

# Gun ownership and social gun culture

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## SUPPLEMENTARY APPENDIX

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## **Supplementary Appendix I: Information regarding YouGov.**

YouGov is a non-partisan international research firm that uses Internet polling to acquire its data. It focuses on politics, public affairs, products, brands, other topics of general interest, or client requests. The company was established in 2000 and is headquartered in the United Kingdom, YouGov is a member of the British Polling Council and is registered with the UK Information Commissioner's Office. Their aim is to provide a broad and accurate portrait of what the world really believes. They can create specific surveys for analysis, and the data can be used by news media, public affairs groups, institutions, political campaigns, companies, and marketing agencies.

A typical YouGov survey is only about 20 to 30 questions in total, and the longest surveys do not take more than 20 minutes to complete. Their methodology solicits responses from an invited group of Internet users, and those responses are weighed according to demographic information from the population of interest. These samples are drawn from a pool of three million people worldwide. Several of their proprietary data products includes: BrandIndex, (daily brand perception tracker) YouGov Omnibus, (a way to obtain answers from both national and selected samples) Pulse, (tracks actual online consumer behavior across laptops, smartphones and tablets) and YouGov Profiles (tool for media planning, segmentation and forecasting). YouGov also publishes a number of syndicated reports, such as the annual Global Survey of Wealth & Affluence, which provides market intelligence on a range of industry sectors. YouGov has a track record as one of the UK's most accurate pollster. In many YouGov polls where data could be compared to actual outcomes, they are typically within a few percentage points. Domestically, during the 2012 US Presidential Election, on the basis of one of the most extensive opinion polls ever conducted, YouGov predicted that Barack Obama would win the national vote by 2%. This prediction was one of the most accurate out of all pollsters covering the election, as they were within 1% of the actual result. Additionally, YouGov accurately predicted the volume of Apple iPhone sales in January 2013.

## Supplementary Appendix II: Survey Instrument and codebook.

### Variable List

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Name	Description
----	-----
caseid	Case ID
weight	Case weight
DPS041	State
DPS042	Age
DPS042_years	Age in years
DPS043	Ethnicity
DPS044_1	Race - White
DPS044_2	Race - Black or African-American
DPS044_3	Race - Asian or Asian-American
DPS044_4	Race - Native Hawaiian or Other Pacific Islander
DPS044_5	Race - American Indian or Alaska Native
DPS044_6	Race - Other
DPS044_9	Race - Refused
DPS045	Sex
DPS046	Marital
DPS047_1	Child_Grps - I have no children
DPS047_2	Child_Grps - 0-2 years
DPS047_3	Child_Grps - 3-5 years
DPS047_4	Child_Grps - 6-10 years
DPS047_5	Child_Grps - 11-13 years
DPS047_6	Child_Grps - 14-18 years
DPS047_7	Child_Grps - 19 years or older
DPS047_8	Child_Grps - Refused
DPS048	Education
DPS049	Employment
DPS050	Income
DPS051_lang	Language
Q1_1	Gun ownership status - Owner, gifted
Q1_2	Gun ownership status - Owner, bought before 2000
Q1_3	Gun ownership status - Owner, bought after 2000
Q1_4	Gun ownership status - Owner, hunter
Q1_5	Gun ownership status - Owner, attended safety classes
Q1_6	Gun ownership status - Owner, advocate responsible ownership
Q1_7	Gun ownership status - Non-owner, might buy
Q1_8	Gun ownership status - Non-owner, will never buy
Q2_1	Family gun ownership culture - No friends own guns
Q2_2	Family gun ownership culture - No family members own guns
Q2_3	Family gun ownership culture - Some friends own guns
Q2_4	Family gun ownership culture - Some family members own gun
Q2_5	Family gun ownership culture - Social circle thinks less of non-ownership
Q2_6	Family gun ownership culture - Family thinks less of non-ownership
Q2_7	Family gun ownership culture - Social life with family involves guns
Q2_8	Family gun ownership culture - Social life with friends involves guns
Q2_9	Family gun ownership culture - None

- Q3\_1 Gun ownership attitude - Carrying gun feels safe
- Q3\_2 Gun ownership attitude - Carrying gun feels powerful
- Q3\_3 Gun ownership attitude - Belonging to organization feels safe
- Q3\_4 Gun ownership attitude - Belonging to organization feels powerful
- Q3\_5 Gun ownership attitude - Don't like being around guns / could hurt someone
- Q3\_6 Gun ownership attitude - Don't like people with guns / might kill someone
- Q3\_7 Gun ownership attitude - People feel nervous around people with guns
- Q3\_8 Gun ownership attitude - Respected people wouldn't have gun
- Q3\_9 Gun ownership attitude - Wish everyone get rid of guns
- Q3\_10 Gun ownership attitude - None
- Q4\_1 Attitude towards aggression - Must fight to show you're not a wimp
- Q4\_2 Attitude towards aggression - Must fight to get pride back
- Q4\_3 Attitude towards aggression - People will pay if I don't get what I want
- Q4\_4 Attitude towards aggression - Feel awful if didn't fight
- Q4\_5 Attitude towards aggression - Beating up person that insults makes me feel better
- Q4\_6 Attitude towards aggression - Must fight if you don't want to be a chump
- Q4\_7 Attitude towards aggression - A person who doesn't get even is a sucker
- Q4\_8 Attitude towards aggression - Social circle thinks I'm weak without gun
- Q4\_9 Attitude towards aggression - None
- Q5\_1 Reasons for owning a gun - Exciting to hold loaded gun
- Q5\_2 Reasons for owning a gun - People will look up to me
- Q5\_3 Reasons for owning a gun - Feel powerful or protected on street
- Q5\_4 Reasons for owning a gun - Feels powerful to hold loaded gun
- Q5\_5 Reasons for owning a gun - Don't owe the world anything
- Q5\_6 Reasons for owning a gun - Fun to play around with real gun
- Q5\_7 Reasons for owning a gun - Care about how actions affect others
- Q5\_8 Reasons for owning a gun - Responsibility to make world a better place
- Q5\_9 Reasons for owning a gun - None
- Q6\_1 Exposure to violence - Current neighborhood has low crime
- Q6\_2 Exposure to violence - Current neighborhood has crime, is unsafe
- Q6\_3 Exposure to violence - Have been shot at before
- Q6\_t Exposure to violence - Have been shot at before - Number of times
- Q6\_4 Exposure to violence - Someone has inflicted physical violence
- Q6\_5 Exposure to violence - Someone has inflicted threats
- Q6\_6 Exposure to violence - Witnessed violence

