trustee. By contrast, trustworthiness represents the amount the trustee returns to the trustor. In other words, the invested money is a proxy of the trustor's trust, and the returned amount is a proxy of the trustee's trustworthiness.

Mutual trust depends on an individual's propensity or willingness to trust others as well as the trustworthiness that others have in trustors' eyes. Therefore, it is important to differentiate trustees' reference groups. As mentioned above family, friends, government, police or neighbors represent different trustee groups and account for varying levels of trustworthiness in the eyes of a trustor. We use behavioral trust questions following previous research of Glaeser et al. (2000) that have family and friends as reference groups. We argue that mutual trust questions are revolving around the trustworthiness of a trustor's neighborhood, like fear of victimization (Kleck et al., 2011), have higher predictive power in gun ownership. Specifically, we anticipate that how trustworthy one estimates strangers is associated with the likelihood of gun ownership. Therefore someone's decision to purchase a

gun should happen out of reasons like crime in their neighborhood or distrust in citizens surrounding the respondent, not in trusting behavior among family members.

While there seems to be a clear connection between forms of trust and gun ownership, studies often are limited by their accuracy in which they measure ownership of a firearm (Glaeser & Glendon, 1998; Kleck & Kovandzic, 2009). Specifically, Rosenfeld, Baumer, & Messner (2007) or Hemenway, Kennedy, Kawachi, & Putnam (2001) use proxies such as homicide or suicide rates to estimate the prevalence of owned guns. The majority of these studies, however, did either not measure ownership at an individual level or failed distinguishing among possible gun acquisition reasons (i.e., hunting, sports, self-defense, job, etc.). Therefore, they lack accuracy in measurement. Measuring the number of guns in the household is not accurate enough to conclude any association between trust and gun ownership because there is no differentiation between respondents that personally own a gun and respondents that just reported to have a gun in the household. Therefore, effects on trusting behavior and attitudes of gun owners get blurred if those groups stay indistinguishable from each other. Moreover, it may be important to differentiate between motivations behind acquiring a gun when investigating the association between trust and gun acquisition.

It is essential to gain a better understanding of factors contributing to firearm purchases and ownership to create counter and policy interventions against the alarming number of gun deaths in the U.S. However, there is a scarcity of empirical research on this topic. One contributing factor to this seems to be the freezing of federal funding for gun violence research. The best example (Jamieson, 2013) would be the Centers for Disease Control and Prevention (henceforth, CDC) federal budget cut of \$2.6 million in 1996 after the publication of an article by Kellerman and colleagues (1993). This amount represents the sum of money that the CDC invested in firearm injury research in the previous year. As a result, there has been little research published on gun-violence and pro-gun control arguments in the past two decades in the U.S.

We measure the prevalence of gun ownership and how it is associated to trust on a convenience sample of U.S.-citizens recruited from Amazon's Mechanical Turk (MTurk). Based on previous literature (Hemenway et al., 2001; Kleck & Kovandzic, 2009; Kovandzic, Kleck, & Gertz, 1998) we anticipate a negative association between various trust measures and gun ownership. That is, a decrease in trust measures are associated with increased likelihood of personal gun ownership. In this survey, we also specifically ask respondents whether there are guns in their household and if they own them. Also, we inquire the reasons

behind the ownership. Furthermore, given gun control attitude, which describes favoring or opposing gun control measures, is strongly positive correlated to gun ownership, cultural traits and social groups (Pederson, Hall, Foster & Coates, 2015; Kleck, 1996), we asked one question about respondents' attitude towards gun control. This way we can test whether effects differ between the attitude towards gun control and having a gun. View on gun control could have an influence on respondents' purchase decisions.

As can be seen, there is a vast amount of factors that influence the likelihood of citizens arming themselves. First, we want to present a better method of measuring gun ownership and show its importance especially in comparisons with variables like trust. These improvements are split into separate models that all have the same control variables and main predictors, so changes in effect strength can be easily observed. And second, we present which kind of trust measurement is best suited to predict gun ownership and why.

## **Method**

### **Participants**

We enrolled 776 responses with two surveys and excluded 156 (20%) due to attrition, not completing the survey or because they deviated over one standard deviations under the mean completion time (which was 5.2 minutes with 2.4 standard deviation). The cleaned sample consists of 620 respondents which demographics can be seen in Table 1. Included are 302 (49%) female and 318 (51%) male participants. Age is ranging from 18 to 78 years with a mean of 38 (12).

**Table 1**

Sample descriptives

Variables	Description	n	%	Mean	SD
<b>Demographics</b>					
<b>AGE</b>	Age in years			37.7	11.97
<b>GENDER</b>	Respondent's gender				
Male		318	51.3		
Female		202	48.7		
<b>RACE</b>	Race (5-categories)				
African American		36	5.8		
Asian		38	6.1		
Caucasian		511	82.4		
Hispanic		25	4.0		
Other		10	1.6		
<b>EMPLOYMENT</b>	Employment status (6-categories)				
Unemployed		59	9.5		
Employed part-time		84	13.5		
Employed full-time		342	55.2		
Self-employed		73	11.8		
Retired		27	4.4		
Other		35	5.6		
<b>EDUCATION</b>	Education level (5-categories)				
Some high school or no high school		4	0.6		
High school graduate		75	12.1		
Trade school/ some college/ associate degree		219	35.3		
Advanced degree		314	50.6		
Other		8	1.3		
<b>PLACE</b>	Living place (6-categories)				
City		311	50.2		
Town		163	26.3		
Small town		116	18.7		
Village		11	1.8		
Farm		9	1.5		
Other		10	1.6		
<b>INCOME</b>	Yearly income before taxes (4-categories)				
Under \$30000		219	35.3		
Between \$30001 and \$55000		208	33.5		
Between \$55001 and \$95000		145	23.4		
Over \$95001		48	7.7		

The sample consists of mainly Caucasians (511, 82.4%) and full time employed participants (55.2%). The education level is rather high with 314 (50.6%) of participants having an advanced degree. 50.2% of Participants reported living in an urban area. These big groups in education level, race, and living place may be influential to our results and should be considered.

