GSS Guns

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```
library(foreign)
library(dplyr)
library(ggplot2)
library(ggthemes)
```

```
## Warning: package 'ggthemes' was built under R version 3.4.4
```

```
library(srvyr)
```

```
## Warning: package 'srvyr' was built under R version 3.4.4
```

```
library(tidyr)
options(survey.lonely.psu = "adjust") #center variance contribution around grand mean
#options(survey.lonely.psu = "certainty") #make no contribution to variance

gss <- read.dta(file="C:/Users/DELL/Documents/UMN/GSS_stata/GSS7216_R1a.dta",
                convert.factors = F, missing.type = F)

gss <- gss %>% filter(!is.na(vpsu) & !is.na(vstrat)) %>%
  mutate(weight=ifelse(year<2004, wtssall, wtssnr))
```

```
## Warning: package 'bindrcpp' was built under R version 3.4.4
```

```
  #https://gssdataexplorer.norc.org/pages/show?page=gss%2Fweighting
  #2004 onward adjusted for nonresponse, WTSSNR used 2004+
  #'72, '73, '74 unweighted, removed to have 1975-2016 weighted series
```

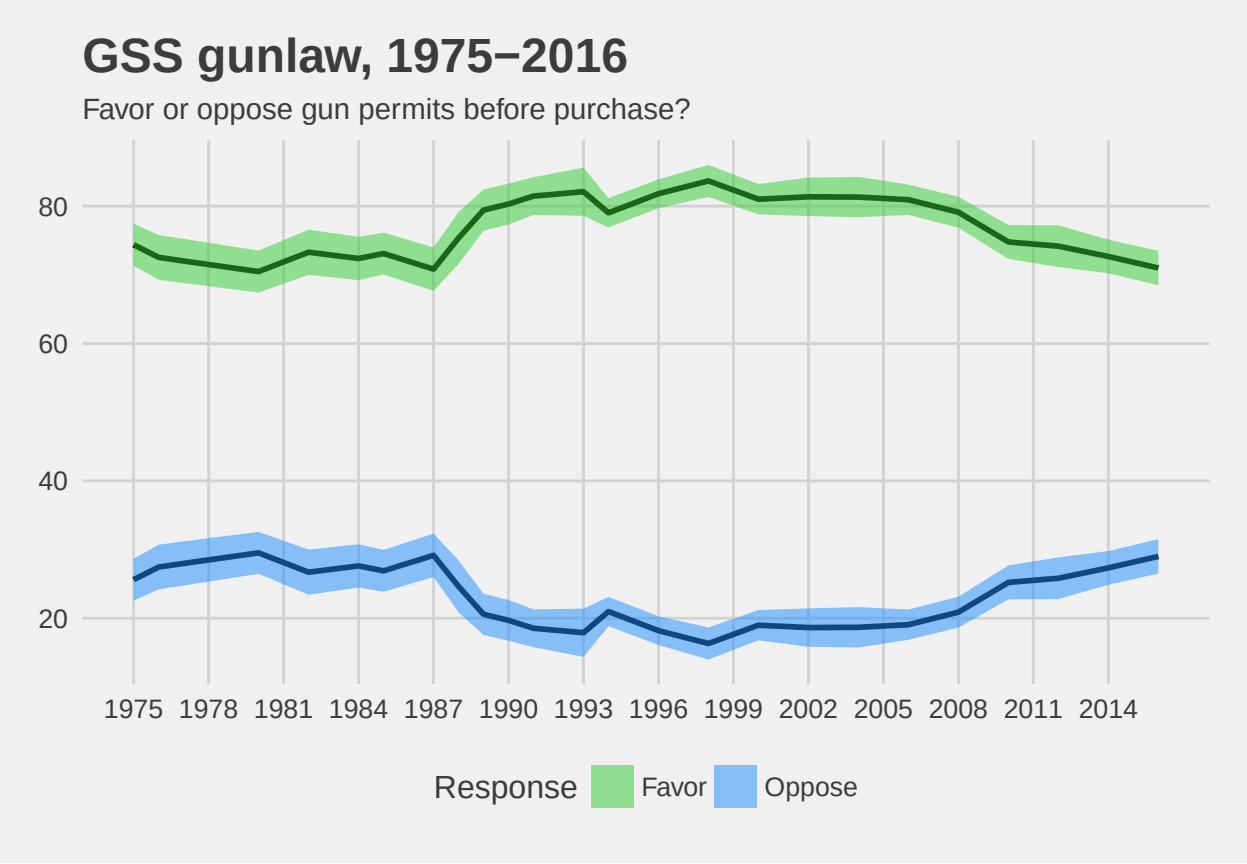
gunlaw

Would you favor or oppose a law which would require a person to obtain a police permit before he or she could buy a gun?