=====  
Verbatims  
=====

DPS051\_lang\_t Language - Other text

=====  
Variable Map and Codebook  
=====

Name: caseid  
Description: Case ID  
=====

Name: weight  
Description: Case weight

=====  
Name: DPS041  
Description: State  
Count Code Label  
-----  
63 1 Alabama  
18 2 Alaska  
120 4 Arizona  
39 5 Arkansas  
480 6 California  
67 8 Colorado  
42 9 Connecticut  
20 10 Delaware  
14 11 District of Columbia  
276 12 Florida  
130 13 Georgia  
18 15 Hawaii  
27 16 Idaho  
154 17 Illinois  
78 18 Indiana  
29 19 Iowa  
43 20 Kansas  
49 21 Kentucky  
36 22 Louisiana  
17 23 Maine  
61 24 Maryland  
59 25 Massachusetts  
101 26 Michigan  
62 27 Minnesota  
31 28 Mississippi  
66 29 Missouri  
13 30 Montana  
24 31 Nebraska  
59 32 Nevada  
13 33 New Hampshire  
108 34 New Jersey  
30 35 New Mexico  
214 36 New York  
115 37 North Carolina  
5 38 North Dakota  
159 39 Ohio  
48 40 Oklahoma  
85 41 Oregon  
157 42 Pennsylvania  
14 44 Rhode Island

60	45	South Carolina
14	46	South Dakota
56	47	Tennessee
301	48	Texas
43	49	Utah
10	50	Vermont
103	51	Virginia
130	53	Washington
28	54	West Virginia
91	55	Wisconsin
9	56	Wyoming
0	60	American Samoa
0	64	Federated States of Micronesia
0	66	Guam
0	68	Marshall Islands
0	69	Northern Mariana Islands
0	70	Palau
0	72	Puerto Rico
0	74	U.S. Minor Outlying Islands
0	78	Virgin Islands
0	81	Alberta
0	82	British Columbia
0	83	Manitoba
0	84	New Brunswick
0	85	Newfoundland
0	86	Northwest Territories
0	87	Nova Scotia
0	88	Nunavut
0	89	Ontario
0	90	Prince Edward Island
0	91	Quebec
0	92	Saskatchewan
0	93	Yukon Territory
0	99	Not in the U.S. or Canada
5	777	Don't know / Not sure
2	999	Refused
4	9998	Skipped
0	9999	Not Asked

-----  
Name: DPS042  
Description: Age  
Count Code Label

-----	-----	-----
3871	1	Age in years:
26	7	Don't know
102	9	Refused
1	98	Skipped

0 99 Not Asked

=====  
Name: DPS042\_years

Description: Age in years

Count Code Label

-----

0 998 Skipped

129 999 Not Asked

=====  
Name: DPS043

Description: Ethnicity

Count Code Label

-----

549 1 Hispanic or Latino

3310 2 Not Hispanic or Latino

139 9 Refused

2 98 Skipped

0 99 Not Asked

=====  
Name: DPS044\_1

Description: Race - White

Count Code Label

-----

3039 1 Yes

961 2 No

0 8 Skipped

0 9 Not Asked

=====  
Name: DPS044\_2

Description: Race - Black or African-American

Count Code Label

-----

516 1 Yes

3484 2 No

0 8 Skipped

0 9 Not Asked

=====  
Name: DPS044\_3

Description: Race - Asian or Asian-American

Count Code Label

-----

111 1 Yes

3889 2 No

0 8 Skipped

0 9 Not Asked

=====  
Name: DPS044\_4

Description:		Race - Native Hawaiian or Other Pacific Islander
Count Code		Label
-----	----	-----
23	1	Yes
3977	2	No
0	8	Skipped
0	9	Not Asked

=====

Name:		DPS044_5
Description:		Race - American Indian or Alaska Native
Count Code		Label
-----	----	-----
90	1	Yes
3910	2	No
0	8	Skipped
0	9	Not Asked

=====

Name:		DPS044_6
Description:		Race - Other
Count Code		Label
-----	----	-----
274	1	Yes
3726	2	No
0	8	Skipped
0	9	Not Asked

=====

Name:		DPS044_9
Description:		Race - Refused
Count Code		Label
-----	----	-----
102	1	Yes
3898	2	No
0	8	Skipped
0	9	Not Asked

=====

Name:		DPS045
Description:		Sex
Count Code		Label
-----	----	-----
1765	1	Male
2203	2	Female
30	9	Refused
2	98	Skipped
0	99	Not Asked

