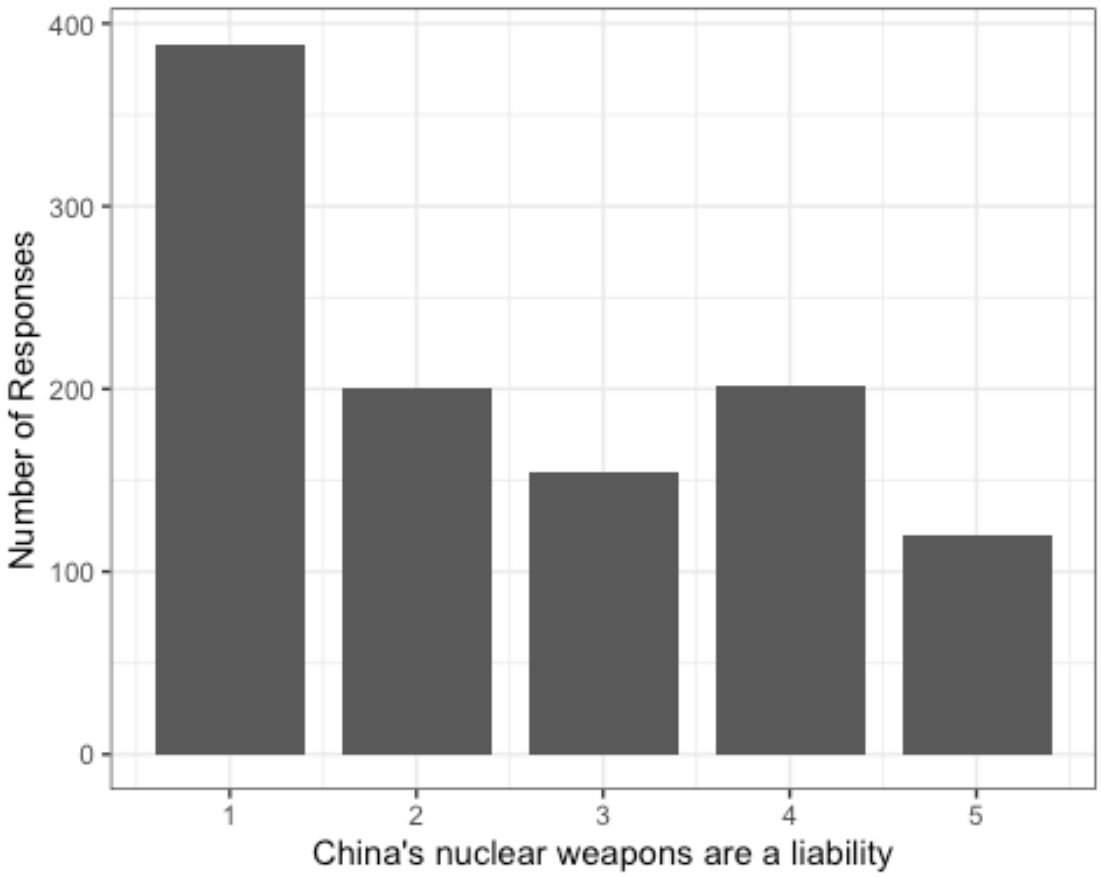
Chinese_nuclear_replication.R

2021-06-06

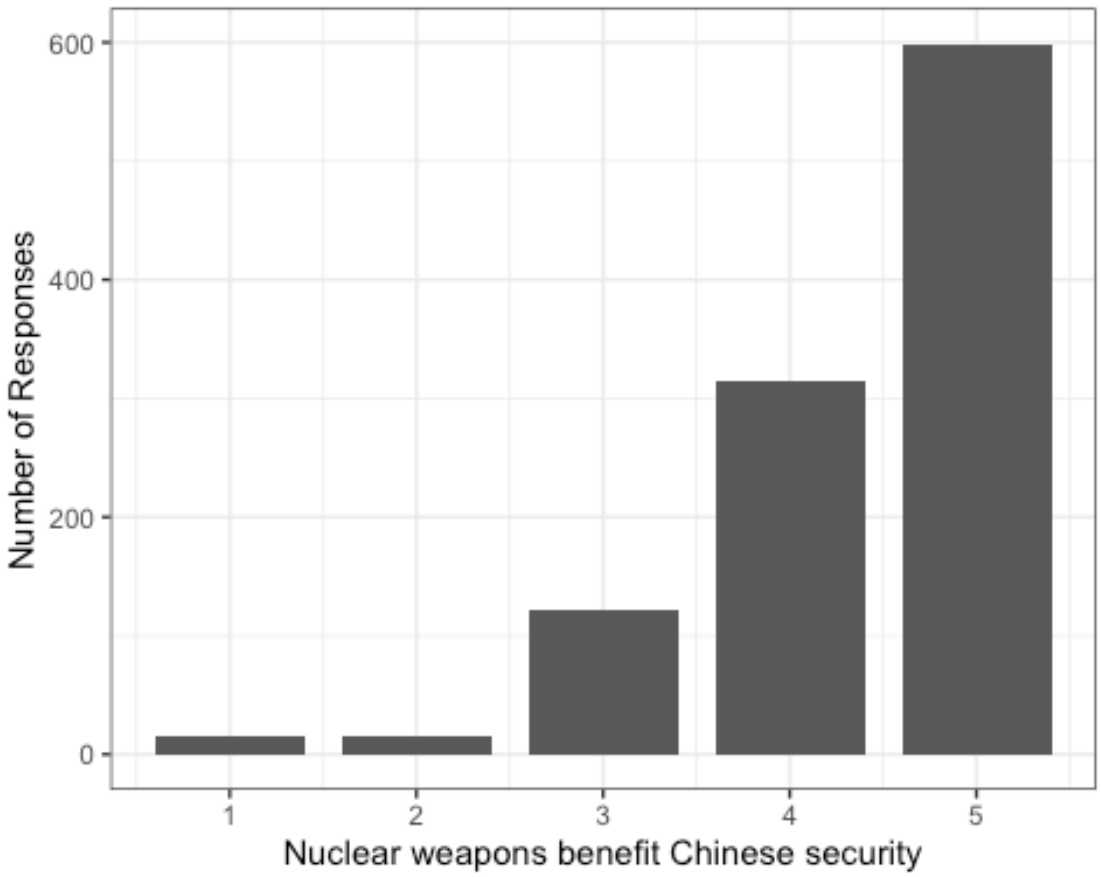
```
setwd("~/Dropbox")

library(readr)
library(quanteda)

## Package version: 2.1.2

## Parallel computing: 2 of 4 threads used.

## See https://quanteda.io for tutorials and examples.

##
## Attaching package: 'quanteda'

## The following object is masked from 'package:utils':
##
##     View

library(tidyverse)

## ── Attaching packages ─────────────────────────────────────────────────
── tidyverse 1.3.0 ──

## ✓ ggplot2 3.3.2     ✓ dplyr   1.0.0
## ✓ tibble  3.0.3     ✓ stringr 1.4.0
## ✓ tidyr   1.1.0     ✓ forcats 0.5.0
## ✓ purrr   0.3.4

## ── Conflicts ────────────────────────────────────────────────────── tid
yverse_conflicts() ──
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(rvest)

## Loading required package: xml2

##
## Attaching package: 'rvest'

## The following object is masked from 'package:purrr':
##
##     pluck
```

```
## The following object is masked from 'package:readr':
##
##     guess_encoding

library(stringr)
library(topicmodels)
library(knitr)
library(pdftools)

## Using poppler version 0.73.0

library(stm)