```
gss.design.gunlaw <- gss %>%
  select_("year","gunlaw","sample","weight", "vpsu", "vstrat") %>%
  mutate(sample=as.numeric(sample)) %>%
  filter(!(sample==4|sample==5|sample==7)) %>% #removing 1982 and 1987 black oversample
  mutate(Favor=ifelse(gunlaw==1, ifelse(is.na(gunlaw),NA,1), 0),
         Oppose=ifelse(gunlaw==2,ifelse(is.na(gunlaw),NA,1),0)) %>%
  as_survey_design(ids= vpsu, weights= weight, strata= vstrat, nest=T) %>%
  filter(!is.na(gunlaw)) %>%
  group_by(year) %>%
  summarize(Favor = survey_mean(Favor, vartype=c("se", "ci")),
            Oppose = survey_mean(Oppose, vartype=c("se", "ci"))) %>%
  gather(key=key, value=value, -year) %>%
  separate(key, into=c("response","stat"), sep="_") %>%
  mutate(stat=ifelse(is.na(stat), "mean", stat), value=value*100) %>%
  spread(key=stat, value=value) %>%
  mutate(response=factor(response,
```

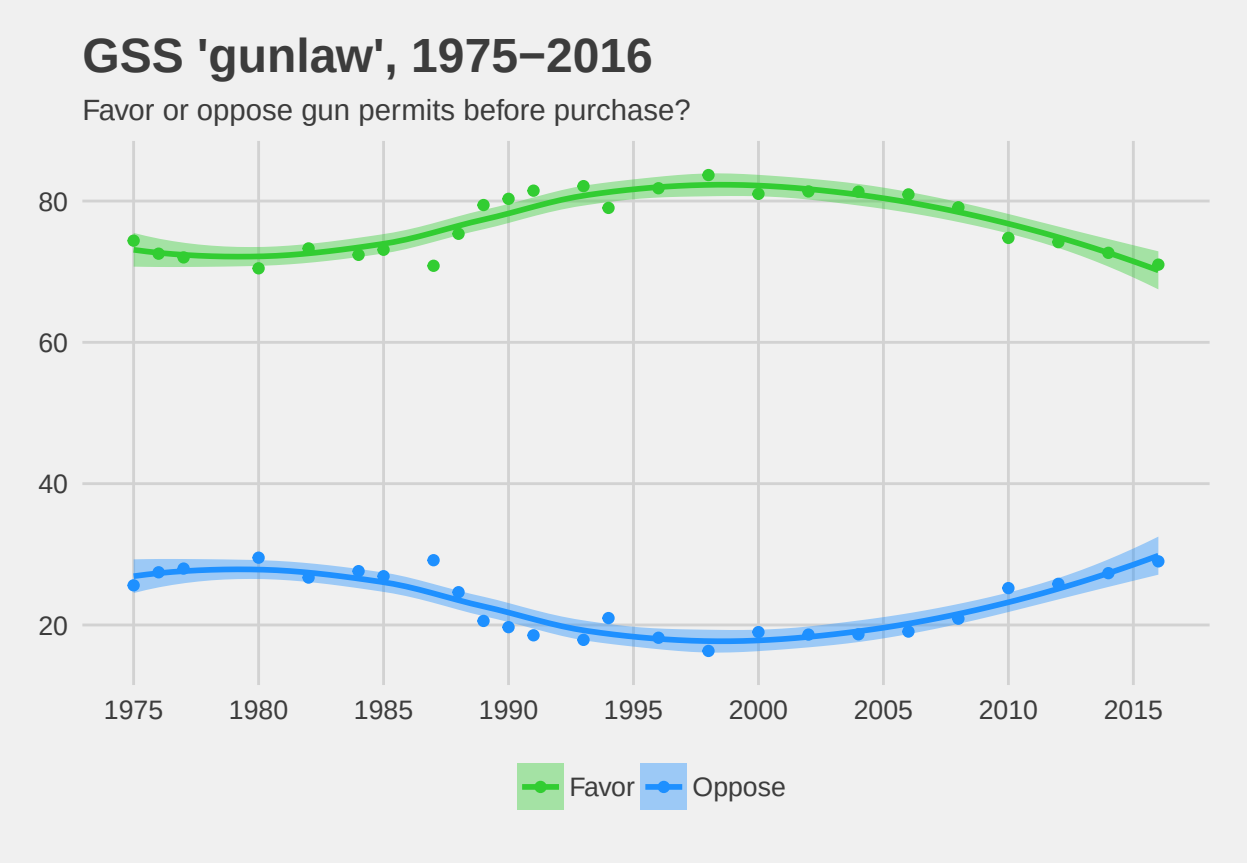
```
                        levels=c("Favor","Oppose")))