=====

Name:		DPS046
Description:		Marital

Count	Code	Label
1935	1	Married
425	2	Divorced
217	3	Widowed
71	4	Separated
981	5	Never Married
315	6	A member of an unmarried couple
56	9	Refused
0	98	Skipped
0	99	Not Asked

=====

Name: DPS047\_1  
Description: Child\_Grps - I have no children

Count	Code	Label
2173	1	Yes
1827	2	No
0	8	Skipped
0	9	Not Asked

=====

Name: DPS047\_2  
Description: Child\_Grps - 0-2 years

Count	Code	Label
327	1	Yes
3673	2	No
0	8	Skipped
0	9	Not Asked

=====

Name: DPS047\_3  
Description: Child\_Grps - 3-5 years

Count	Code	Label
324	1	Yes
3676	2	No
0	8	Skipped
0	9	Not Asked

=====

Name: DPS047\_4  
Description: Child\_Grps - 6-10 years

Count	Code	Label
424	1	Yes
3576	2	No
0	8	Skipped
0	9	Not Asked

```

=====
Name:          DPS047_5
Description:   Child_Grps - 11-13 years
Count Code    Label
-----  ----  -----
289  1      Yes
3711 2      No
0    8      Skipped
0    9      Not Asked
=====

```

```

=====
Name:          DPS047_6
Description:   Child_Grps - 14-18 years
Count Code    Label
-----  ----  -----
408  1      Yes
3592 2      No
0    8      Skipped
0    9      Not Asked
=====

```

```

=====
Name:          DPS047_7
Description:   Child_Grps - 19 years or older
Count Code    Label
-----  ----  -----
702  1      Yes
3298 2      No
0    8      Skipped
0    9      Not Asked
=====

```

```

=====
Name: DPS047_8
Description: Child_Grps - Refused
Count Code    Label
-----  ----  -----
106  1      Yes
3894 2      No
0    8      Skipped
0    9      Not Asked
=====

```

```

=====
Name: DPS048
Description: Educa
Count Code    Label
-----  ----  -----
15  1      Never attended school or only attended kindergarten
33  2      Grades 1 through 8 (elementary)
193 3      Grades 9 through 11 (some high school)
1321 4     Grades 12 or GED (high school graduate or GED certificate)
1212 5     College 1 year to 3 years (Some college or technical school,
779  6     College 4 years or more (College graduate)
=====

```

396	7	Postgraduate degree (MA, MBA, MD, JD, PhD, etc.)
50	9	Refused
1	98	Skipped
0	99	Not Asked

=====  
Name: DPS049

Description: Employ

Count	Code	Label
-----	----	-----
1297	1	Employed for wages, full-time
422	2	Employed for wages, part-time
263	3	Self-employed
276	4	Out of work for more than 1 year
136	5	Out of work for less than 1 year
411	6	A Homemaker
206	7	A Student
911	8	Retired
78	9	Refused
0	98	Skipped
0	99	Not Asked

=====  
Name: DPS050

Description: Income

Count	Code	Label
-----	----	-----
375	1	Less than \$10,000
264	2	\$10,000 to less than \$15,000
251	3	\$15,000 to less than \$20,000
296	4	\$20,000 to less than \$25,000
454	5	\$25,000 to less than \$35,000
536	6	\$35,000 to less than \$50,000
675	7	\$50,000 to less than \$75,000
736	8	\$75,000 or more
412	9	Refused
1	98	Skipped
0	99	Not Asked

=====  
Name: DPS051\_lang

Description: Language

Count	Code	Label
-----	----	-----
3677	1	English
72	2	Spanish
175	3	Both, Spanish and English equally
49	4	Other
24	9	Refused
3	98	Skipped

0 99 Not Asked

=====  
Name: Q1\_1

Description: Gun ownership status - Owner, gifted

Count	Code	Label
523	1	Yes
3477	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_2

Description: Gun ownership status - Owner, bought before 2000

Count	Code	Label
457	1	Yes
3543	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_3

Description: Gun ownership status - Owner, bought after 2000

Count	Code	Label
382	1	Yes
3618	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_4

Description: Gun ownership status - Owner, hunter

Count	Code	Label
178	1	Yes
3822	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_5

Description: Gun ownership status - Owner, attended safety classes

Count	Code	Label
362	1	Yes
3638	2	No
0	8	Skipped
0	9	Not Asked

Name: Q1\_6

Description: Gun ownership status - Owner, advocate responsible ownership

Count	Code	Label
606	1	Yes
3394	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_7

Description: Gun ownership status - Non-owner, might buy

Count	Code	Label
1066	1	Yes
2934	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q1\_8

Description: Gun ownership status - Non-owner, will never buy

Count	Code	Label
1812	1	Yes
2188	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_1

Description: Family gun ownership culture - No friends own guns

Count	Code	Label
567	1	Yes
3433	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_2

Description: Family gun ownership culture - No family members own guns

Count	Code	Label
479	1	Yes
3521	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_3

Description: Family gun ownership culture - Some friends own guns

Count	Code	Label
1678	1	Yes
2322	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_4

Description: Family gun ownership culture - Some family members own gun

Count	Code	Label
1840	1	Yes
2160	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_5

Description: Family gun ownership culture - Social circle thinks less of non-ownership

Count	Code	Label
95	1	Yes
3905	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_6

Description: Family gun ownership culture - Family thinks less of non-ownership

Count	Code	Label
112	1	Yes
3888	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_7

Description: Family gun ownership culture - Social life with family involves guns

Count	Code	Label
292	1	Yes
3708	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_8

Description: Family gun ownership culture - Social life with friends involves guns

Count	Code	Label
-------	------	-------

309	1	Yes
3691	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q2\_9  
Description: Family gun ownership culture - None