## stm v1.3.6 successfully loaded. See ?stm for help.
##  Papers, resources, and other materials at structuraltopicmodel.com

library(xtable)
library(readtext)
library(tidytext)
library(spacyr)
library(extrafont)

## Registering fonts with R

library(RColorBrewer)
library(tinytex)
nuke_cov <- read_csv("China nuclear opinion/Nukescovariates.csv")

## Parsed with column specification:
## cols(
##   doc_id = col_character(),
##   age = col_double(),
##   nukes = col_character(),
##   nukes_n = col_double(),
##   wmd_1 = col_double(),
##   wmd_2 = col_double(),
##   wmd_3 = col_double(),
##   nukes_reordered = col_double(),
##   age_cat = col_character()
## )

pcre_config()

##              UTF-8 Unicode properties                JIT              stac
k
##               TRUE               TRUE              FALSE              FALS
E

summary(nuke_cov)

##     doc_id               age           nukes              nukes_n
##  Length:1066        Min.   :18.00   Length:1066        Min.   :1.000
```

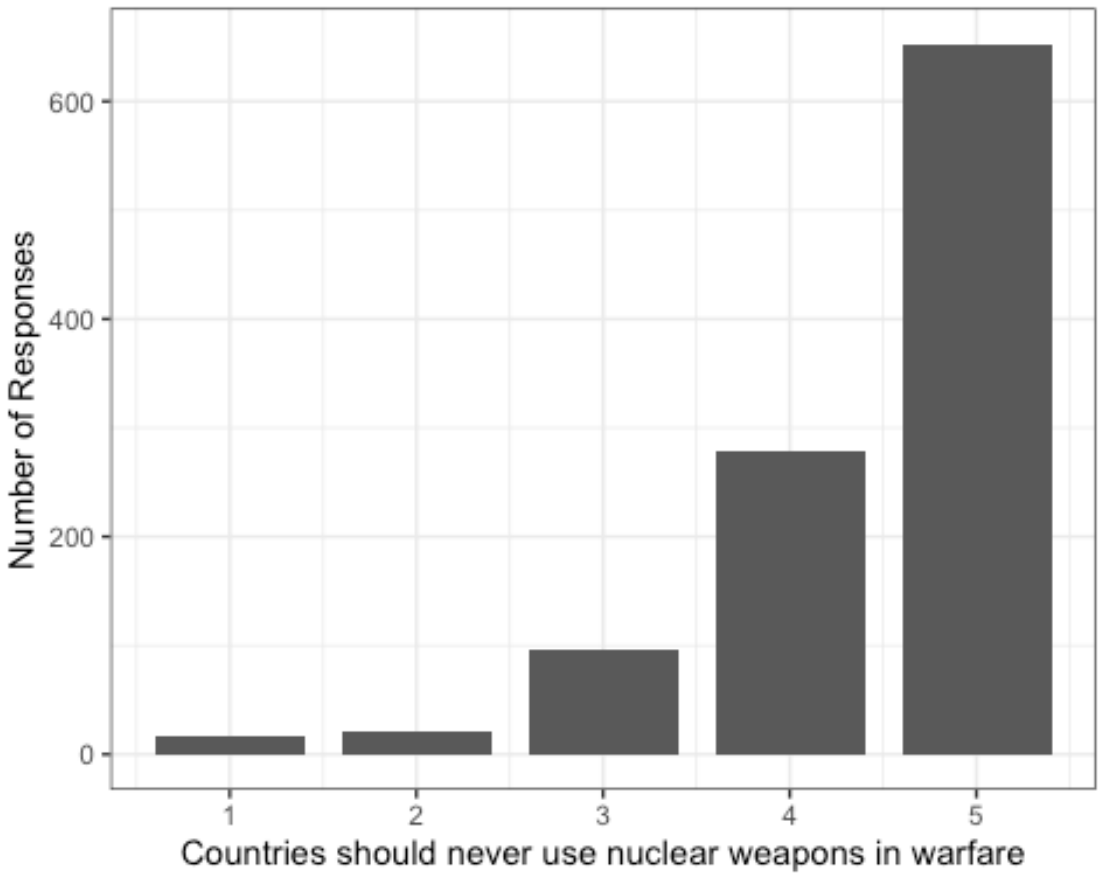
```
##  Class :character   1st Qu.:20.00   Class :character   1st Qu.:1.000
##  Mode  :character   Median :31.00   Mode  :character   Median :1.000
##                     Mean   :34.63                      Mean   :1.261
##                     3rd Qu.:45.00                      3rd Qu.:1.000
##                     Max.   :72.00                      Max.   :4.000
##      wmd_1            wmd_2            wmd_3       nukes_reordered
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:4.000   1st Qu.:4.000   1st Qu.:3.000
##  Median :2.000   Median :5.000   Median :5.000   Median :3.000
##  Mean   :2.496   Mean   :4.374   Mean   :4.434   Mean   :2.814
##  3rd Qu.:4.000   3rd Qu.:5.000   3rd Qu.:5.000   3rd Qu.:3.000
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :4.000
##    age_cat
##  Length:1066
##  Class :character
##  Mode  :character
##
##
##

#bar charts of responses
par(family = "Arial Unicode MS")
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_1), width = .8) + labs(x
= "China\'s nuclear weapons are a liability", y = "Number of Responses") + th
eme_bw()
```



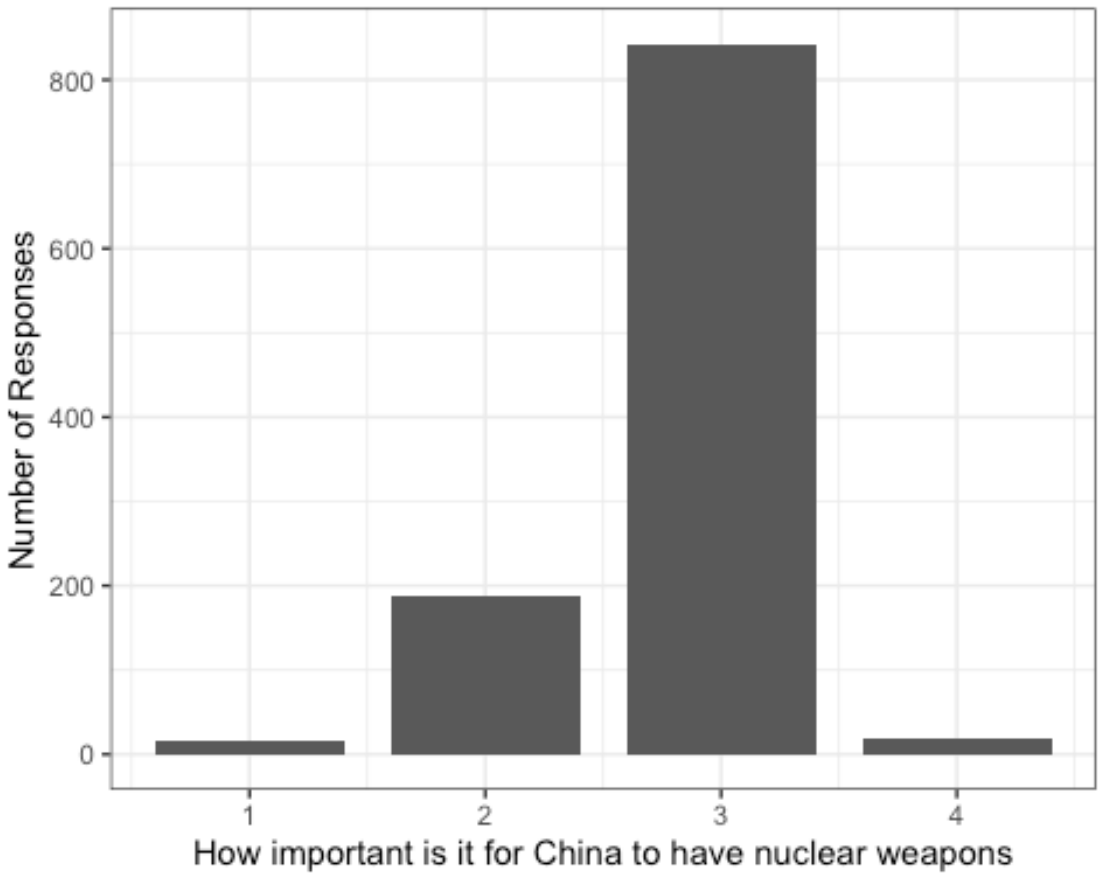

```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_2), width = .8) + labs(x
= "Nuclear weapons benefit Chinese security", y = "Number of Responses") + th
eme_bw()
```




```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_3), width = .8) + labs(x
= "Countries should never use nuclear weapons in warfare", y = "Number of Res
ponses") + theme_bw()
```

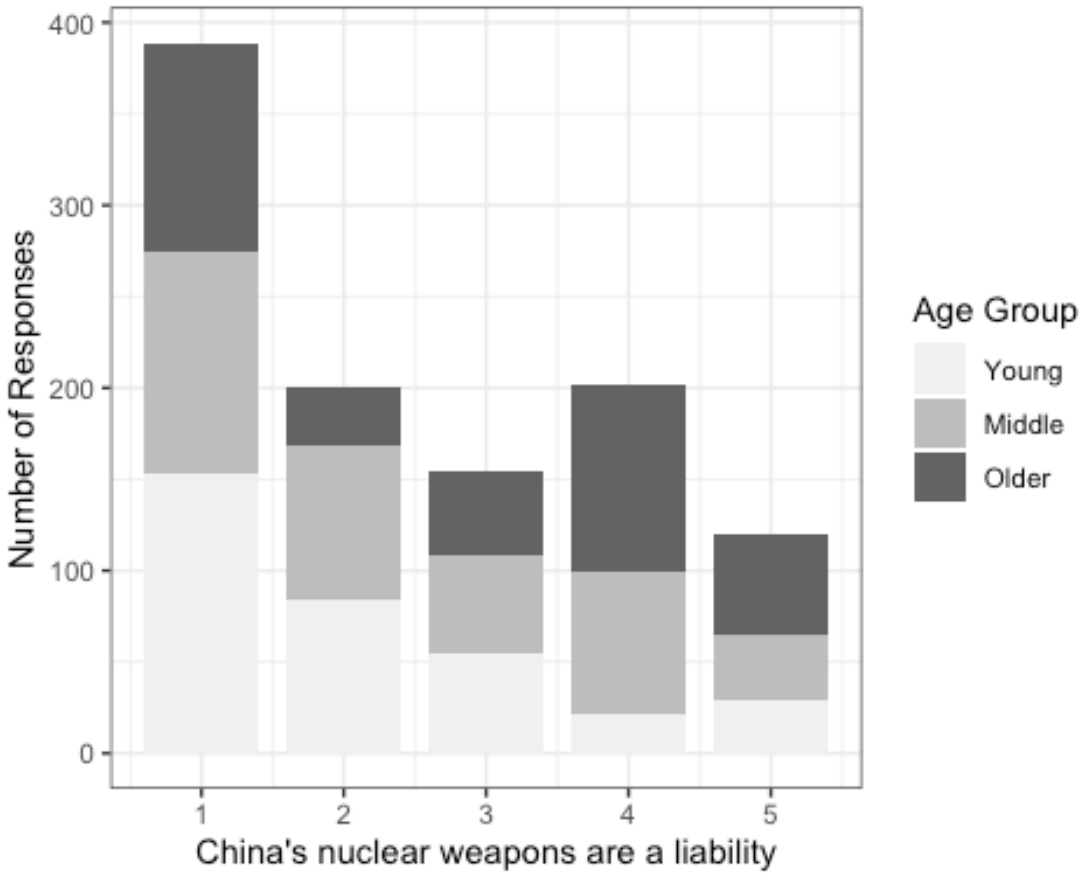



```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=nukes_reordered), width = .8
) + labs(x = "How important is it for China to have nuclear weapons", y = "Nu
mber of Responses") + theme_bw()
```

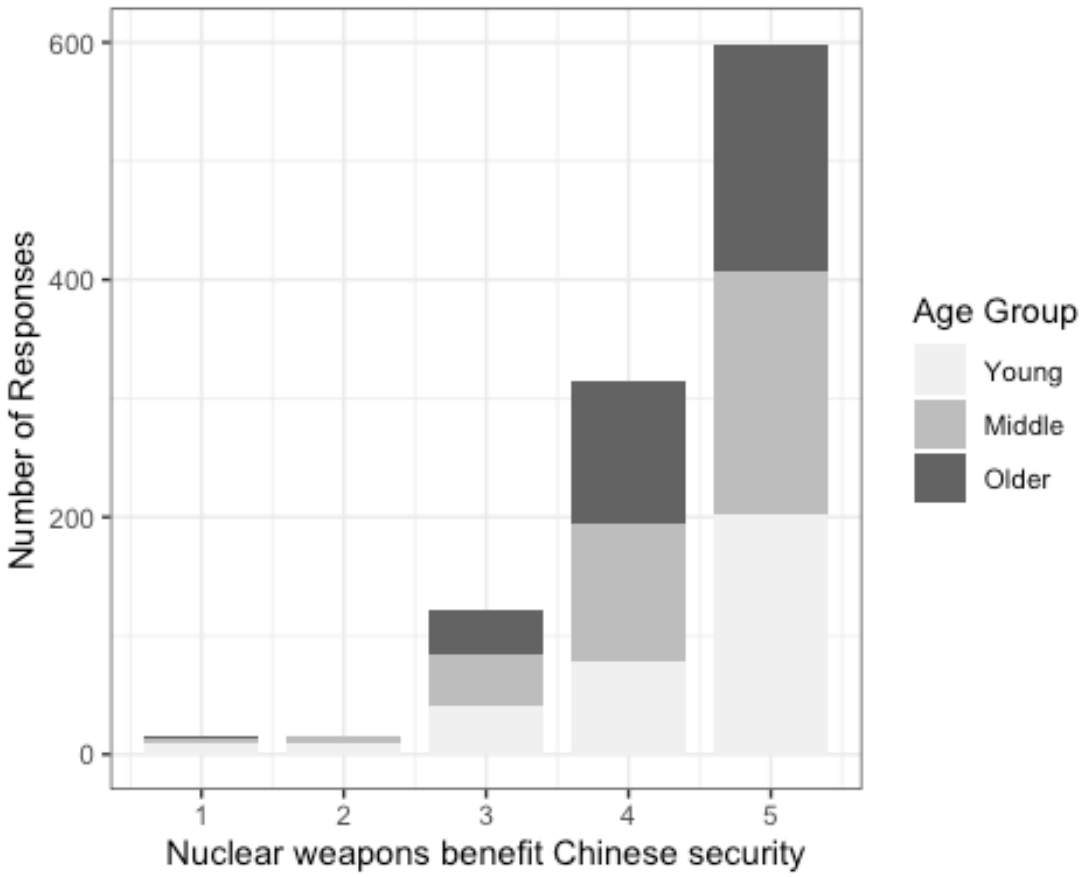



```
#summary stats
tabulate(nuke_cov$nukes_reordered)

## [1]  15 188 843  20

tabulate(nuke_cov$wmd_1)

## [1] 389 201 154 202 120

tabulate(nuke_cov$wmd_2)

## [1]  16  15 122 314 599

tabulate(nuke_cov$wmd_3)

## [1]  17  21  97 278 653

#age subgroup analysis
nuke_cov$age_cat = factor(nuke_cov$age_cat, levels=c("Young", "Middle", "Olde
r"))
summary(nuke_cov$age_cat)

##  Young Middle  Older
##    342    373    351
```

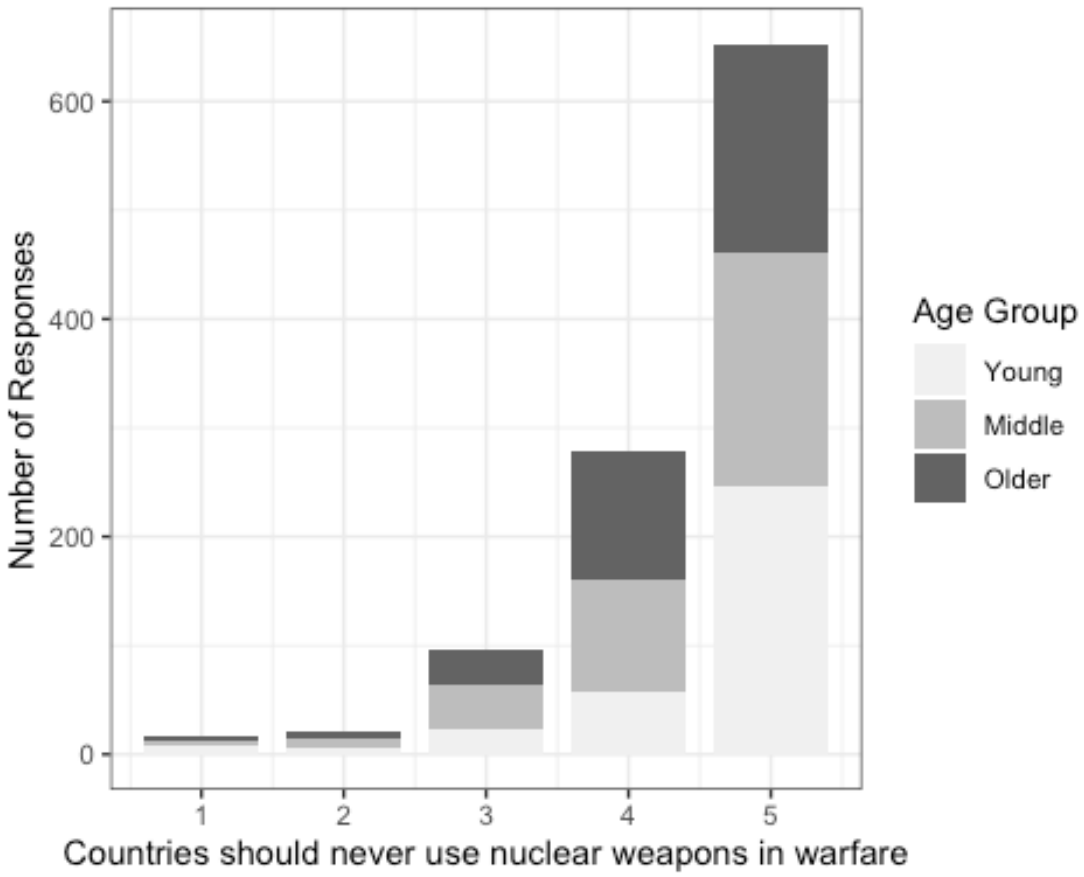
```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_1, fill=age_cat), width=
.8, position = position_stack(reverse = TRUE)) + labs(x = "China\'s nuclear w
eapons are a liability", y = "Number of Responses", fill="Age Group") + scale
_fill_brewer(palette = "Greys") + theme_bw()
```



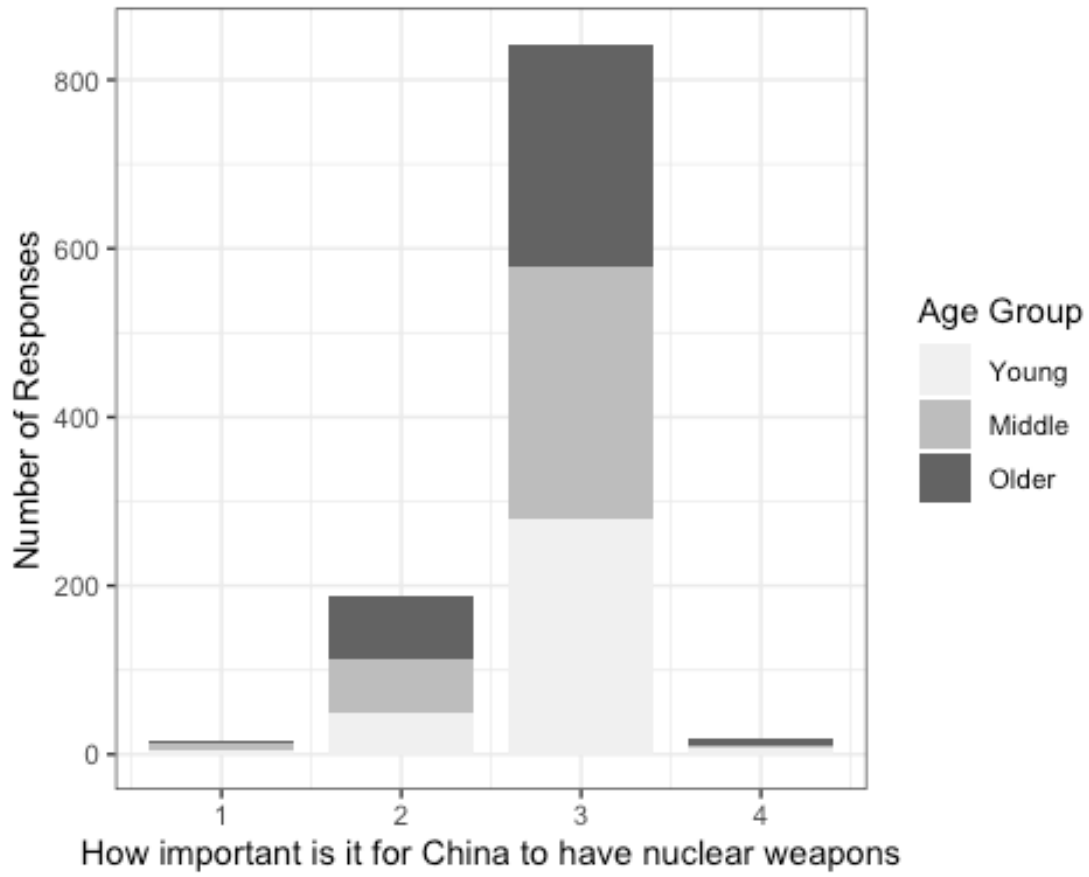

```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_2, fill=age_cat), width
= .8, position = position_stack(reverse = TRUE)) + labs(x = "Nuclear weapons
benefit Chinese security", y = "Number of Responses", fill="Age Group") + sca
le_fill_brewer(palette = "Greys") + theme_bw()
```




```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=wmd_3, fill=age_cat), width
= .8, position = position_stack(reverse = TRUE)) + labs(x = "Countries should
never use nuclear weapons in warfare", y = "Number of Responses", fill = "Age
Group") + scale_fill_brewer(palette = "Greys") + theme_bw()