## Materials and Procedure

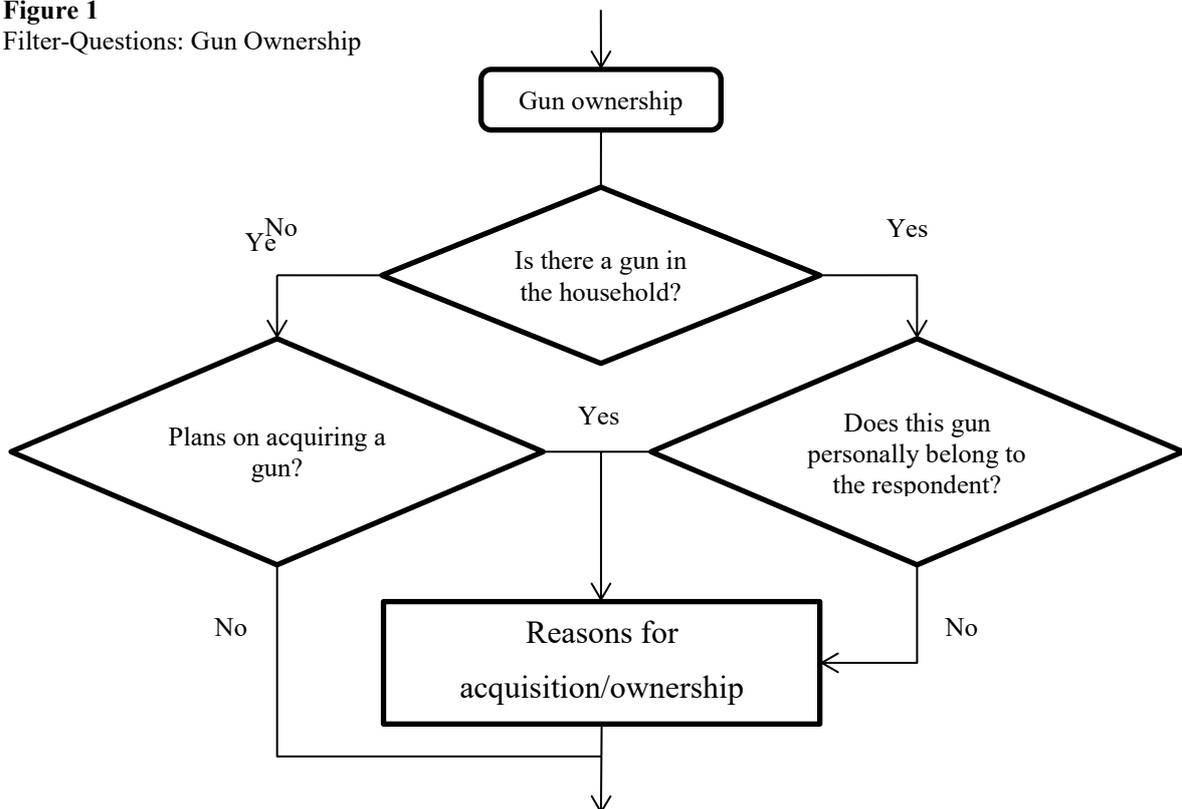
The survey (see Appendix for used questions and their corresponding answer format) was launched on Amazon's Mechanical Turk services ([www.MTurk.com](http://www.MTurk.com)). MTurk is an online service that allowed us to collect data fast and inexpensively. Through a compensation system, surveys conduct data from a potential participant base of over 100,000 workers (i.e., survey respondents) (Pontin, 2007). Even though compensation fees are relatively low compared to conventional recruitment methods, MTurk sample is highly diversified, reliable

and well represents the U.S. population (for more details on MTurk sample see for instance, Buhrmester, Kwang, & Gosling, 2011).

The online survey started off with an information page that included participant requirements, payment/compensation information and contact data for questions. To be able to participate respondents had to be 18 years of age or older and to participate voluntarily in our survey as well as agree to have read and understood the information.

After the consent/ information page, we asked simple demographic questions including age, gender, race, living place, income, education, and employment status as Table 1 summarizes. These demographics are important and could show effects and differences between gun and non-gun owners.

**Figure 1**  
Filter-Questions: Gun Ownership



**Gun ownership and gun control.** As can be seen in Figure 1, following questions revolved around the gun ownership level of participants and their plans to purchase one as well as their reasons for owning a firearm. These are filter questions that depend on participants' answers to the previous gun-related questions.

First, participants were asked if they have any guns in or near their home (abbreviated as GUN\_House in Table 2). We followed Kleck et al. (2011) and used their question “Do you or any members of your household 18 years or older currently have any legally-owned firearms in your home, car, garage, basement, or elsewhere around your home? Do not include air-guns, toys, models, or starter pistols.” (more information about the exact questions and answer format can be seen in the Appendix)

If the first question was answered with “Yes” a second question aimed to differentiate between respondents that personally own a gun and respondents that have a gun in their home, but it does not personally belong to them (variable GUN\_PersOwn in Table 2). If on the other hand the first question was answered with “No” respondents were asked if they intend to purchase one in the next 12 months. Due to a very low number of respondents that plan to purchase a gun, we excluded these people from our sample.