Count	Code	Label
683	1	Yes
3317	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_1  
Description: Gun ownership attitude - Carrying gun feels safe

Count	Code	Label
1113	1	Yes
2887	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_2  
Description: Gun ownership attitude - Carrying gun feels powerful

Count	Code	Label
694	1	Yes
3306	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_3  
Description: Gun ownership attitude - Belonging to organization feels safe

Count	Code	Label
719	1	Yes
3281	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_4  
Description: Gun ownership attitude - Belonging to organization feels powerful

Count	Code	Label
605	1	Yes
3395	2	No

0 8 Skipped  
0 9 Not Asked

=====  
Name: Q3\_5

Description: Gun ownership attitude - Don't like being around guns / could hurt someone

Count	Code	Label
991	1	Yes
3009	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_6

Description: Gun ownership attitude - Don't like people with guns / might kill someone

Count	Code	Label
453	1	Yes
3547	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_7

Description: Gun ownership attitude - People feel nervous around people with guns

Count	Code	Label
749	1	Yes
3251	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_8

Description: Gun ownership attitude - Respected people wouldn't have gun

Count	Code	Label
520	1	Yes
3480	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_9

Description: Gun ownership attitude - Wish everyone get rid of guns

Count	Code	Label
679	1	Yes
3321	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q3\_10

Description: Gun ownership attitude - None

Count	Code	Label
1116	1	Yes
2884	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_1

Description: Attitude towards aggression - Must fight to show you're not a wimp

Count	Code	Label
128	1	Yes
3872	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_2

Description: Attitude towards aggression - Must fight to get pride back

Count	Code	Label
86	1	Yes
3914	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_3

Description: Attitude towards aggression - People will pay if I don't get what I want

Count	Code	Label
160	1	Yes
3840	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_4

Description: Attitude towards aggression - Feel awful if didn't fight

Count	Code	Label
126	1	Yes
3874	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_5

Description: Attitude towards aggression - Beating up person that insults makes me feel better

Count	Code	Label
115	1	Yes
3885	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_6

Description: Attitude towards aggression - Must fight if you don't want to be a chump

Count	Code	Label
103	1	Yes
3897	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_7

Description: Attitude towards aggression - A person who doesn't get even is a sucker

Count	Code	Label
68	1	Yes
3932	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_8

Description: Attitude towards aggression - Social circle thinks I'm weak without gun

Count	Code	Label
36	1	Yes
3964	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q4\_9

Description: Attitude towards aggression - None

Count	Code	Label
3445	1	Yes
555	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_1

Description: Reasons for owning a gun - Exciting to hold loaded gun

Count	Code	Label
71	1	Yes
3929	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_2

Description: Reasons for owning a gun - People will look up to me

Count	Code	Label
34	1	Yes
3966	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_3

Description: Reasons for owning a gun - Feel powerful or protected on street

Count	Code	Label
266	1	Yes
3734	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_4

Description: Reasons for owning a gun - Feels powerful to hold loaded gun

Count	Code	Label
60	1	Yes
3940	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_5

Description: Reasons for owning a gun - Don't owe the world anything

Count	Code	Label
580	1	Yes
3420	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_6

Description: Reasons for owning a gun - Fun to play around with real gun

Count	Code	Label
-----	-----	-----

82	1	Yes
3918	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_7

Description: Reasons for owning a gun - Care about how actions affect others

Count	Code	Label
-------	------	-------

-----	-----	-----
470	1	Yes
3530	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_8

Description: Reasons for owning a gun - Responsibility to make world a better place

Count	Code	Label
-------	------	-------

-----	-----	-----
485	1	Yes
3515	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q5\_9

Description: Reasons for owning a gun - None

Count	Code	Label
-------	------	-------

-----	-----	-----
2464	1	Yes
1536	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q6\_1

Description: Exposure to violence - Current neighborhood has low crime

Count	Code	Label
-------	------	-------

-----	-----	-----
2970	1	Yes
1030	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q6\_2

Description: Exposure to violence - Current neighborhood has crime, is unsafe

Count	Code	Label
-------	------	-------

-----	-----	-----
313	1	Yes
3687	2	No

0 8 Skipped  
0 9 Not Asked

=====  
Name: Q6\_3

Description: Exposure to violence - Have been shot at before

Count	Code	Label
164	1	Yes
3836	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q6\_t

Description: Exposure to violence - Have been shot at before - Number of times

Count	Code	Label
3835	-9	Not Asked
3	-8	Skipped

=====  
Name: Q6\_4

Description: Exposure to violence - Someone has inflicted physical violence

Count	Code	Label
1011	1	Yes
2989	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q6\_5

Description: Exposure to violence - Someone has inflicted threats

Count	Code	Label
758	1	Yes
3242	2	No
0	8	Skipped
0	9	Not Asked

=====  
Name: Q6\_6

Description: Exposure to violence - Witnessed violence

Count	Code	Label
1235	1	Yes
2765	2	No
0	8	Skipped
0	9	Not Asked



# Supplementary Appendix III: Survey Methodology Report from YouGov

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## 1. Introduction

In October and November 2013, YouGov conducted a survey among individuals in United States age >18 years. YouGov conducted 4,486 interviews in English among this population. All respondents were administered questions about knowledge about and experiences with guns. The set of interviews was then matched down to a sample of 4,000 to produce the final dataset.