```




```
ggplot(data=nuke_cov) + geom_bar(mapping = aes(x=nukes_reordered, fill=age_ca
t), width = .8, position = position_stack(reverse = TRUE)) + labs(x = "How im
portant is it for China to have nuclear weapons", y = "Number of Responses",
fill="Age Group") + scale_fill_brewer(palette = "Greys") + theme_bw()
```




```
#text analysis
nukes <- read_csv("China nuclear opinion/Nukestext.csv")

## Parsed with column specification:
## cols(
##   doc_id = col_character(),
##   text = col_character()
## )

pcre_config()

##              UTF-8 Unicode properties                JIT              stac
k
##               TRUE               TRUE              FALSE              FALS
E

summary(nukes)

##     doc_id              text
##  Length:1066        Length:1066
##  Class :character   Class :character
##  Mode  :character   Mode  :character
```

```
nukemerge <- merge(nukes, nuke_cov, by = "doc_id")
summary(nukemerge)
```

```
##     doc_id              text                age           nukes
##  Length:1066        Length:1066        Min.   :18.00   Length:1066
##  Class :character   Class :character   1st Qu.:20.00   Class :character
##  Mode  :character   Mode  :character   Median :31.00   Mode  :character
##                                        Mean   :34.63
##                                        3rd Qu.:45.00
##                                        Max.   :72.00
##     nukes_n          wmd_1           wmd_2           wmd_3
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:4.000   1st Qu.:4.000
##  Median :1.000   Median :2.000   Median :5.000   Median :5.000
##  Mean   :1.261   Mean   :2.496   Mean   :4.374   Mean   :4.434
##  3rd Qu.:1.000   3rd Qu.:4.000   3rd Qu.:5.000   3rd Qu.:5.000
##  Max.   :4.000   Max.   :5.000   Max.   :5.000   Max.   :5.000
##  nukes_reordered   age_cat
##  Min.   :1.000   Young :342
##  1st Qu.:3.000   Middle:373
##  Median :3.000   Older :351
##  Mean   :2.814
##  3rd Qu.:3.000
##  Max.   :4.000
```

```
ch_stop1 <- c("一个", "一种", stopwords("zh", source = "misc"))

nukescorpus <- corpus(nukemerge, docvars = nuke_cov)

## Warning: docvars argument is not used.

dfmnukes <- dfm(nukescorpus, remove = ch_stop1, remove_punct = TRUE, remove_n
umbers = TRUE)
summary(dfmnukes)

## Length  Class   Mode
## 818688    dfm     S4

topfeatures(dfmnukes)

##     国家    核武器     中国 国家安全     保护     威慑     安全     实力
##      261      148      139      124      124       99       91       77
##     国防     地位
##       70       69

nukemerge$age_cat <- factor(nukemerge$age_cat)
par(family = "Arial Unicode MS") #set font
par(mar=c(4.1, 11.5, 5.1, 2.1)) #set margins

#topic model
```

```
nukes8age <- stm(documents = dfmnukes, K = 8, data = docvars(nukescorpus), pr
evalence = ~nukemerge$age_cat)

## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      ........
##   Recovering initialization...
##      .......
## Initialization complete.
## ..................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -5.585)
## ..................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -5.511, relative change =
1.324e-02)
## ..................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -5.325, relative change =
3.376e-02)
## ..................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -5.216, relative change =
2.052e-02)
## ..................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -5.168, relative change =
9.266e-03)
## Topic 1: 中国, 核, 震, 武器, 强国
##  Topic 2: 核武器, 拥有, 国防, 我国, 权
##  Topic 3: 核武器, 侵略, 必须, 也是, 不用
##  Topic 4: 保护, 威慑, 安全, 实力, 军事
##  Topic 5: 国家, 没有, 国, 作用, 主权
##  Topic 6: 发达, 威胁, 能力, 国力, 自保
##  Topic 7: 国家安全, 重要, 保障, 地位, 国际
##  Topic 8: 中国, 科技, 有了, 很好, 增加
## ..................................................................
.............................
```

```
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -5.139, relative change =
5.592e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -5.122, relative change =
3.149e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -5.113, relative change =
1.908e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -5.107, relative change =
1.162e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -5.104, relative change
= 6.057e-04)