ggplot(gss.design.gunlaw)+
  geom_line(aes(x=year, y=mean, group=response), size=1)+
  scale_colour_manual(labels=c("Favor","Oppose"),
                      values=c("limegreen","dodgerblue"))+
  geom_ribbon(aes(x=year, ymin=low, ymax=upp, fill=response), alpha=.5)+
  scale_fill_manual(labels=c("Favor","Oppose"),
                      values=c("limegreen","dodgerblue"))+
  ggtitle("GSS gunlaw, 1975-2016",
          subtitle = "Favor or oppose gun permits before purchase?")+
  labs( fill="Response")+
  scale_x_continuous(limits=c(1975,2016), breaks=seq(1975,2016,3))+
  xlab("Year")+ylab("Percent of Population (GSS)")+
  theme_fivethirtyeight()
```



The plot above mirrors our Valentine's plots. They show the design-corrected standard error of the mean estimate. I made the plot below instead with a loess fit, and I think its a bit easier on the eyes, but does not depict design corrected standard errors (rather, loess SE's for the loess fit through the survey weighted point estimates.

```
ggplot(gss.design.gunlaw)+
  geom_point(aes(x=year, y=mean,  color=response))+
  geom_smooth(aes(x=year, y=mean, color=response, fill=response), method="loess", se=T, size=1)+
  scale_color_manual(name="Response",labels=c("Favor","Oppose"),
                       values=c("limegreen","dodgerblue"))+
  scale_fill_manual(name="Response",labels=c("Favor","Oppose"),
                                    values=c("limegreen","dodgerblue"))+