The last gun related question asked about the reasons behind the ownership to differentiate between hunters, sport shooters and respondents that own their guns for defensive purposes. We asked this question only to people that reported to have a gun in their home and people that personally own a gun (Figure 1 and abbreviated as GUN\_DefReas in Table 2).

To further investigate the attitude towards gun control we asked one question about their general stance on gun control and if they are somewhat/absolutely opposed or in favor of gun control (under GUN\_Control in Table 2).

We excluded 28 respondents that preferred not to answer the first filter-question, as for those it can be assumed they do not want to answer this question because of privacy reasons. Therefore we cannot allocate them to non-gun owners, hence coded them as missing. Respondents that do not know if there is a gun in the household were considered as identical to respondents that answered with “No,” thus they were coded as 0 like everyone that reported to have no gun in the household. To clarify in the sample size of 620 participants, these 28 participants were already excluded.

**Table 2**  
Sample descriptives

Variables	Description	n	%	Mean	SD
<b>Abbreviation of survey items</b>					
<b>GUN_House</b>	Has a gun in the household	198	31.9		
<b>GUN_PersOwn</b>	Owns a gun personally	129	20.8		
<b>GUN_DefReas</b>	Personally owns a gun for defensive purposes	111	17.9		
<b>GUN_Control</b>	Stance on gun control				
Anti_GunCtrl	Is opposing gun control	197	31.8		
Neutral	Has a neutral stance	27	4.4		
Pro_GunCtrl	Is in favor of gun control	396	63.9		
<b>POLIT_PREF</b>	Political preference (4-categories)				
Democrat		265	42.7		
Republican		129	20.8		
Independent		181	29.2		
No identification		45	7.3		
<b>INCIDENTS</b>	Estimation on gun related incidents rates in 2015 (4-categories)				
Less than 100		16	2.6		
More than 100 less than a 1000		138	22.8		
More than a 1000 less than 10000		312	50.3		
Over 10000		154	24.8		
<b>VICTIMIZATION</b>	Has been a victim of the following kind				
Burglary		73	11.8		
Robbery		46	7.4		
Bullying		72	11.6		
Light physical violence		64	10.3		
Serious physical violence		19	3.1		
Domestic Violence		40	6.5		
Other violence		14	2.3		
No victim		404	65.2		
<b>SELFISH</b>	Respondent split money selfishly	205	33.1		
<b>PATRIOT</b>	Patriotism level (4-point scale)			2.8	0.95
<b>FEAR1</b>	Has no functioning community in his/her neighborhood (4-point scale)			2.01	0.62
<b>FEAR2</b>	Perception of his/her safety when going out in the dark (4-point scale)			1.79	0.76
<b>FEAR3</b>	Perception of the likelihood to be victimized (0-100 scale)			14.01	18.2
<b>M_TRUST1</b>	Trusts strangers (4-point scale)			1.91	0.63
<b>M_TRUST2</b>	Does not think others try to take advantage of him/her (4-point scale)			2.63	0.65
<b>B_TRUST1</b>	Lends belongings to friends/family (4-point scale)			2.49	0.74
<b>B_TRUST2</b>	Borrows belongings from friends/family (4-point scale)			2.17	0.74
<b>M_TRUST3</b>	Believes in strangers to return lost belongings (0-100 scale)			42.68	23.43

**Trust.** We asked five questions about participants trust levels. We adopted two General Social Survey (GSS) mutual trust items by asking respondents: “When dealing with strangers, one is better off using caution before trusting them.” and “In general, people are trying to take advantage of others whenever they have a chance.” Higher values represent little trust or great distrust. Responses were recorded on a four-level Likert-scale ranging from “strongly disagree” to “strongly agree.” Values were converted for higher values representing a high level in trust, abbreviated as M\_TRUST1&2 in Table 2, respectively.

By focusing on actual episodes of trusting behavior in the past we adopted one item from Glaeser et al. (2000) “How often do you lend your personal belongings and money to your friends or family?” with the addition of a second item “How often do you borrow personal belongings and/or money from your friends or family?” A 4-point ordinal scale from “never” to “regularly” (Behavioral trust as variables B\_TRUST1&2 in Table 2).

Additionally, the fifth item measured respondents' beliefs about the trustworthiness of an imaginary person in a vignette. Respondents were prompted to imagine the following scenario: "Imagine that a random person finds a purse with 500 USD and an unofficial personal ID (e.g., college ID, business card, but not a passport, not a driver's license, social security card) of the purse's potential owner. The finder is just a visitor in the city where she/he found the purse and not planning on returning, and does not know anyone in there. In your best estimate, what is the likelihood that this person returns the purse, e.g., handing it over to a police officer?" A percent slider measured responses from 0-100%. Higher values are proxies for a higher level of believed trustworthiness (abbreviated as M\_TRUST3 in Table 2). It was important for us to create a very specific scenario to limit variance in participants' perception.

**Patriotism and political preference.** We asked respondents one simple question to self-evaluate if they feel patriotic or not (abbreviated as PATRIOT in Table 2). "Some people talk about patriotism as "love for one's country." How patriotic do you feel towards the USA?" with the four options as an ordinal scale: "Not at all patriotic," "A little patriotic," "Fairly patriotic," and "Very patriotic." As mentioned above living by constitutional rights, therefore defending it by having guns just because it is one's right to do so could have an effect on our gun ownership measurements. Therefore patriotism should serve as a proxy.

To see if political preferences show different effects we asked participants "Which political party do you identify with?" with four different options to choose from: "Democrat," "Republican," "Independent," and "No identification."