## Topic 1: 核, 慑, 震, 武器, 力
##  Topic 2: 核武器, 拥有, 国防, 我国, 权
##  Topic 3: 核武器, 侵略, 必须, 也是, 不用
##  Topic 4: 保护, 威慑, 安全, 实力, 军事
##  Topic 5: 国家, 作用, 没有, 国, 能够
##  Topic 6: 威胁, 发达, 国力, 能力, 不受
##  Topic 7: 国家安全, 重要, 地位, 保障, 国际
##  Topic 8: 中国, 科技, 有了, 很好, 威望
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -5.102, relative change
= 4.000e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -5.100, relative change
= 2.973e-04)
## ..........................................................................
```

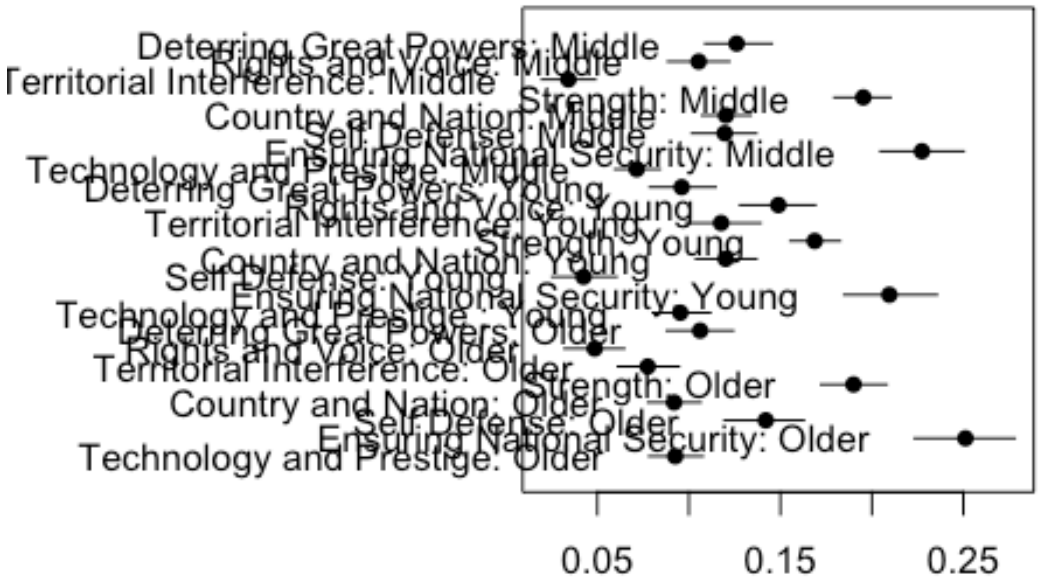
```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -5.099, relative change
= 2.788e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -5.098, relative change
= 1.935e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -5.097, relative change
= 1.360e-04)
## Topic 1: 核, 慑, 震, 力, 武器
##  Topic 2: 核武器, 拥有, 我国, 权, 话语
##  Topic 3: 核武器, 侵略, 必须, 也是, 不用
##  Topic 4: 保护, 威慑, 安全, 实力, 军事
##  Topic 5: 国家, 作用, 没有, 国, 能够
##  Topic 6: 威胁, 发达, 国力, 能力, 不受
##  Topic 7: 国家安全, 重要, 地位, 保障, 国防
##  Topic 8: 中国, 科技, 有了, 很好, 威望
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -5.096, relative change
= 1.672e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -5.095, relative change
= 1.468e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 18 (approx. per word bound = -5.095, relative change
= 1.116e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 19 (approx. per word bound = -5.094, relative change
= 1.320e-04)
```

```
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 20 (approx. per word bound = -5.093, relative change
= 1.376e-04)
## Topic 1: 核, 力, 慑, 震, 武器
##  Topic 2: 核武器, 拥有, 我国, 权, 话语
##  Topic 3: 核武器, 侵略, 必须, 也是, 不用
##  Topic 4: 保护, 威慑, 安全, 实力, 军事
##  Topic 5: 国家, 作用, 没有, 国, 能够
##  Topic 6: 威胁, 发达, 国力, 能力, 不受
##  Topic 7: 国家安全, 重要, 国防, 地位, 保障
##  Topic 8: 中国, 科技, 提升, 有了, 很好
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 21 (approx. per word bound = -5.093, relative change
= 1.203e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 22 (approx. per word bound = -5.092, relative change
= 8.601e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 23 (approx. per word bound = -5.092, relative change
= 1.041e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 24 (approx. per word bound = -5.091, relative change
= 7.709e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 25 (approx. per word bound = -5.091, relative change
= 2.106e-05)
## Topic 1: 核, 力, 慑, 震, 欺负
##  Topic 2: 核武器, 拥有, 我国, 权, 话语
##  Topic 3: 核武器, 侵略, 必须, 也是, 不用
##  Topic 4: 保护, 威慑, 安全, 实力, 军事
```

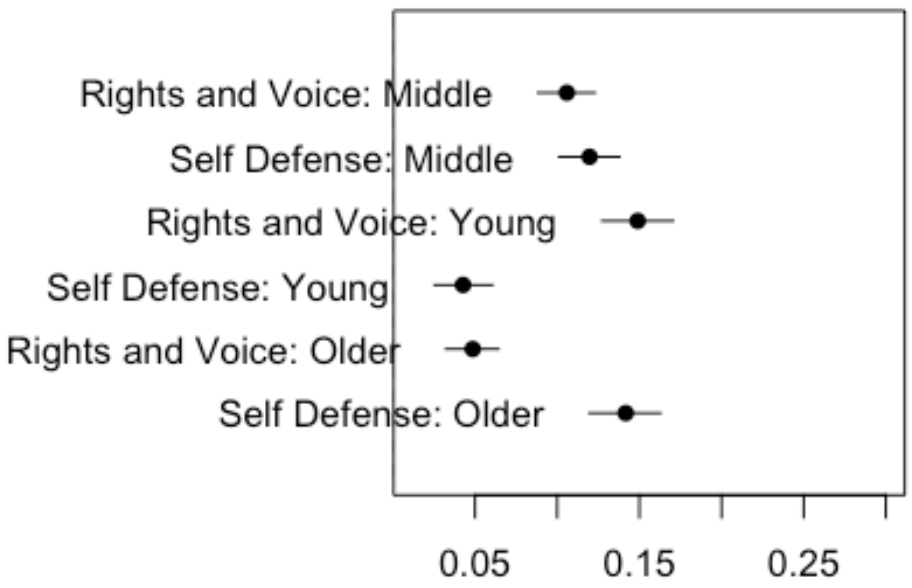
```
##  Topic 5: 国家, 作用, 没有, 国, 能够
##  Topic 6: 威胁, 发达, 国力, 能力, 不受
##  Topic 7: 国家安全, 国防, 重要, 地位, 保障
##  Topic 8: 中国, 提升, 科技, 有了, 很好
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 26 (approx. per word bound = -5.091, relative change
= 2.899e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Model Converged

summary(nukes8age)

## A topic model with 8 topics, 1066 documents and a 768 word dictionary.

## Topic 1 Top Words:
##       Highest Prob: 核, 力, 慑, 震, 欺负, 武器, 强国
##       FREX: 震, 慑, 不被, 强国, 被人, 保持, 核
##       Lift: 一百, 不惧, 丛林, 之外, 之路, 人鱼, 仍然是
##       Score: 震, 核, 慑, 力, 武器, 强国, 欺负
## Topic 2 Top Words:
##       Highest Prob: 核武器, 拥有, 我国, 权, 话语, 不敢, 使用
##       FREX: 话语, 气, 权, 底, 一部分, 谈判, 才有
##       Lift: 制造, 息, 是否, 一部分, 不可或缺, 不时之需, 中立
##       Score: 核武器, 拥有, 话语, 权, 气, 才有, 底
## Topic 3 Top Words:
##       Highest Prob: 核武器, 侵略, 必须, 也是, 不用, 领土, 国土
##       FREX: 完整, 也是, 国土, 不知道, 危害, 应对, 不用
##       Lift: 一道, 不利, 不然就, 不知道, 丧, 久远, 也不
##       Score: 侵略, 也是, 必须, 领土, 核武器, 要有, 不用
## Topic 4 Top Words:
##       Highest Prob: 保护, 威慑, 安全, 实力, 军事, 力量, 强大
##       FREX: 实力, 保护, 增强, 力量, 象征, 更好, 自我
##       Lift: 最好的, 反应, 变的, 展示, 方法, 直接, 才可以
##       Score: 保护, 威慑, 实力, 安全, 力量, 军事, 强大
## Topic 5 Top Words:
##       Highest Prob: 国家, 作用, 没有, 国, 能够, 主权, 家
##       FREX: 国, 国家, 卫, 保, 作用, 没有, 现在
##       Lift: 卫, 不在, 亡国, 侵入, 卷, 坚强, 填到
##       Score: 国家, 国, 作用, 没有, 保, 能够, 家
## Topic 6 Top Words:
##       Highest Prob: 威胁, 发达, 国力, 能力, 不受, 自保, 自卫
##       FREX: 自卫, 感觉, 威胁, 自保, 国力, 不太, 专业
```

```