In this report we describe:

- How respondents were recruited into the YouGov Panel
- The process of sample matching and the creation of weights
- The response rate for the survey

## 2. Survey Panel Data

Panel members who participated in the survey were recruited by a number of methods and on a variety of topics to help ensure diversity in the panel population. In the United States, the YouGov panel — a proprietary opt-in survey panel — is comprised of 1.2 million U.S. residents who have agreed to participate in YouGov's Web surveys. At any given time, YouGov maintains a minimum of five recruitment campaigns based on salient current events.

Panel members are recruited by a number of methods to help ensure diversity in the panel population. Recruiting methods include Web advertising campaigns (public surveys), permission-based email campaigns, partner sponsored solicitations, telephone-to-Web recruitment (RDD based sampling, and mail-to-Web recruitment (voter registration based sampling).

The primary method of recruitment for the YouGov panel is Web advertising campaigns that target respondents based on their keyword searches. In practice, a search in Google may prompt an active YouGov advertisement inviting their opinion on the search topic. At the conclusion of the short survey respondents are invited to join the YouGov panel in order to directly receive and participate in additional surveys. After a double opt-in procedure, where respondents must confirm their consent again by responding to an email, the

database checks to ensure the newly recruited panelist is in fact new and that the address information provided is valid.

Additionally, YouGov occasionally augments the panel with difficult to recruit respondents by soliciting panelists in telephone and mail surveys. For instance, in the United States YouGov conducted telephone-to-Web recruitment in the fall and winter of 2010 and 2012. Respondents provided a working email where they could receive an electronic invitation and confirm their consent and interest in receiving and participating in YouGov Web surveys. At the conclusion of that survey, respondents were invited to become YouGov members and receive additional survey invitations to their email address.

By utilizing different modes of recruitment continuously over time, this ensures that hard-to-reach populations will be adequately represented in survey samples. Participants are not paid to join the YouGov panel, but do receive incentives through a loyalty program to take individual surveys.

### 3. Survey Administration and Quality Assurance

YouGov managed the questionnaire consulting, sample design, programming, pre-testing, data collection, data processing, data analysis, and documentation for the Project. This section provides details about survey procedures and deliverables.

#### 3.1 Survey Invitations

Each respondent was invited to the survey by an email invitation that included a button that the respondent clicked on to take the survey; this is supported using HTML-based email that contains links. In every survey invitation, the button links to a unique URL that provides the respondent secure access to review the consent form and complete their Web survey. The unique URL also supports survey resumption during the entire field period. Prior to completing the survey, respondents may close their browser and return to the same point in the survey to resume their interview simply by selecting their unique URL again. Once a respondent has completed their survey and submitted their answers, that unique URL to their survey is not available for a respondent to access again. This prevents respondents from taking the survey more than one time.

#### 3.2 Incentives

YouGov awards “polling points” to incentivize panelists for every survey they take. Panelists can redeem points for rewards, including \$100 for 100,000 points in the United States. Participants in this study were awarded a minimum of 500 points for their participation.

### 3.3 Survey Programming and Administration Processes

YouGov employs a number of quality assurance steps to ensure data integrity. Data integrity requires accurate programming, extensive end-to-end testing, data export and tabulations of test data prior to launching with a live sample, and pre-testing with a small sample of the population. At all steps of this process, YouGov employs redundancy checks to protect the quality of the data.

Additionally, YouGov employs a number of innovative technology checks that ensure that data collection proceeds without load or bandwidth issues. Our Survey Services and Information Services teams use network monitoring application software that monitors the performance of our data collection servers constantly. The Information Services team responds to any performance issues 24 hours a day, 7 days a week.

For this Study, YouGov systematically checked the skip patterns and branching logic of the survey instruments before the survey launched and also examined the integrity of the data collection by examining the data collected during the initial soft launch.

## 4. Study Sampling Frame:

Sampling targets were set based on gender, age, race, and education using information from the 2010 American Community Survey. After matching, YouGov then weighted the matched set of survey respondents to known characteristics in the United States using propensity score weighting. Table 1 shows the baseline sampling targets for the study.

Table 1: Sampling Targets for the Study Sampling Frame

		Target
Race	Black	12%
	Hispanic	14%
	White+ all other	74%
Age	18-29	22%
	30-44	26%
	45-64	35%
	54+	17%
Gender	Male	48%
	Female	52%
Education	Less than high school grad	15%
	High school grad	29%

	Some college	31%
	College grad	17%
	Post grad	9%

In the next section, we describe the sample matching process.

## 5. Sample Matching

Sample matching is a methodology for selection of “representative” samples from non-randomly selected pools of respondents. It is ideally suited for Web access panels, but could also be used for other types of surveys, such as phone surveys. Sample matching starts with an enumeration of the target population. For general population studies, the target population is all adults, and can be enumerated through the use of the decennial Census or a high quality survey, such as the American Community Survey or National Health and Nutrition Examination Survey. In other contexts, this is known as the sampling frame, though, unlike conventional sampling, the sample is not drawn from the frame. Traditional sampling, then, selects individuals from the sampling frame at random for participation in the study. This may not be feasible or economical as the contact information, especially email addresses, is not available for all individuals in the frame and refusals to participate increase the costs of sampling in this way.

Sample selection using the matching methodology is a two-stage process. First, a random sample is drawn from the target population. We call this sample the target sample. Details on how the target sample is drawn are provided below, but the essential idea is that this sample is a true probability sample and thus representative of the frame from which it was drawn.

Second, for each member of the target sample, we select one or more matching members from our pool of opt-in respondents. This is called the matched sample. Matching is accomplished using a large set of variables that are available in consumer and voter databases for both the target population and the opt-in panel.