**Victimization and Incidents.** To measure, if people have different information about the actual number on gun-related incidents in the U.S. and if their estimates have any effect, we asked: "Please provide your best guess on how many people died from firearm incidents (both intentional and unintentional) in the U.S. in 2015? Please DO NOT look up this information on the internet or anywhere else. We are solely interested in your OWN estimate and perceptions." On a 4-point scale, respondents had to choose from: "Less than 100," "More than 100 less than 1000," "More than 1000 less than 10000," and "Over 10000."

Victimization in the past is argued to have an effect on people arming themselves. As to measure if there is an effect of individuals have been a victim of crime or violence we asked to check any victimization they have been a victim of in the past (under VICTIMIZATION in Table 2).

**Fear.** To measure participants overall level of fear, two statements “There is a well-functioning community in my neighborhood” and “It is dangerous to go out after dark in my neighborhood” had to be agreed or disagreed on a 4-point scale from “strongly disagree” to “strongly agree” (abbreviated as FEAR1&2 in Table 2). For the third fear variable (FEAR3), participants were asked: “In your view, what is the likelihood you or anyone from your family, friends, or any other loved one will be a victim of a firearm incident (both intentional and unintentional) in the U.S. in the next 12 months, excluding terrorist attacks?” with a percent slider as answer format.

**Selfishness.** Selfishness (SELFISH in Table 2) was measured through a dictator game setting as a dichotomous variable that had a selfish and a social choice as answer format. We created two surveys that differed purely surrounding the SELFISH item and information given with it. In the dictator version of our survey, people got the information that their payment is the sum of their compensation for participating and a bonus earning depending on their choice. Participants received the same information in our receiver version with the exception that people were told their bonus is dependent on the decision of someone else and with luck, they would receive a bonus payment. Participant in the dictator setting had the chance to divide a small amount of money between them and an unknown person. The first option they could choose from would divide evenly between dictator and receiver. The second alternative was the selfish one that benefited the dictator.

## Results

Regression coefficients in Table 3 were converted into odds ratios (ORs). The odds ratio (OR) is interpreted as the effect of a predictor or control variable on the odds on our gun ownership and gun control measurements. Dummied as 0 in Model 1-3 always stands for not having a gun in the household. 1 respectively in each model refers to have at least a gun in the household. In Model 2 respondents coded as 1 own a gun personally, which means all that reported having a gun but not personally owning it got excluded. For Model 3 coded as 1 are all respondents that own a gun personally and for defensive reasons like defending their family or property. So from Model 3 everyone that had other reasons for owning a gun than defensive ones got excluded (e.g. job-related reasons, hunting, sport). Model 4 displays differences in attitude towards gun control in 0 for favoring and 1 for opposing gun control.

Odds ratios (ORs) are interpreted as the effect of a change in the predictor variable. ORs of continuous variables like age are one-unit changes in odds. Means a displayed OR of age is a change in one-year increments. Finally, dichotomous predictor variables' reference groups are always coded as 0 thus everyone that is not 1. As an example, if an individual was a victim of burglary (coded as 1) the OR displays the change in odds compared to everyone that was not a victim of burglary (coded as 0). That is the effect of having been a victim of burglary on the likelihood of having a gun in the household (e.g. in Model 1).

### **Households with guns compared to households with no guns (Model 1 in Table 3)**

In Table 3 under Model 1 effects of predictors and control variables are presented as changes in odds for having a gun in the household (displayed as Odds ratios).

Following demographics show significant effects for predicting a gun in the household of respondents. First, younger respondents are more likely to report a gun in the household. Asians primarily report to have fewer guns in their households than Caucasians. Compared with high schoolers respondents with advanced degrees are significantly less likely of reporting a gun in their household. A strong effect can be observed in respondents political preferences. Compared to independents, Democrats are much less likely to have a gun in the household. Which further interprets in an even bigger effect comparing republicans with democrats, thus Republicans OR in Model 1 (Table 3) is over 1. Even though Republicans do not differ significantly from independents (reference group of POLIT PEF in Model 1), they differ more from Democrats than independents do. Thus Republicans are much more likely of reporting having a gun in their households than Democrats. Income shows increasing positive effects. Therefore higher income raises the likelihood of people having a gun their household. Overall living in a more rural area seems to predict a higher likelihood of having a gun in the household compared with people living in urban areas. Feeling patriotic shows a significant positive effect on having a gun in the household. Victimization overall displays positive directions of odds except domestic violence though not significant. Only victims of burglary and serious physical violence show slightly significant positive effects on having a gun in the household. Two of our three fear measurements point in different directions with FEAR2 having a significant negative effect on having a gun in the household and FEAR3 a significantly positive one.