##       Lift: 不伤，不太，不错，专业，个人，中国人，为国争光
##       Score: 威胁，自卫，自保，发达，感觉，国力，能力
## Topic 7 Top Words:
##       Highest Prob: 国家安全，国防，重要，地位，保障，国际，提高
##       FREX: 国家安全，提高，保障，非常，经济，确保，重要
##       Lift: 严峻，中的，事业，价，优势，保驾，做
##       Score: 国家安全，保障，提高，地位，经济，重要，国防
## Topic 8 Top Words:
##       Highest Prob: 中国，提升，科技，有了，很好，威望，增加
##       FREX: 威望，基础，增加，科技，综合，中国，很好
##       Lift: 也能，优秀，伟大，关键时刻，可用，同事，基础
##       Score: 中国，科技，很好，威望，提升，增加，有了
```

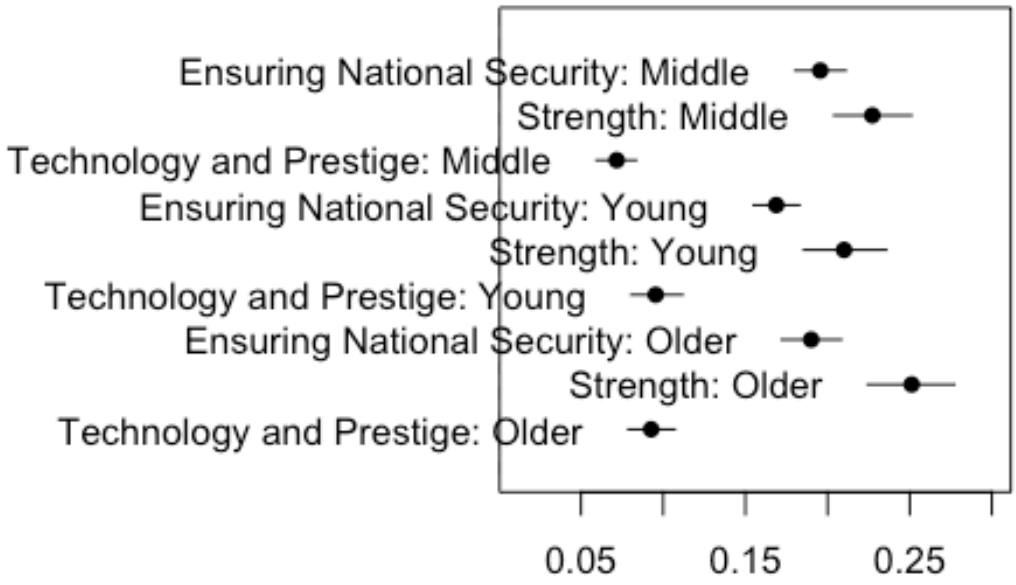
```
enukes8age <- estimateEffect(1:8 ~ age_cat, stmobj = nukes8age, metadata = nu
kemerge)
plot(enukes8age, covariate="age_cat", labeltype = "custom", custom.labels = c
("Deterring Great Powers: Middle", "Rights and Voice: Middle", "Territorial I
nterference: Middle", "Strength: Middle", "Country and Nation: Middle", "Self
Defense: Middle",

"Ensuring National Security: Middle", "Technology and Prestige: Middle", " De
terring Great Powers: Young", "Rights and Voice: Young", "Territorial Interfe
rence: Young", "Strength: Young", "Country and Nation: Young", "Self Defense:
Young",

"Ensuring National Security: Young", "Technology and Prestige : Young", " Det
erring Great Powers: Older", "Rights and Voice: Older", "Territorial Interfer
ence: Older", "Strength: Older", "Country and Nation: Older", "Self Defense:
Older", "Ensuring National Security: Older", "Technology and Prestige: Older"
), width=55)
```



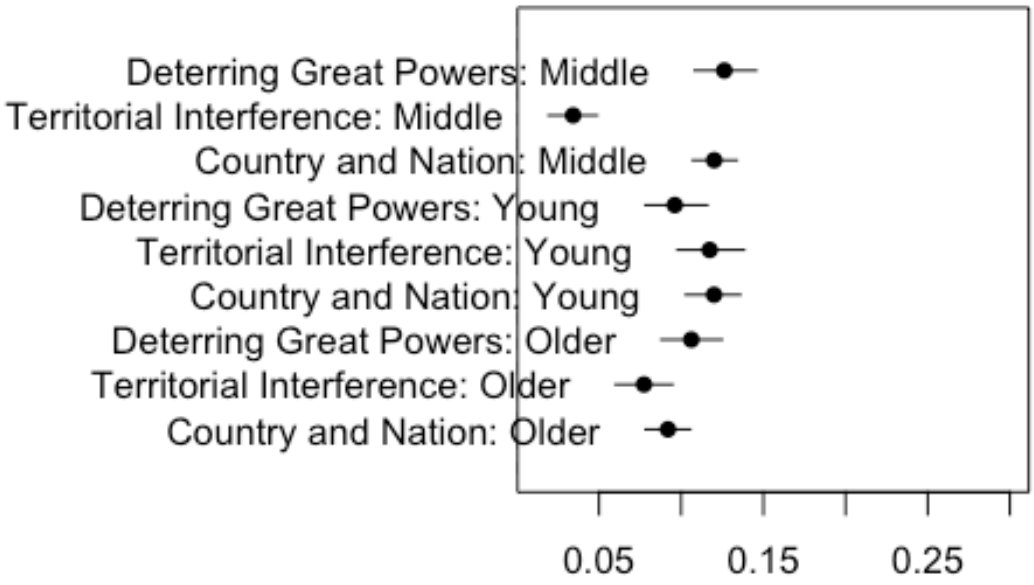

```
plot(enukes8age, covariate="age_cat", topics = c(2, 6), xlim = c(.012, .3), l
abeltype = "custom", custom.labels = c("Rights and Voice: Middle", "Self Defe
nse: Middle", "Rights and Voice: Young", "Self Defense: Young", "Rights and V
oice: Older", "Self Defense: Older"), width=35)
```




```
plot(enukes8age, covariate="age_cat", topics = c(4, 7, 8), xlim = c(.012, .3)
, labeltype = "custom", custom.labels = c("Ensuring National Security: Middle
", "Strength: Middle", "Technology and Prestige: Middle", "Ensuring National
Security: Young", "Strength: Young", "Technology and Prestige: Young", "Ensur
ing National Security: Older", "Strength: Older", "Technology and Prestige: O
lder"), width=35)
```




```
plot(enukes8age, covariate="age_cat", topics = c(1, 3, 5), xlim = c(0.012, .3
), labeltype = "custom", custom.labels = c("Deterring Great Powers: Middle",
"Territorial Interference: Middle", "Country and Nation: Middle", "Deterring
Great Powers: Young", "Territorial Interference: Young", "Country and Nation:
Young", "Deterring Great Powers: Older", "Territorial Interference: Older", "
Country and Nation: Older"), width=35)
```




```
#Alternate specifications
nukes6age <- stm(documents = dfmnukes, K = 6, data = docvars(nukescorpus), pr
evalence = ~nukemerge$age_cat)

## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      ......
##   Recovering initialization...
##      .......
## Initialization complete.
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -5.609)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -5.433, relative change =
3.132e-02)
## ..........................................................................
```

```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -5.322, relative change =
2.041e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -5.265, relative change =
1.081e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -5.232, relative change =
6.122e-03)
## Topic 1: 中国, 军事, 和平, 震, 世界
##  Topic 2: 国家安全, 保障, 国际, 地位, 重要
##  Topic 3: 国家, 安全, 人民, 主权, 维护
##  Topic 4: 核武器, 保护, 实力, 力量, 强大
##  Topic 5: 威慑, 强国, 必须, 战略, 必要
##  Topic 6: 力, 核, 国防, 没有, 国力
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -5.213, relative change =
3.632e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -5.202, relative change =
2.137e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -5.196, relative change =
1.278e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -5.191, relative change =
8.801e-04)
## ..........................................................................
.............................
```

```
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -5.188, relative change
= 6.721e-04)
## Topic 1: 中国, 军事, 和平, 震, 世界
##  Topic 2: 国家安全, 地位, 重要, 国际, 保障
##  Topic 3: 国家, 安全, 人民, 主权, 维护
##  Topic 4: 核武器, 保护, 实力, 力量, 强大
##  Topic 5: 威慑, 强国, 确保, 必要, 必须
##  Topic 6: 国防, 核, 力, 没有, 国力
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -5.185, relative change