The purpose of matching is to find an available respondent who is as similar as possible to the selected member of the target sample. The result is a sample of respondents who have the same measured characteristics as the target sample. Under certain conditions, described below, the matched sample will have similar properties to a true random sample. That is, the matched sample mimics the characteristics of the target sample. It is, as far as we can tell, “representative” of the target population (because it is similar to the target sample).

When choosing the matched sample, it is necessary to find the closest matching respondent in the panel of opt-ins to each member of the target sample. Various types of matching could be employed: exact matching, propensity score matching, and proximity matching. Exact matching is impossible if the set of characteristics used for matching is large and, even for a small set of characteristics, requires a very large panel (to find an exact match). Propensity score matching has the disadvantage of requiring estimation of the propensity score. Either a propensity score needs to be estimated for each individual study, so the procedure is automatic, or a single propensity score must be estimated for all studies. If large numbers of variables are used the estimated propensity scores can become unstable and lead to poor samples.

YouGov employs the proximity matching method. For each variable used for matching, we define a distance function,  $d(x,y)$ , which describes how “close” the values  $x$  and  $y$  are on a particular attribute. The overall distance between a member of the target sample and a member of the panel is a weighted sum of the individual distance functions on each attribute. The weights can be adjusted for each study based upon which variables are thought to be important for that study, though, for the most part, we have not found the matching procedure to be sensitive to small adjustments of the weights. A large weight, on the other hand, forces the algorithm toward an exact match on that dimension.

## 5.1 Theoretical Background for Sample Matching

To understand better the sample matching methodology, it may be helpful to think of the target sample as a simple random sample (SRS) from the target population. The SRS yields unbiased estimates because the selection mechanism is unrelated to particular characteristics of the population. The efficiency of the SRS can be improved by using stratified sampling in place of simple random sampling. SRS is generally less efficient than stratified sampling because the size of population subgroups varies in the target sample.

Stratified random sampling partitions the population into a set of categories that are believed to be more homogeneous than the overall population, called strata. For example, we might divide the population into race, age, and gender categories. The cross-classification of these three attributes divides the overall population into a set of mutually exclusive and exhaustive groups, or strata. Then an SRS is drawn from each category and the combined set of respondents constitutes a stratified sample. If the number of respondents selected in each strata is proportional to

their frequency in the target population, then the sample is self-representing and requires no additional weighting.

The theory behind sample matching is analogous to stratified sampling: if respondents who are similar on a large number of characteristics tend to be similar on other items for which we lack data, then substituting one for the other should have little impact upon the sample. This approach can be made rigorous under certain assumptions.

- Assumption 1: Ignorability. Panel participation is assumed to be ignorable with respect to the variables measured by survey conditional upon the variables used for matching. That is, if we examined panel participants and non-participants who have exactly the same values of the matching variables, on average there would be no difference between how these sets of respondents answered the survey. This does not imply that panel participants and non-participants are identical, but only that the differences between them are captured by the variables used for matching. Since the set of data used for matching is quite extensive, this is, in most cases, a plausible assumption.
- Assumption 2: Smoothness. The expected value of the survey items given the variables used for matching is a “smooth” function. Smoothness is a technical term meaning that the function is continuously differentiable with bounded first derivative. In practice, this means that the expected value function does not have any kinks or jumps.
- Assumption 3: Common Support. The variables used for matching must have a distribution that covers the same range of values for panelists and non-panelists. More precisely, the probability distribution of the matching variables must be bounded away from zero for panelists on the range of values (known as the “support”) taken by the non-panelists. In practice, this excludes attempts to match on variables for which there are no possible matches within the panel. For instance, it would be impossible to match on computer usage because there are no panelists without some experience using computers.

## 5.2. Stratification and Matching in the Study

The sample drawn for this study was chosen from the YouGov Panel using a four-way cross-classification (age x gender x race x education). The final set of

completed interviews was then matched to the target frame using a weighted Euclidean distances metric.

The following distance functions were used for the match:

```
fmatch ← function(target, pool) {  
  4 * DIST(age)/10 +  
  3 * DIFF(gender) +  
  2 * DIFF(race4) +  
  2 * DIFF(educ4) +  
  1 * (mat.newsint[target$newsint, pool$newsint]) +  
  1 * (mat.ideo5[target$ideo5, pool$ideo5])  
}
```

Where the matching variables were:

- age: respondent's age in years
- gender: respondent's gender
- race4: categorical race variable with categories white, black, and Hispanic/Latino, and other
- educ4: categorical education variable with categories high school grad or less, some college, college grad, post graduate degree
- newsint: 4-point interest in politics plus a "Don't know" category
- ideo5: 5-point ideology plus a "Don't know" category

## 6. Weighting

The matched cases were then weighted to the sampling frame using propensity scores. The matched cases and the frame were combined and a logistic regression was estimated for inclusion in the frame. The propensity score function included age, years of education, gender, race/ethnicity, predicted voter registration, news interest, inability to place oneself on an ideological scale, and baseline party identification. The propensity scores were grouped into deciles of the estimated propensity score in the frame and post-stratified according to these deciles. The final weights were then post-stratified by gender, race, education, and age. Weights larger than 7 were trimmed and the final weights normalized to equal sample size. The following formula was used for propensity score weighting:

```
form ← ~(age + I(age <30) + I(age >64)) * I(gender==2) +  
  releval(factor(race4), 1)  
  * educyrs + I(race4 == 2)
```

```

* I(gender == 2) +
I(race4 == 3) * I(gender
== 2) + I(race4 == 2) *
I(age <30) +
I(race4 == 3) * I(age
<30) + I(race4 == 2)
* I(eduycrs <14) +
I(race4 == 3) * I(eduycrs <14) *
I(gender == 2) + I(eduycrs <14) *
I(age <30) +
I(eduycrs <14) *
I(age >64) +
I(ideo5 == 1) +
I(ideo5 == 4) +
I(ideo5 == 2) +
I(ideo5 == 3) +
as.factor(marstat) *
age + I(educ5 == 1)
* I(age >64)

```

Where the weighting variables were:

- age: respondent's age in years
- gender: respondent's gender
- race4: categorical race variable with categories white, black, and Hispanic/Latino, and other
- educ5: categorical education variable with categories less than high school, high school grad, some college, college grad, post graduate degree
- educes: education in number of years completed (e.g., high school graduate = 12)
- ideo5: 5-point ideology plus a "Don't know" category
- marstat: marital status

Table 2 shows the correspondence between the sampling targets and the final unweighted and weighted sample composition.