**Table 3**

Logistic Regression Analyses

Odds Ratios of Predictors on Gun Ownership Measurements and Gun Control Attitude

<i>independent variables</i>	(Ref. group)	Gun Ownership			
		Model 1	Model 2	Model 3	Model 4
		Gun in household	Personal Ownership	Defensive purpose	Against Gun Control
		Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
<b>AGE (in years)</b>		0.975 **	0.995	0.990	0.996
<b>MALE</b>		0.86	1.39	1.35	1.88 ***
<b>RACE</b>	Caucasian				
	African American	0.84	1.11	1.27	1.88
	Asian	0.25 ***	0.19 **	0.08 **	0.46
	Other	0.44	0.64	0.81	2.80
	Hispanic	0.45	0.35	0.28	1.10
<b>EMPLOYMENT</b>	Full time				
	Unemployed	0.68	0.54	0.47	0.30 ***
	Part-time	0.65	0.37 **	0.36 **	1.00
	Other	0.85	0.18 **	0.08 **	0.38 *
	Self-employed	1.10	1.01	1.16	0.54 *
	Retired	1.47	0.48	0.76	1.34
<b>EDUCATION</b>	High school				
	Some or no high school	0.00	0.00	0.00	5.14
	Other	0.66	2.35	2.37	0.15
	Trade school	0.85	1.11	1.02	0.88
	Advanced degree	0.45 **	0.61	0.54	0.37 ***
<b>POLIT PEF</b>	Independent				
	Democrat	0.52 ***	0.45 ***	0.35 ***	0.11 ***
	Republican	1.31	1.32	1.07	2.12 **
	No identification	1.27	1.18	1.16	0.58
<b>INCOME</b>	Under \$30000				
	Btw. \$30001 and \$55000	1.23	0.89	0.95	1.06
	Btw. \$55001 and \$95000	1.83 **	1.49	1.82	1.16
	Over \$95001	2.34 **	1.95	2.99 **	1.07
<b>PLACE</b>	City				
	Town	0.82	0.83	0.87	0.87
	Small Town	1.79 **	1.63	1.71	1.56
	Village	1.00	0.68	0.84	1.63
	Farm	4.53 *	7.26 **	3.86	2.40
	Other	2.09	2.09	2.25	1.98
<b>INCIDENTS</b>	Over 10000				
	Less than 100	1.10	1.74	2.21	7.46 **
	Btw. 100 and 1000	0.79	0.66	0.77	2.85 ***
	Btw. 1000 and 10000	1.05	0.98	0.93	1.22
<b>PATRIOT</b>		1.26 **	1.29 *	1.28 *	1.04
<b>VICTIMIZATION</b>					
	Burglary	2.13 *	2.22	1.58	2.86 **
	Robbery	1.34	1.62	1.60	1.42
	Bullying	1.67	1.48	1.28	1.01
	Light physical violence	1.11	1.03	1.20	2.35 *
	Serious physical violence	3.02 *	3.49 *	1.99	0.70
	Domestic violence	0.66	0.46	0.63	1.04
	Other violence	1.64	1.49	1.64	7.22 **
	No victim	1.20	0.94	0.87	1.78
<b>SELFISH</b>		0.76	0.78	0.81	1.43
<b>FEAR</b>					
	FEAR1	1.09	1.03	0.97	0.96
	FEAR2	0.74 **	0.74	0.83	0.91
	FEAR3	1.012 **	1.026 **	1.010	0.984 **
<b>TRUST (Variables of interest)</b>					
	M_TRUST1	1.22	1.24	1.09	0.80
	M_TRUST2	0.66 **	0.66 *	0.71	0.90
	B_TRUST1	0.92	0.98	1.04	1.19
	B_TRUST2	0.95	0.90	0.88	0.68 **
	M_TRUST3	0.991 *	0.990 *	0.988 **	1.002
*** p < .01	N =	620	551	533	593
** p < .05	C & S R <sup>2</sup> =	.16	.17	.17	.33
* p < .1	Nagelk. R <sup>2</sup> =	.22	.26	.27	.45
	H & L =	$\chi^2(8) = 7.5$	$\chi^2(8) = 3.8$	$\chi^2(8) = 7.1$	$\chi^2(8) = 8.5$

**Trust (Model 1).** Two of our mutual trust items show significant negative effects in the hypothesized direction. Respondents that think, in general people try to take advantage of others, are significantly more likely to have a gun in their households than respondents that disagreed with this statement (M\_TRUST2). Participants that believed in strangers to return found belongings thus having higher mutual trust, show a significant negative effect, and therefore are more unlikely to have a gun in the household. Behavioral trust items (B\_TRUST1&2), as well as M\_TRUST1, show no significant effects.

### **Changes in measuring gun ownership (Model 1 to Model 3 in Table 3)**

People reporting to have a gun in the household (Model 1), people that personally own a gun (Model 2) and people that own a gun solely for defensive purposes are displayed side by side in Table 3 with the exact same predictor and control variables to see improvements of explained variance per model. Even though sample sizes get smaller starting with Model 1 (n = 620), to Model 2 (n = 551) and Model 3 with 533 respondents, the explained variance increases (Model 3 compared with Model 1) which indicate an increase in model fit.

Age for people that personally own a gun (Model 2) no longer shows significant effects compared with people that reported to have a gun in the household (Model 1). Being part time employed compared with full-time employed respondents otherwise now show a significant negative effect on the likelihood of people owning a gun personally. Thus part-time employees are less likely to own a gun personally and for defensive reasons (Model 3) compared with full-time employees. Other than in Model 1 respondents with advanced degrees show no significant effects on the likelihood of owning a gun personally nor for defensive reasons. Political preference overall seems a strong predictor as well in Model 2 and 3 with Democrats having a much lower likelihood of owning a gun. Respectively, respondents that reported to identify with Republicans show a higher likelihood of personally owning a gun as well as owning a gun for defensive reasons compared to Democrats. In Model 2 income has no significant effect compared to Model 1 but Model 3 high-income respondents show a significant positive effect on owning a gun for defensive purposes again. Compared to Model 1 people that personally own a gun seem to have a significantly higher likelihood of having fear as in FEAR3 but show no effect in FEAR2 compared to Model 1. In Model 3 there are no effects in fear. Thus the likelihood of people owning guns for defensive purposes is not significantly changed by their fear levels.

**Trust (Model 1-3).** Model 1 to 3 show mutual trust item M\_TRUST2 barely still having a significant negative effect in Model 2 and no effect in Model 3, M\_TRUST3 is the only trust item that as hypothesized increases in effect strength from Model 1 to 3 and showing a significant effect in Model 3. Therefore respondents that have higher mutual trust (as in M\_TRUST3) are significant less likely to have a gun in their household (Model 1), owning a gun personally (Model 2) and owning a gun personally for defensive purposes with increased strength in effect in Model 3 compared with Model 1&2.