= 3.933e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -5.184, relative change
= 3.198e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -5.183, relative change
= 2.516e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -5.181, relative change
= 1.981e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -5.181, relative change
= 1.789e-04)
## Topic 1: 中国, 军事, 和平, 震, 世界
##  Topic 2: 国家安全, 地位, 重要, 国际, 保障
##  Topic 3: 国家, 安全, 人民, 主权, 捍卫
##  Topic 4: 核武器, 保护, 实力, 力量, 强大
##  Topic 5: 威慑, 强国, 确保, 必要, 必须
##  Topic 6: 国防, 核, 力, 没有, 武器
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
```

```
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -5.180, relative change
= 1.280e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -5.179, relative change
= 1.121e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 18 (approx. per word bound = -5.179, relative change
= 7.887e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 19 (approx. per word bound = -5.179, relative change
= 5.455e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 20 (approx. per word bound = -5.178, relative change
= 3.476e-05)
## Topic 1: 中国, 军事, 和平, 震, 世界
##  Topic 2: 国家安全, 地位, 重要, 国际, 保障
##  Topic 3: 国家, 安全, 保证, 威胁, 人民
##  Topic 4: 核武器, 保护, 实力, 力量, 强大
##  Topic 5: 威慑, 强国, 确保, 必要, 必须
##  Topic 6: 国防, 核, 力, 没有, 武器
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 21 (approx. per word bound = -5.178, relative change
= 1.763e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Model Converged

summary(nukes6age)

## A topic model with 6 topics, 1066 documents and a 768 word dictionary.
```

```
## Topic 1 Top Words:
##       Highest Prob: 中国, 军事, 和平, 震, 世界, 作用, 慑
##       FREX: 震, 不会, 才不会, 不被, 不受, 抵抗, 和平
##       Lift: 一百, 一直, 不得已, 不惧, 不法, 丛林, 主动
##       Score: 中国, 军事, 和平, 震, 世界, 慑, 作用
## Topic 2 Top Words:
##       Highest Prob: 国家安全, 地位, 重要, 国际, 保障, 提高, 经济
##       FREX: 家, 卫, 器, 经济, 重, 自保, 国之
##       Lift: 卫, 不时之需, 不畏, 严重, 也不, 事物, 产物
##       Score: 国家安全, 经济, 地位, 保障, 国际, 非常, 重要
## Topic 3 Top Words:
##       Highest Prob: 国家, 安全, 保证, 威胁, 人民, 主权, 捍卫
##       FREX: 主权, 人民, 国家, 技术, 完整, 方面, 捍卫
##       Lift: 息, 是否, 一道, 不利, 不然就, 侵入, 受制于人
##       Score: 国家, 安全, 主权, 人民, 捍卫, 领土, 威胁
## Topic 4 Top Words:
##       Highest Prob: 核武器, 保护, 实力, 力量, 强大, 拥有, 我国
##       FREX: 实力, 保护, 象征, 核武器, 挨打, 增强, 力量
##       Lift: 人才, 变的, 开战, 手里, 损害, 方法, 土地
##       Score: 保护, 核武器, 实力, 力量, 强大, 保卫, 我国
## Topic 5 Top Words:
##       Highest Prob: 威慑, 强国, 确保, 必要, 必须, 足够, 手段
##       FREX: 威慑, 战略, 强国, 平衡, 要有, 气, 确保
##       Lift: 之路, 以外, 富民, 年代, 敢, 时代, 根本
##       Score: 威慑, 强国, 战略, 气, 要有, 必须, 底
## Topic 6 Top Words:
##       Highest Prob: 国防, 核, 力, 武器, 没有, 国力, 体现
##       FREX: 国力, 体现, 综合, 国防, 加强, 武器, 核
##       Lift: 人类, 伤害, 信心, 强盛, 必然, 不少, 不足
##       Score: 核, 国防, 力, 没有, 国力, 武器, 保持
```

```
nukes7age <- stm(documents = dfmnukes, K = 7, data = docvars(nukescorpus), pr
evalence = ~nukemerge$age_cat)
```

```
## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      .......
##   Recovering initialization...
##      .......
## Initialization complete.
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -5.542)
## .....................................................................
.............................
```

```
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -5.389, relative change =
2.767e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -5.271, relative change =
2.195e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -5.191, relative change =
1.503e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -5.152, relative change =
7.669e-03)
## Topic 1: 核, 和平, 作用, 世界, 欺负
##  Topic 2: 力量, 中国, 国防, 慑, 震
##  Topic 3: 拥有, 中国, 必须, 使用, 战争
##  Topic 4: 国家, 核武器, 保护, 威慑, 实力
##  Topic 5: 重要, 地位, 国家安全, 国际, 经济
##  Topic 6: 国家安全, 保障, 中国, 安全, 没有
##  Topic 7: 能力, 权, 话语, 安全, 中国
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -5.139, relative change =
2.467e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -5.130, relative change =
1.778e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -5.123, relative change =
1.369e-03)
## ..........................................................................
.............................