Table 2: Demographic Characteristics of the Study

		Target	Unweighted Sample	Weighted Sample
Race	Black	12%	12%	12%
	Hispanic	14%	12%	14%
	White + all other	74%	76%	74%
Age	18-29	22%	22%	22%
	30-44	26%	27%	26%
	45-64	35%	36%	35%
	54+	17%	16%	17%
Gender	Male	48%	45%	48%
	Female	52%	55%	52%
Education	Less than high school	15%	6%	14%
	High school grad	29%	33%	29%
	Some college	31%	31%	31%
	College grad	17%	20%	17%
	Post grad	9%	10%	9%

Table 3: Response Rate for the Study

Invitations	11471
Starts	5,392
Completes	4,622
Incompletes	770
Nonresponse	6,079
RR1	4,622/11471 (40.3%)
RR2	5,392/11471 (47.0%)

## 7. Response Rate

Table 3 shows the respondent dispositions. RR1 and RR2 reflect within-panel response rates.

## Supplementary Appendix IV: Covariates used for analysis

Individual characteristics considered were age, gender, race, ethnicity, marital status, education, employment, income, language, number of children, neighborhood crime and violence exposure. State-level characteristics were strength of gun policy in the respondent's home state using the Brady Law strength score and 2011 state-specific gun fatality rates.

**Age:** All respondents were above 18 years. We dichotomized age at 55 years with two groups: Those greater than 55 years old and those between 19 to 55 years old. The reference group was 19 to 55 years old.

**Gender:** Male versus female (reference)

**Race:** Since race was indicated by multiple variables, we used the variables DPS044\_1 DPS044\_2 DPS044\_3 DPS044\_4 DPS044\_5 DPS044\_6 DPS044\_9 to create a race category of "white", "black" and "other". Race was categorized as "white" if  $DPS044_1=1$  &  $(DPS044_2 \neq 1 \text{ \& } DPS044_3 \neq 1 \text{ \& } DPS044_4 \neq 1 \text{ \& } DPS044_5 \neq 1 \text{ \& } DPS044_6 \neq 1)$ . Race was categorized as "black" if  $DPS044_2=1$ . Race was categorized as other for all the rest of the individuals who were not categorized as either "white" or "black". We further dichotomized as "black" and "not-black", where "not-black" included both "white" and "other".

**Ethnicity:** Ethnicity was asked as a separate question with categories "Hispanic" and "Non-Hispanic" and was not incorporated to the questions regarding race.

**Marital status:** We categorized marital status into 3 main categories from the nine mutually exclusive categories of marital status in the questionnaire. Never married was the reference category with responses "married" and "a member of an unmarried couple" categorized as currently married and responses "divorced", "widowed", "separated" was categorized as formerly married.

**Education:** We use education as four categories after pooling 9 mutually exclusive responses. "Never attended school or only attended kindergarten", "Grades 1 through 8 (elementary)" and "Grades 9 through 11 (some high school)" was categorized as "less than high school" and was the reference group. "Grades 12 or GED (high school graduate or GED certificate)" was categorized as "High school/GED", "College 1 year to 3 years (Some college or technical school)" was categorized as "some college" and either "College 4 years or more (College graduate)" and "Postgraduate degree (MA, MBA, MD, JD, PhD, etc.)" was categorized as "more than college".

**Employment:** We used employment as a dichotomous variable of being either employed or not. Reference category was employed. When the response was either “Out of work for more than 1 year” or “Out of work for less than 1 year” was categorized as “unemployed”.

**Income:** Income was used as a 3 category variable: <\$25,000 (reference), \$25,000 to \$50,000 and >=\$50,000 by pooling the 9 categories from the survey

**Language:** We use language variable as those who speak English exclusively from the survey question responses of English, Spanish, both, other.

**Have children:** We used only 1 variable (DPS047\_1- I have no children), to derive whether the respondent had children or not. Reference was “no children”

**Neighborhood crime:** This variable was dichotomized as low crime (reference) and high crime using two variables (Q6\_1 Q6\_2). A neighborhood was considered “low crime” when the response to Q6\_1 was 1. A neighborhood was considered “high crime” when Q6\_1 was 2 and if Q6\_2 is either 1 or 2.

**Violence exposure:** We presented violence exposure in 3 categories: low (reference), medium and high. The variable was constructed from 4 variables Q6\_3 Q6\_4 Q6\_5 Q6\_6. If the respondent reported “yes” to none of these four violence exposure questions were categorized as having “low” violence exposure, if the respondent reported “yes” to only 1 then the category was medium while if the respondent reported “yes” to two or more than two of the four violence exposure.