### **Attitude towards gun control (Model 4 in Table 3)**

Our data explains nearly double the variance in Model 4 compared with our gun ownership measurements (Models 1-3). Overall demographics and control variables show to predict better if a respondent is opposing or favoring gun control than people owning a gun or having one in their household. The following variables show significant effects on respondents' attitude towards gun control.

Despite having no effect in other models, gender shows a strong significant effect in Model 4. Being a man strongly affects the likelihood of respondents being against gun control. Men are significantly more likely of opposing gun control than women. Compared to full-time employees results indicate that unemployed respondents are significant more likely of being in favor of gun control. Similar effects can be observed in our education level items. Respondents with advanced degrees are significant more likely of being in favor of gun control than high schoolers. For people that estimated the annual gun-related incidents in the U.S., results indicate strong effects for those that heavily underestimated the real number. Underestimating gun related incidents results in a significant increase in the likelihood of being against gun control. In line with the previous models, political preferences is a strong predictor in Model 4 as well. Compared with independents, Democrats are less likely to oppose gun control whereas Republicans are more likely to oppose gun control. Having been a burglary victim also strongly increases the likelihood of opposing gun control.

The only trust variable that significantly predicts being against gun control is one of our behavioral trust questions (B\_TRUST2) that showed no significant effects in the previous models (Model 1-3). Those who showed higher trust levels in B\_TRUST2 were more likely of being in favor of gun control.

### Discussion

In our study, we aimed to further investigate reasons why U.S. citizens arm themselves from a more unbiased independent, objective view. As a primary variable of interest based on the previous literature, we argued trust to be a major predictor for people arming themselves. To improve on previous studies with a similar focus on trust as a predicting factor for gun ownership we further increased the accuracy of how ownership of a firearm is measured and hypothesized an increase in effect strength within trust measurements. We expected trust to have negative effects on the likelihood of people arming themselves or having guns in their home.

As for our hypothesized increase in model strength by improving on measuring gun ownership more accurately, we see clear increases in Table 3 over Model 1 to 3 in explained variance, besides lower numbers in sample size. We argued that it is important especially when dealing with trust or fear measures to exclude people that are not influenced by these factors. So in our first measurement improvement (Model 2) we excluded all people that reported to have at least one gun in the household but not owning it personally. Thus only considering respondents that actively made a decision to purchase or acquire a gun and excluding everyone where we cannot be sure what reasons were behind the acquisition. These excluded respondents are not the actual owner of the gun. The second improvement aimed to sort out any participants that are gun owners but not for defensive purposes. We argued that effects of trust are getting blurred by people having their gun for job-related reasons or solely for hunting, thus not for defensive reasons which can be argued to be better predicted by trust variables. Which does not mean it is not possible for trust to predict a gun in the household for people that do not own a firearm themselves. M\_TRUST2, for example, seems to be especially affecting those passively gun owners, for it getting non-significant with gun ownership improvements in Model 2&3 but being strongly significant in Model 1. That could mean these people getting influenced by the presence of a gun or the gun owner, thus having lower mutual trust in people surrounding their home as a justification of a gun in the household.

For our second assumption for trust negatively influencing the likelihood of a gun in the household, significant results indicate overall a union tendency in argued direction. That is trust overall reduces the likelihood of having a gun in the household, owning one or owning one for defensive reasons. But only M\_TRUST3 increased in strength and significance through Model 1 to 3. We argue this might be due to the nature of how this item was measured and what kind of trust it elicits. Our trust variables were intended to be relatively

different in nature. So that we had, for example, two behavior trust questions (B\_TRUST1&2) where B\_TRUST1 is an indication of someone's benevolence or trust which correlates strongly with a trust game measurement (Glaeser et al., 2000). This question was aimed to ask for trusting behavior in the past and if the respondent trusts family and friends by lending belongings to them. However, as a pure trust measurement, it might be better suited for different phenomenon than gun ownership, because of the reference group in this question and the negligence of trustworthiness. We argue that trust measurements surrounding family members and friends like in B\_TRUST1&2 have little impact on people arming themselves compared with questions that have other reference groups and also account for trustworthiness. As an example, our significant M\_TRUST3 item firstly revolves around mutual trust and had as reference group strangers, not family and friends. Mutual trust questions combine benevolence as well as an evaluation how trustworthy a stranger might be. So in studying gun ownership, we argue that besides trust, trustworthiness is crucial for predicting gun acquisition. Mutual trust as a predictor for gun ownership like results suggest might be a better-suited trust measurement than trusting benevolence or behavioral trust question with family and friends as reference groups.

So why are M\_TRUST1&2 in our as best argued Model 3 not significant and M\_TRUST1 not being significant at all? M\_TRUST2 and 1 are items we adapted from the General Social Survey and are claimed to measure mutual trust. Results of the second mutual trust item show substantial effects in Model 1 which get barely significant in Model 2 and not significant in Model 3. Overall effects are in argued direction with significant results in the first two models. It might be a too vague statement description in M\_TRUST2 were people had different associations with words like "in general" or "advantage," but that does not explain the strong effect in Model 1. Maybe people that got excluded in Model 2 and 3 are especially not trusting strangers. For M\_TRUST1 odds ratios are not representing the effects of M\_TRUST2&3. Results showed wrong trends with odds ratios above 1, even though not significant but indicating that this item was not well suited. Respondents had to agree or disagree on the following statement "When dealing with strangers, one is better off using caution before trusting them." Due to the very neutral wording in this item, we argue that even trusting people might have answered with agreeing to be more cautious with strangers. In other words, high or low trust leveled individuals might see this statement not as a negative thus agreeing with the statement and caution overall and objectively is something positive to have.