  ggtitle("GSS 'gunlaw', 1975-2016", subtitle = "Favor or oppose gun permits before purchase?")+
  labs( fill="Response")+
  scale_x_continuous(limits=c(1975,2016), breaks=seq(1975,2016,5))+
  scale_y_continuous(limits=c(15,85))+
  xlab("Year")+ylab("Percent of Population (GSS)")+
  theme_fivethirtyeight()  +
  theme(legend.title=element_blank())
```

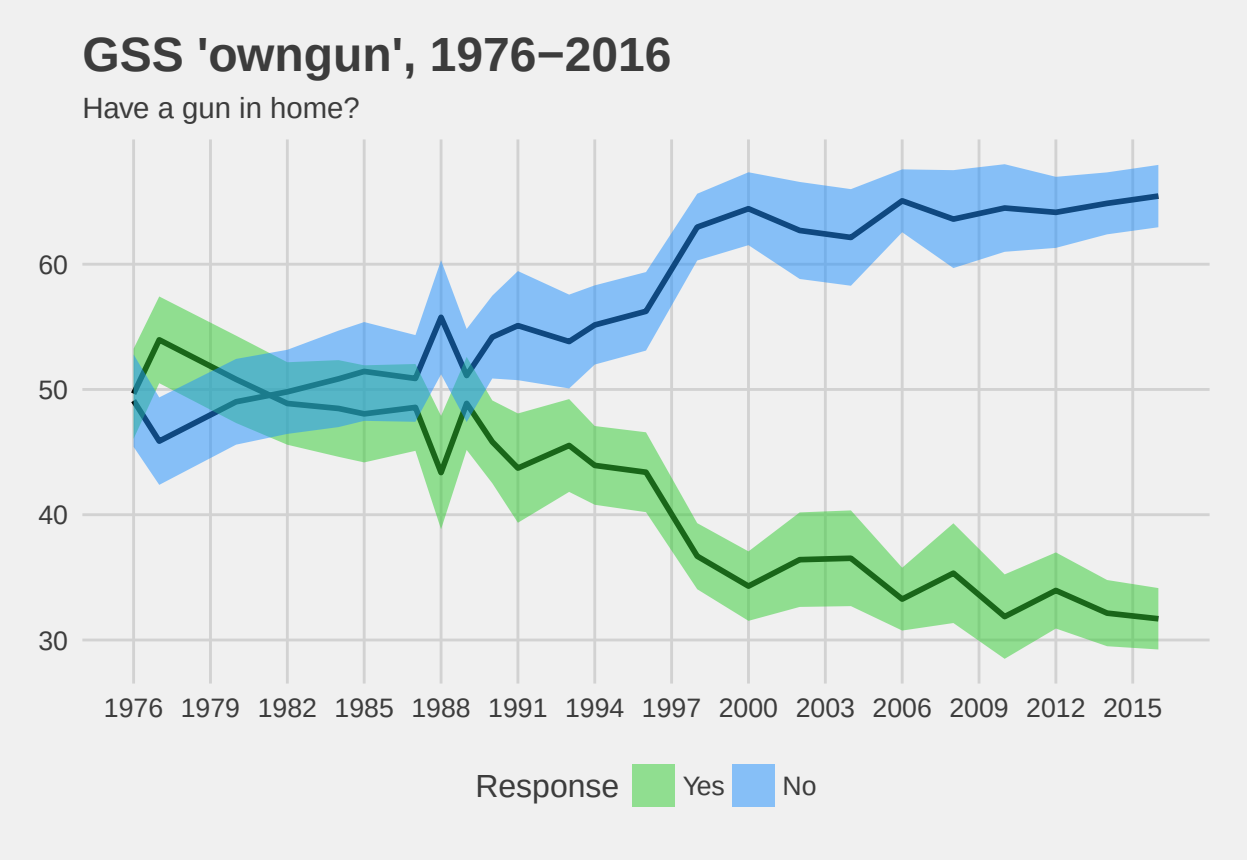


owngun

We should mention that even though ownership is declining, sales are still high, indicating that sales are concentrated amongst those who already own.

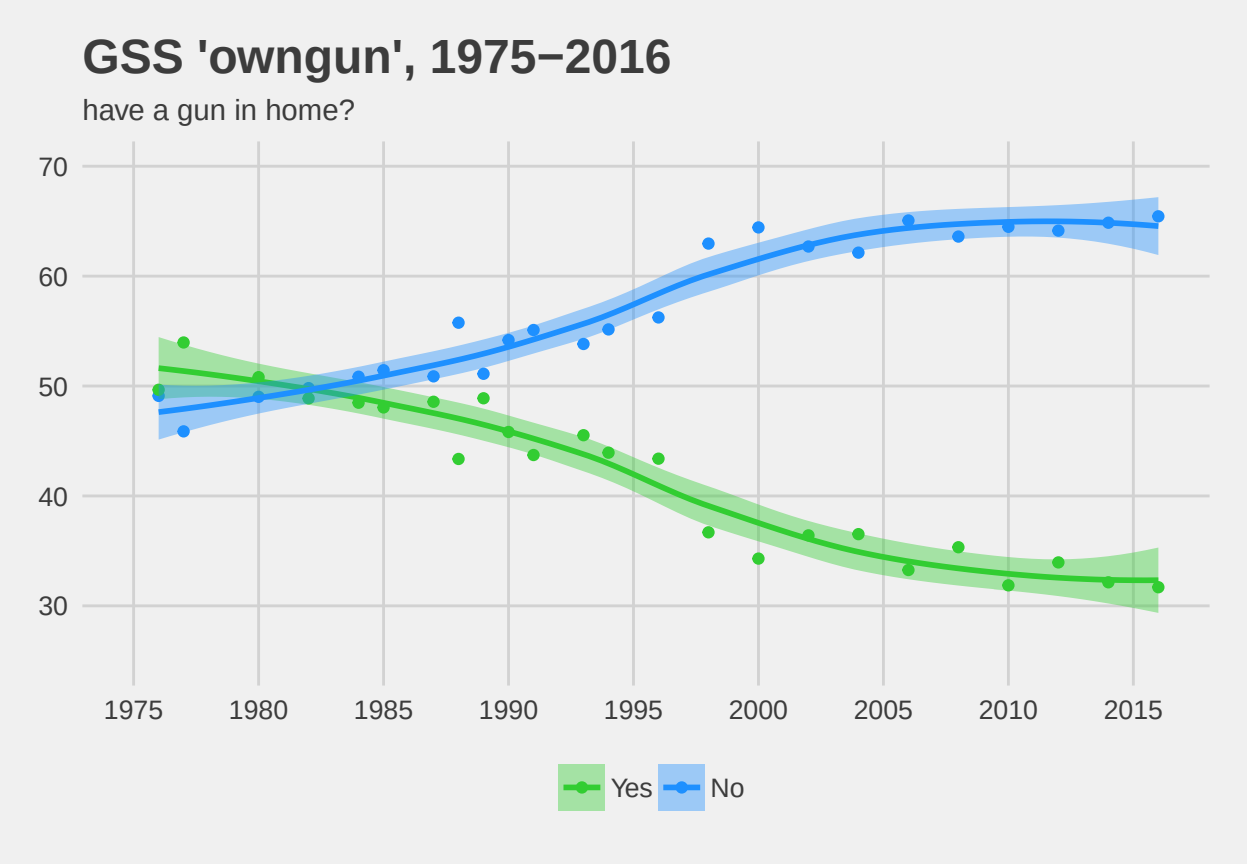
```
gss.design.owngun <- gss %>%
  select_("year","owngun","sample","weight", "vpsu", "vstrat") %>%
  mutate(sample=as.numeric(sample)) %>%
  filter(!(sample==4|sample==5|sample==7)) %>% #removing 1982 and 1987 black oversample
  mutate(Yes=ifelse(owngun==1, ifelse(is.na(owngun),NA,1), 0),
         No=ifelse(owngun==2,ifelse(is.na(owngun),NA,1),0)) %>%
  as_survey_design(ids= vpsu, weights= weight, strata= vstrat, nest=T) %>%
  filter(!is.na(owngun)) %>%
  group_by(year) %>%
  summarize(Yes = survey_mean(Yes, vartype=c("se", "ci")),
            No = survey_mean(No, vartype=c("se", "ci"))) %>%
  gather(key=key, value=value, -year) %>%
  separate(key, into=c("response","stat"), sep="_") %>%
  mutate(stat=ifelse(is.na(stat), "mean", stat), value=value*100) %>%
  spread(key=stat, value=value) %>%
  mutate(response=factor(response,
                         levels=c("Yes","No")))