```

```
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -5.119, relative change =
7.470e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -5.117, relative change
= 4.401e-04)
## Topic 1: 核, 和平, 世界, 作用, 欺负
##  Topic 2: 力量, 中国, 国防, 慑, 震
##  Topic 3: 拥有, 中国, 人民, 使用, 必须
##  Topic 4: 国家, 核武器, 保护, 威慑, 实力
##  Topic 5: 重要, 地位, 国际, 提高, 经济
##  Topic 6: 国家安全, 安全, 保障, 中国, 没有
##  Topic 7: 能力, 威胁, 权, 话语, 自保
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -5.115, relative change
= 3.232e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -5.113, relative change
= 3.248e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -5.112, relative change
= 2.656e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -5.111, relative change
= 2.556e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -5.109, relative change
= 3.075e-04)
## Topic 1: 核, 和平, 世界, 欺负, 作用
##  Topic 2: 力量, 中国, 国防, 慑, 震
```

```
##  Topic 3: 拥有, 使用, 人民, 中国, 必须
##  Topic 4: 国家, 核武器, 保护, 威慑, 实力
##  Topic 5: 地位, 重要, 国际, 提高, 经济
##  Topic 6: 国家安全, 安全, 保障, 中国, 维护
##  Topic 7: 能力, 威胁, 权, 话语, 有了
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -5.108, relative change
= 2.117e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -5.107, relative change
= 1.795e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 18 (approx. per word bound = -5.106, relative change
= 1.864e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 19 (approx. per word bound = -5.105, relative change
= 2.332e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 20 (approx. per word bound = -5.104, relative change
= 2.074e-04)
## Topic 1: 核, 和平, 世界, 欺负, 作用
##  Topic 2: 力量, 中国, 国防, 慑, 震
##  Topic 3: 拥有, 使用, 人民, 中国, 核武器
##  Topic 4: 国家, 保护, 核武器, 威慑, 实力
##  Topic 5: 地位, 重要, 国际, 提高, 我国
##  Topic 6: 国家安全, 安全, 中国, 保障, 维护
##  Topic 7: 能力, 有了, 权, 威胁, 核武器
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 21 (approx. per word bound = -5.103, relative change
= 1.767e-04)
## ..........................................................................
```

```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 22 (approx. per word bound = -5.102, relative change
= 1.383e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 23 (approx. per word bound = -5.102, relative change
= 1.442e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 24 (approx. per word bound = -5.101, relative change
= 2.050e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 25 (approx. per word bound = -5.099, relative change
= 3.449e-04)
## Topic 1: 核, 和平, 世界, 欺负, 作用
##  Topic 2: 力量, 国防, 中国, 慑, 震
##  Topic 3: 拥有, 核武器, 使用, 人民, 中国
##  Topic 4: 国家, 保护, 威慑, 核武器, 实力
##  Topic 5: 地位, 重要, 国际, 提高, 我国
##  Topic 6: 国家安全, 安全, 中国, 保障, 维护
##  Topic 7: 核武器, 能力, 有了, 权, 话语
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 26 (approx. per word bound = -5.097, relative change
= 2.629e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 27 (approx. per word bound = -5.096, relative change
= 1.899e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 28 (approx. per word bound = -5.095, relative change
= 1.944e-04)
## ..........................................................................
```

```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 29 (approx. per word bound = -5.094, relative change
= 2.322e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 30 (approx. per word bound = -5.093, relative change
= 1.756e-04)
## Topic 1: 核, 和平, 世界, 欺负, 作用
##  Topic 2: 力量, 国防, 中国, 慑, 震
##  Topic 3: 核武器, 拥有, 中国, 使用, 人民
##  Topic 4: 国家, 保护, 威慑, 实力, 军事
##  Topic 5: 地位, 重要, 国际, 提高, 我国
##  Topic 6: 国家安全, 安全, 中国, 保障, 维护
##  Topic 7: 核武器, 能力, 有了, 权, 话语
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 31 (approx. per word bound = -5.092, relative change
= 1.859e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 32 (approx. per word bound = -5.091, relative change
= 2.254e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 33 (approx. per word bound = -5.090, relative change
= 2.437e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 34 (approx. per word bound = -5.088, relative change
= 3.127e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 35 (approx. per word bound = -5.088, relative change
= 1.900e-04)
## Topic 1: 核, 威慑, 和平, 世界, 欺负
```

```
##  Topic 2: 国防, 力量, 中国, 慑, 震
##  Topic 3: 核武器, 拥有, 中国, 使用, 必须
##  Topic 4: 国家, 保护, 实力, 军事, 威慑
##  Topic 5: 地位, 重要, 国际, 提高, 我国
##  Topic 6: 国家安全, 安全, 中国, 保障, 维护
##  Topic 7: 核武器, 能力, 有了, 权, 话语
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 36 (approx. per word bound = -5.087, relative change
= 1.092e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 37 (approx. per word bound = -5.087, relative change
= 7.401e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 38 (approx. per word bound = -5.086, relative change
= 3.972e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Model Converged

summary(nukes7age)

## A topic model with 7 topics, 1066 documents and a 768 word dictionary.

## Topic 1 Top Words:
##       Highest Prob: 威慑, 核, 和平, 世界, 欺负, 作用, 大国
##       FREX: 核, 和平, 不被, 维持, 欺负, 受, 平衡
##       Lift: 一百, 一直, 不再, 不可, 不惧, 不法, 不被
##       Score: 核, 和平, 威慑, 欺负, 强国, 世界, 不被
## Topic 2 Top Words:
##       Highest Prob: 国防, 力量, 慑, 震, 中国, 增强, 发达
##       FREX: 国, 家, 保, 综合, 力量, 科技, 发达
##       Lift: 卫, 禁止, 不了, 不可或缺, 不少, 不时之需, 不足
##       Score: 力量, 慑, 震, 国防, 发达, 国, 科技
## Topic 3 Top Words:
##       Highest Prob: 核武器, 拥有, 中国, 使用, 必须, 没有, 战争
##       FREX: 资本, 不用, 必须, 使用, 不能, 抵抗, 突破
##       Lift: 一项, 不一定, 不然就, 不用, 不能, 两码, 事
##       Score: 核武器, 拥有, 使用, 必须, 突破, 不用, 资本
```

```
## Topic 4 Top Words:
##       Highest Prob: 国家, 保护, 实力, 军事, 强大, 力, 保卫
##       FREX: 实力, 国家, 保护, 象征, 强大, 保卫, 力
##       Lift: 不轨, 争, 侵入, 侵害, 做为, 最好的, 反应
##       Score: 国家, 保护, 实力, 军事, 强大, 保卫, 力
## Topic 5 Top Words:
##       Highest Prob: 地位, 重要, 国际, 提高, 我国, 经济, 发展
##       FREX: 非常, 感觉, 经济, 了解, 重要, 地位, 不知道
##       Lift: 一道, 不得已, 不畏, 不知道, 不错, 严峻, 丧
##       Score: 地位, 经济, 提高, 重要, 非常, 国际, 我国
## Topic 6 Top Words:
##       Highest Prob: 国家安全, 安全, 中国, 保障, 维护, 保证, 没有
##       FREX: 国家安全, 保障, 增加, 安全, 可能, 有益, 立足
##       Lift: 不公, 为国争光, 举措, 亡国, 产品, 人类, 伤害
##       Score: 国家安全, 安全, 保障, 维护, 保证, 中国, 增加
## Topic 7 Top Words:
##       Highest Prob: 核武器, 能力, 有了, 权, 话语, 必要, 自保
##       FREX: 话语, 自保, 权, 气, 能力, 底, 怕
##       Lift: 话语, 不伤, 不利, 不对, 久远, 之后, 也有
##       Score: 能力, 话语, 权, 有了, 气, 底, 自保
```

```
nukes9age <- stm(documents = dfmnukes, K = 9, data = docvars(nukescorpus), pr
evalence = ~nukemerge$age_cat)
```

```
## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      .........
##   Recovering initialization...
##      .......
## Initialization complete.
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -5.602)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -5.412, relative change =
3.386e-02)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -5.283, relative change =
2.386e-02)
## .....................................................................
```

```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -5.215, relative change =
1.286e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -5.180, relative change =
6.841e-03)
## Topic 1: 国家安全，强大，重要，经济，非常
##  Topic 2: 核武器，核，没有，拥有，大国
##  Topic 3: 核武器，国家，拥有，必须，才不会
##  Topic 4: 保护，实力，发展，慑，保卫
##  Topic 5: 威慑，力，提升，国力，作用
##  Topic 6: 军事，地位，国家，国际，提高
##  Topic 7: 国家，力量，国防，震，威胁
##  Topic 8: 中国，保障，欺负，科技，增加
##  Topic 9: 安全，国防，国家安全，国家，经济
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -5.155, relative change =
4.815e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -5.136, relative change =
3.671e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -5.122, relative change =
2.729e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -5.113, relative change =
1.758e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -5.108, relative change
```

```
= 1.023e-03)
## Topic 1: 国家安全，强大，重要，经济，非常
##  Topic 2: 核武器，核，没有，大国，拥有
##  Topic 3: 核武器，国家，拥有，代表，有了
##  Topic 4: 保护，实力，发展，慑，保卫
##  Topic 5: 威慑，力，提升，国力，作用
##  Topic 6: 地位，军事，国际，提高，我国
##  Topic 7: 国家，力量，震，威胁，国防
##  Topic 8: 中国，保障，欺负，科技，增加
##  Topic 9: 安全，国防，和平，世界，维护
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -5.104, relative change
= 7.370e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -5.101, relative change
= 5.343e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -5.099, relative change
= 3.288e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -5.098, relative change
= 2.053e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -5.097, relative change
= 1.805e-04)
## Topic 1: 国家安全，重要，强大，经济，非常
##  Topic 2: 核武器，没有，大国，拥有，使用
##  Topic 3: 核武器，国家，拥有，代表，有了
##  Topic 4: 保护，实力，发展，保卫，慑
##  Topic 5: 威慑，力，核，国力，提升
##  Topic 6: 地位，军事，国际，提高，我国
##  Topic 7: 国家，力量，震，威胁，防止
##  Topic 8: 中国，保障，欺负，科技，增加
```

```
##  Topic 9: 安全, 国防, 和平, 世界, 维护
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -5.097, relative change
= 1.758e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -5.096, relative change
= 1.314e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 18 (approx. per word bound = -5.095, relative change
= 1.682e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 19 (approx. per word bound = -5.094, relative change
= 1.781e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 20 (approx. per word bound = -5.093, relative change
= 1.614e-04)
## Topic 1: 国家安全, 重要, 强大, 经济, 非常
##  Topic 2: 核武器, 没有, 大国, 拥有, 使用
##  Topic 3: 核武器, 国家, 拥有, 代表, 有了
##  Topic 4: 保护, 实力, 发展, 保卫, 慑
##  Topic 5: 威慑, 力, 核, 国力, 作用
##  Topic 6: 地位, 军事, 国际, 提高, 我国
##  Topic 7: 国家, 力量, 威胁, 震, 防止
##  Topic 8: 中国, 保障, 欺负, 科技, 增加
##  Topic 9: 安全, 国防, 维护, 和平, 世界
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 21 (approx. per word bound = -5.092, relative change
= 1.605e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
```