**Limitations**

There are of course limitations some of which should be mentioned below to further improve follow-up studies with similar topics. First, we want to discuss the nature of how our study was conducted and the research design. As an incentive driven online study, we mentioned above that we had to exclude respondents that rushed to the end to maximize profit with time spent. This is a general problem of online based studies where the concentration level might suffer more or less under such circumstances, therefore, these surveys shouldn't take too long nor be exhausting. To ensure stronger reliability, as well as validity more elaborated trust scales with higher item count, can improve on these shortcomings. As a survey, our results also present important control variables that should be accounted for and a general direction how to measure gun ownership with trust comparisons and which trust measurements are better suited for such research.

To account for a causal error effect, we also measured if people have plans on purchasing a gun but not yet having one. Thus we cannot be sure if owning a gun result in effects we argued as predictors or if these predictors result because of owning a gun. Arguably this effect might be more present in for example fear measurements than trust, for that an acquired gun reduces fear. Therefore effects of fear might not show in a sample with people that already own guns. Our group size for non-gun owners that planned to purchase one was too small to further investigate if this effect occurred.

As can be seen in our results different trust measurements show varying strength in effect. To further investigate the predictive power of trust on gun ownership we suggest implementing questions revolving around other reference groups than neighborhood, family or friends. Governmental trust or trust in the police capabilities might as well predict if people feel the need to protect themselves therefore acquiring firearms.

### **Conclusion**

This study aims to provide an overview of important factors that contribute to a citizen's decision on arming himself/herself. We present and argue a more precise measurement of gun ownership. Especially in research with trust, it is important to reduce interferences in gun ownership measurements. As shown, excluding respondents that are not argued to be influenced by trust for their gun acquisition results show more explained variance in models and increasing effects for example in mutual trust.

Evidence support findings of previous research for trust being an important predictor of gun ownership. Not every trust item though is equally well suited for predicting gun ownership or acquisition. Our findings suggest that mutual trust items in particular show higher predictive power on gun owners than other methods of trust measurements.

If the overall goal is to further reduce the alarming number of gun-related deaths in the U.S., it is essential to have a better understanding about contributing factors that lead to citizens arming themselves and investigate on measurement improvements to create counter-interventions and policies.

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## Appendix

### Survey Items

Item	Question
<i>Demographics:</i>	
Age	The year when you were born
Gender	Your gender (1 = Female, 2 = Male)
Race	Your race (1 = African American, 2 = Asian, 3 = Caucasian, 4 = Hispanic, 5 = Other, please specify)
Income	Your yearly income before taxes (1 = Under \$30000, 2 = Between \$30001 and \$55000, 3 = Between \$55001 and \$95000, 4 = Over \$95001)
Employment status	Your employment status (1 = Unemployed, 2 = Employed part-time, 3 = Employed full-time, 4 = Self-employed, 5 = Retired, 6 = Other, please specify)
Education	Your highest level of education (1 = Some high school or no high school, 2 = High school graduate, 3 = Trade school/some college/associate degree, 4 = Advanced degree, 5 = Other, please specify)
Place	Your living place (1 = City, 2 = Town, 3 = Small town, 4 = Village, 5 = Farm, 6 = Other, please specify)
<i>Patriotism and political preference:</i>	
Political preference	Which political party do you identify with? (1 = Democrat, 2 = Republican, 3 = Independent, 4 = No identification)
Patriotism	Some people talk about patriotism as “love for one’s country”. How patriotic do you feel towards the USA? (1 = Not at all patriotic, 2 = A little patriotic, 3 = Fairly patriotic, 5 = Very patriotic)

*Victimization and incidents:*

Gun incidents Please provide your best guess how many people died from firearm incidents (both intentional and unintentional) in the US in 2015? Please DO NOT look up this information on the internet or anywhere else. We are solely interested in your OWN estimate and perceptions.

(1 = Less than 100, 2 = More than 100 less than a 1000, 3 = More than a 1000 less than 10000, 4 = Over 10000)

Victimization In the past ten years, have you been victim of any kind of crime or violence? Please select all crimes or violence you have been the victim of.

(1 = Burglary, 2 = Robbery, 3 = Bullying, 4 = Light physical violence, 5 = Serious physical violence, 6 = Domestic violence, 7 = Other, please specify)

*Fear:*

Fear 1 There is a well-functioning community in my neighborhood.  
(1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)

Fear 2 It is dangerous to out after dark I my neighborhood.  
(1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)

Fear 3 In your view, what is the likelihood that you or anyone from your family, friends, or any other loved one will be a victim of a firearm incident (both intentional and unintentional) in the US in the next 12 months, excluding terrorist attacks?  
Click on the slider to set the percentage.