ggplot(gss.design.owngun)+
  geom_line(aes(x=year, y=mean, group=response), size=1)+
  scale_colour_manual(labels=c("Yes","No"),
                      values=c("limegreen","dodgerblue"))+
  geom_ribbon(aes(x=year, ymin=low, ymax=upp, fill=response), alpha=.5)+
  scale_fill_manual(labels=c("Yes","No"),
                      values=c("limegreen","dodgerblue"))+
  ggtitle("GSS 'owngun', 1976-2016",
          subtitle = "Have a gun in home?")+
  labs( fill="Response")+
  scale_x_continuous(limits=c(1976,2016), breaks=seq(1976,2016,3))+
  xlab("Year")+ylab("Percent of Population (GSS)")+
  theme_fivethirtyeight()
```



Again, a LOESS fit instead of a geom_line with design-corrected standard errors.

```
ggplot(gss.design.owngun)+
  geom_point(aes(x=year, y=mean,  color=response))+
  geom_smooth(aes(x=year, y=mean, color=response, fill=response), method="loess", se=T, size=1)+
  scale_color_manual(name="Response",labels=c("Yes","No"),
                     values=c("limegreen","dodgerblue"))+
  scale_fill_manual(name="Response",labels=c("Yes","No"),
                                  values=c("limegreen","dodgerblue"))+
  ggtitle("GSS 'owngun', 1975-2016", subtitle = "have a gun in home?")+
  labs( fill="Response")+
  scale_x_continuous(limits=c(1975,2016), breaks=seq(1975,2016,5))+
  scale_y_continuous(limits=c(25,70))+
  xlab("Year")+ylab("Percent of Population (GSS)")+
  theme_fivethirtyeight()  +
  theme(legend.title=element_blank())
```


GSS 'owngun', 1975−2016
have a gun in home?
70
60
50
40
30
1975
1980
1985
1990
1995
2000
2005
2010
2015
Yes
No