**State-specific Brady Law strength score:** State-specific firearm related legislation for the year 2011 was obtained from the Brady Center to Prevent Gun Violence and validated using LexisNexis Academic. Since 2007, the Brady Center has published annual reports regarding state-specific firearm legislature and an arbitrary legislative scorecard with specific score criteria and broadly classifies all laws into five categories: (1) curb firearm trafficking; (2) strengthen background checks on purchasers of firearms beyond those required by the Brady Handgun Violence Prevention Act; (3) ensure child safety; (4) ban military style assault weapons; and (5) restrict guns in public places. We used the overall legislative scores and categorized into four groups based on quartiles. The lowest quartile was used as the reference category.

**State-specific gun fatality rates:** Rates of firearm mortality were obtained from querying the restricted version of Centers of Disease Control and Prevention, Web-based Injury Statistics Query and Reporting System (WISQARS) for the year 2011. Mortality data in the WISQARS is compiled by the National Center for Health Statistics using data from the death registry. We categorized gun fatality rates into

four groups based on quartiles. The lowest quartile was used as the reference category.

## Supplementary Table 1: Correlation between variables for social gun culture

	Social circle would think less of me if I do not have/own a gun	Family would think less of me if I do not have/own a gun	A part of my social life involving family involves activities related to guns	A part of my social life involving friends involves activities related to guns
Social circle would think less of me if I do not have/own a gun	1.0000			
Family would think less of me if I do not have/own a gun	0.4612 ( $<0.0001$ )	1.0000		
A part of my social life involving family involves activities related to guns	0.2529 ( $<0.0001$ )	0.2262 ( $<0.0001$ )	1.0000	
A part of my social life involving friends involves activities related to guns	0.2439 ( $<0.0001$ )	0.2006 ( $<0.0001$ )	0.5451 ( $<0.0001$ )	1.0000

The values are rho (p-value)  
 Rho is spearman's coefficient

## Supplementary Table 2: Association of individual and state characteristics with gun ownership (sensitivity analysis)

	Crude OR (95%CI)	P	MV OR (95% CI)	P
Social gun culture		<0.0001		<0.0001
No	Reference		Reference	
Yes	3.32 (2.91-3.78)		2.20 (1.91-2.52)	
Age		<0.0001		<0.0001
19-55 years	Reference		Reference	
>55 years	1.41 (1.28-1.55)		1.21 (1.10-1.34)	
Hispanic		<0.0001		0.17
No	Reference		Reference	
Yes	0.64 (0.52-0.79)		0.78 (0.54-1.11)	
Black race		<0.0001		<0.0001
No	Reference		Reference	
Yes	0.48 (0.37-0.62)		0.53 (0.41-0.68)	
Gender		<0.0001		<0.0001
Female	Reference		Reference	
Male	1.74 (1.55-1.96)		1.64 (1.45-1.85)	
Marital status		<0.0001		<0.0001
Never married	Reference		Reference	
Married/ Partner	2.10 (1.78-2.47)		1.75 (1.47-2.08)	
Divorced/Widowed/ Separated	1.56 (1.28-1.91)		1.46 (1.19-1.79)	
Education		0.44		
Less than high school	Reference			
High School/ GED	1.27 (0.93-1.74)			
Some college	1.27 (0.95-1.68)			
More than college	1.27 (0.93-1.72)			
Unemployed		0.008		0.58
No	Reference		Reference	
Yes	0.72 (0.56-0.92)		0.94 (0.73-1.19)	
Income		<0.0001		0.084
<\$25,000	Reference		Reference	
\$25,000 to <\$50,000	1.20 (1.00-1.44)		1.05 (0.86-1.27)	
≥\$50,000	1.52 (1.33-1.73)		1.14 (0.99-1.32)	
Have children		0.66		
No	Reference			
Yes	1.03 (0.91-1.16)			
Speaks only English		<0.0001		0.60
No	Reference		Reference	
Yes	1.74 (1.28-2.35)		1.14 (0.70-1.85)	
Neighborhood crime		0.014		0.84
Low crime	Reference		Reference	
High crime	0.83 (0.72-0.96)		0.99 (0.83-1.16)	
Violence exposure		<0.0001		0.079
Low	Reference		Reference	
Medium	1.09 (0.95-1.25)		1.13 (0.97-1.32)	
High	1.41 (1.24-1.60)		1.17 (1.02-1.35)	
Brady Law strength score		<0.0001		0.004

High ( $\geq 59$ )	Reference		Reference	
Moderate ( $< 59$ to $\geq 24$ )	1.46 (1.13-1.89)		1.23 (1.01-1.50)	
Mild ( $< 24$ to $\geq 15.5$ )	1.80 (1.42-2.28)		1.40 (1.16-1.69)	
Least ( $< 15.5$ )	2.11 (1.63-2.73)		1.32 (1.03-1.68)	
State gun fatality rate		$< 0.0001$		0.005
Lowest ( $\leq 7.7$ )	Reference		Reference	
Low ( $> 7.7$ to $\leq 10.7$ )	1.36 (0.84-2.20)		1.17 (0.84-1.63)	
Moderate ( $> 10.7$ to $\leq 11.6$ )	1.83 (1.14-2.91)		1.38 (0.97-1.97)	
High ( $> 11.6$ )	2.26 (1.41-3.64)		1.52 (1.05-2.20)	

Social gun culture was reporting yes to at least two of the four questions: “social circle thinks less of them if they did not own a gun”, “family thinks less of them not owning a gun”, “social life with family involves guns” and “social life with friends involves guns”. Reference was reporting “no” to all four questions.

Modified poisson regression was using Generalized Estimating Equations (GEE) to account for clustering by states. P-values are from weighted poisson regression with cluster option for state.

MV denotes multivariable.