*Social preference:*

Social preference (dictator condition) You are paired with another person and are given \$0.60 to divide between you and this other person. The person you are paired with also makes his/her choice. However, his/her choice is only hypothetical. That is, your and the other person's payments from this situation only depend on YOUR choice. At the end of the study you will be paid according to

	<p>your choice (this will be your bonus payment). Please choose one of the options below.</p> <p>(1 = You get \$0.5 and the other person gets \$0.1, 2 = You get \$0.3 and the other person gets \$0.3)</p>
Social preference (receiver condition)	<p>You are now paired with another person and you are given \$0.60 to divide between you and this other person. The person you are paired with also makes his/her choice. However, your choice is only hypothetical, while your partner's choice is real. This means, that your and your partner's payoff from this decision only depends on your partner's choice. At the end of the study you will be paid according to your partner's choice. Please choose one of the options below.</p> <p>(1 = You get \$0.5 and the other person gets \$0.1, 2 = You get \$0.3 and the other person gets \$0.3)</p>
<i>Gun ownership and attitude towards gun control:</i>	
Gun household	<p>Do you or any members of your household 18 years of age or older currently have any legally-owned firearms in your home, car, garage, basement, or elsewhere around your home? Do not include air-guns, toys, models, or starter pistols.</p> <p>(1 = Yes, 2 = No, 3 = I do not know, 4 = I prefer not to answer this question)</p>
Personal gun ownership	<p>Do any of the guns belong to you personally?</p> <p>(1 = Yes, 2 = No, 3 = I prefer not to answer this question, 4 = Other, please specify)</p>
Reasons of ownership	<p>Please select the reasons why you and/or somebody from your household own(s) a gun. You can select multiple answers.</p> <p>(1 = Self-defense (including defending my family and loved ones), 2 = To defend property and belongings, 3 = Hunting, 4 = Sport, 5 = To protect my community, 6 = Because this is the norm where I/family live/s, 7 = The fact that I/my family</p>

- own/s gun(s) keeps criminals from attacking me/my family, 8 = Job, 9 = Other, please specify)
- Plan on purchasing a gun Are you planning to legally purchase or to legally acquire a firearm anytime in the next 12 months?  
(1 = Yes, 2 = No, 3 = I do not know, 4 = I prefer not to answer this question)
- Gun control attitude There has been some debate about gun control in the US. What is your stance on gun control?  
(1 = I am absolutely in favor of gun control, 2 = I am somewhat in favor of gun control, 3 = I have a neutral stance , 4 = I am somewhat opposed to gun control, 5 = I am absolutely opposed to gun control)
- Trust:*
- Mutual trust 1 When dealing with strangers, one is better off using caution before trusting them.  
(1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)
- Mutual trust 2 In general, people are trying to take advantage of others whenever they have a chance.  
(1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)
- Mutual trust 3 Imagine that a random person finds a purse with 500 USD and an unofficial personal ID (e.g., college ID, business card, but not a passport, not a driver's license, social security card) of the purse's potential owner. The finder is just a visitor in the city where she/he found the purse and not planning on returning, and does not know anyone in there. In your best estimate what is the likelihood that this person returns the purse, e.g., handing it over to a police officer? Click on the slider to set the percentage.
- Behavioral trust 1 How often do you lend your personal belongings and/or money to your friends or family?  
(1 = never, 2 = rarely, 3 = sometimes, 4 = regularly)

Behavioral trust 2

How often do you borrow personal belongings and/or money from your friends or family?

(1 = never, 2 = rarely, 3 = sometimes, 4 = regularly)

## **Zusammenfassung**

In den USA sind Debatten um strengere Waffengesetze nach wie vor aktuell. Positiv verbunden mit einer hohen Anzahl in Umlauf sich befindender Waffen sind jährliche Unfälle/Vorfälle verursacht durch Waffengewalt. Einen wesentlichen Beitrag zu gesetzlichen Regulierungen und Gegenmaßnahmen liefern empirische Forschungsergebnisse. Gründe sowie Ursachen die mit Waffenbesitz und Anschaffung in Verbindung stehen, sind dementsprechend wichtig zu untersuchen. Dem entnommen verwundern Kürzungen in Forschungsgeldern die in dieses Feld innerhalb der U.S. investiert wurden. Finanziell unabhängig ist es unser Ziel einen Überblick der Gründe und Ursachen für Waffenbesitz zu liefern, mit speziellem Fokus auf Vertrauen. Darauf hinaus präsentieren und argumentieren wir eine präzisere Messmethode zur Erfassung von WaffenbesitzerInnen und vergleichen Unterschiede der Methoden die bisher in der Forschung zum Einsatz kamen. Dies ist besonders wichtig, steht die Analyse von Angst oder Vertrauen im Fokus.

In der vorliegenden Arbeit untersuchen wir, auf bisheriger Forschung aufbauend, die Unterschiede zwischen WaffenbesitzerInnen und Personen ohne Waffe in deren Haushalt. Mit speziellem Fokus auf Vertrauen und der Messung von Waffenbesitz befragten wir 620 Personen innerhalb der Vereinigten Staaten mittels eines online Fragebogens. Von Literatur und Forschungsergebnissen ausgehend hypothetisierten wir einen signifikant negativen Zusammenhang von Vertrauen und Waffenbesitz.

Resultate binärer logistischer Regressionen zeigen neben signifikanten demografischen Prädiktoren auch Effekte in unseren Vertrauensvariablen. Allgemein sind leicht signifikant negative Effekte, wie sie hypothetisiert wurden, zu erkennen. In dem von uns argumentierten besten Modell zeigt nur noch eine Vertrauensvariable einen signifikanten Effekt, jedoch wurde dieser Effekt parallel zur Verbesserung der Messgenauigkeit größer und stark signifikant. Heißt, neben vielen Kontrollvariablen zeigt Vertrauen in unseren Modellen auch noch einen signifikanten Einfluss auf die Wahrscheinlichkeit des Waffenbesitzes. Personen mit geringerem Vertrauen in deren Umfeld sind mit einer höheren Wahrscheinlichkeit WaffenbesitzerInnen.

### **Eidesstattliche Erklärung**

Ich erkläre hiermit an Eides Statt, dass ich die vorliegende Arbeit selbständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde bisher in gleicher oder ähnlicher Form keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

Wien, am 22.5.2017

(Daniel Schmidt)