```
## Completed M-Step.
## Completing Iteration 22 (approx. per word bound = -5.091, relative change
= 2.147e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 23 (approx. per word bound = -5.090, relative change
= 2.829e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 24 (approx. per word bound = -5.089, relative change
= 1.252e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 25 (approx. per word bound = -5.089, relative change
= 1.215e-04)
## Topic 1: 国家安全, 重要, 强大, 经济, 非常
##  Topic 2: 核武器, 慑, 震, 没有, 大国
##  Topic 3: 核武器, 国家, 拥有, 代表, 有了
##  Topic 4: 保护, 实力, 发展, 保卫, 增强
##  Topic 5: 威慑, 力, 核, 作用, 国力
##  Topic 6: 地位, 军事, 国际, 提高, 我国
##  Topic 7: 国家, 力量, 威胁, 防止, 主权
##  Topic 8: 中国, 保障, 欺负, 科技, 增加
##  Topic 9: 安全, 国防, 维护, 和平, 世界
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 26 (approx. per word bound = -5.088, relative change
= 1.399e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 27 (approx. per word bound = -5.087, relative change
= 2.205e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 28 (approx. per word bound = -5.086, relative change
= 1.453e-04)
## ..........................................................................
```

```
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 29 (approx. per word bound = -5.086, relative change
= 3.541e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Model Converged

summary(nukes8age)

## A topic model with 8 topics, 1066 documents and a 768 word dictionary.

## Topic 1 Top Words:
##       Highest Prob: 核, 力, 慑, 震, 欺负, 武器, 强国
##       FREX: 震, 慑, 不被, 强国, 被人, 保持, 核
##       Lift: 一百, 不惧, 丛林, 之外, 之路, 人鱼, 仍然是
##       Score: 震, 核, 慑, 力, 武器, 强国, 欺负
## Topic 2 Top Words:
##       Highest Prob: 核武器, 拥有, 我国, 权, 话语, 不敢, 使用
##       FREX: 话语, 气, 权, 底, 一部分, 谈判, 才有
##       Lift: 制造, 息, 是否, 一部分, 不可或缺, 不时之需, 中立
##       Score: 核武器, 拥有, 话语, 权, 气, 才有, 底
## Topic 3 Top Words:
##       Highest Prob: 核武器, 侵略, 必须, 也是, 不用, 领土, 国土
##       FREX: 完整, 也是, 国土, 不知道, 危害, 应对, 不用
##       Lift: 一道, 不利, 不然就, 不知道, 丧, 久远, 也不
##       Score: 侵略, 也是, 必须, 领土, 核武器, 要有, 不用
## Topic 4 Top Words:
##       Highest Prob: 保护, 威慑, 安全, 实力, 军事, 力量, 强大
##       FREX: 实力, 保护, 增强, 力量, 象征, 更好, 自我
##       Lift: 最好的, 反应, 变的, 展示, 方法, 直接, 才可以
##       Score: 保护, 威慑, 实力, 安全, 力量, 军事, 强大
## Topic 5 Top Words:
##       Highest Prob: 国家, 作用, 没有, 国, 能够, 主权, 家
##       FREX: 国, 国家, 卫, 保, 作用, 没有, 现在
##       Lift: 卫, 不在, 亡国, 侵入, 卷, 坚强, 填到
##       Score: 国家, 国, 作用, 没有, 保, 能够, 家
## Topic 6 Top Words:
##       Highest Prob: 威胁, 发达, 国力, 能力, 不受, 自保, 自卫
##       FREX: 自卫, 感觉, 威胁, 自保, 国力, 不太, 专业
##       Lift: 不伤, 不太, 不错, 专业, 个人, 中国人, 为国争光
##       Score: 威胁, 自卫, 自保, 发达, 感觉, 国力, 能力
## Topic 7 Top Words:
##       Highest Prob: 国家安全, 国防, 重要, 地位, 保障, 国际, 提高
##       FREX: 国家安全, 提高, 保障, 非常, 经济, 确保, 重要
```

```
##       Lift: 严峻, 中的, 事业, 价, 优势, 保驾, 做
##       Score: 国家安全, 保障, 提高, 地位, 经济, 重要, 国防
## Topic 8 Top Words:
##       Highest Prob: 中国, 提升, 科技, 有了, 很好, 威望, 增加
##       FREX: 威望, 基础, 增加, 科技, 综合, 中国, 很好
##       Lift: 也能, 优秀, 伟大, 关键时刻, 可用, 同事, 基础
##       Score: 中国, 科技, 很好, 威望, 提升, 增加, 有了
```

```
nukes10age <- stm(documents = dfmnukes, K = 10, data = docvars(nukescorpus),
prevalence = ~nukemerge$age_cat)
```

```
## Beginning Spectral Initialization
##   Calculating the gram matrix...
##   Finding anchor words...
##      .........
##   Recovering initialization...
##      .......
## Initialization complete.
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 1 (approx. per word bound = -5.667)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 2 (approx. per word bound = -5.500, relative change =
2.949e-02)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 3 (approx. per word bound = -5.326, relative change =
3.162e-02)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 4 (approx. per word bound = -5.258, relative change =
1.284e-02)
## .....................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 5 (approx. per word bound = -5.217, relative change =
7.793e-03)
## Topic 1: 国家安全, 力量, 重要, 国防, 提高
##  Topic 2: 威慑, 核, 力, 我国, 发展
```

```
##  Topic 3: 国家, 实力, 强大, 安全, 体现
##  Topic 4: 保护, 保障, 保卫, 欺负, 代表
##  Topic 5: 中国, 安全, 地位, 国际, 提升
##  Topic 6: 慑, 震, 和平, 国, 强国
##  Topic 7: 核武器, 拥有, 国家, 有了, 才有
##  Topic 8: 军事, 威望, 自卫, 资本, 自保
##  Topic 9: 和平, 慑, 震, 国, 强国
##  Topic 10: 国家, 强大, 战争, 国家安全, 安全
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 6 (approx. per word bound = -5.153, relative change =
1.225e-02)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 7 (approx. per word bound = -5.127, relative change =
5.082e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 8 (approx. per word bound = -5.110, relative change =
3.330e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 9 (approx. per word bound = -5.097, relative change =
2.543e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 10 (approx. per word bound = -5.088, relative change
= 1.608e-03)
## Topic 1: 国家安全, 重要, 国防, 力量, 维护
##  Topic 2: 威慑, 核, 力, 我国, 经济
##  Topic 3: 国家, 实力, 强大, 体现, 人民
##  Topic 4: 保护, 保障, 保卫, 欺负, 代表
##  Topic 5: 中国, 安全, 地位, 国际, 提高
##  Topic 6: 慑, 震, 和平, 国, 世界
##  Topic 7: 核武器, 拥有, 有了, 国家, 才有
##  Topic 8: 军事, 威望, 自卫, 自保, 感觉
##  Topic 9: 强国, 不会, 和平, 核武, 要有
##  Topic 10: 战争, 武器, 国家, 能力, 有效
```

```
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 11 (approx. per word bound = -5.083, relative change
= 1.044e-03)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 12 (approx. per word bound = -5.080, relative change
= 5.538e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 13 (approx. per word bound = -5.079, relative change
= 2.516e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 14 (approx. per word bound = -5.078, relative change
= 1.875e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 15 (approx. per word bound = -5.077, relative change
= 1.978e-04)
## Topic 1: 国家安全，重要，国防，力量，维护
##  Topic 2: 威慑，核，力，我国，经济
##  Topic 3: 国家，实力，强大，人民，体现
##  Topic 4: 保护，保障，保卫，欺负，代表
##  Topic 5: 中国，安全，地位，国际，提高
##  Topic 6: 慑，震，和平，作用，世界
##  Topic 7: 核武器，拥有，没有，有了，才有
##  Topic 8: 军事，威望，自卫，自保，感觉
##  Topic 9: 强国，不会，核武，和平，要有
##  Topic 10: 武器，战争，能力，威胁，有效
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Completing Iteration 16 (approx. per word bound = -5.077, relative change
= 1.157e-04)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
```

```
## Completed M-Step.
## Completing Iteration 17 (approx. per word bound = -5.076, relative change
= 3.430e-05)
## ..........................................................................
.............................
## Completed E-Step (0 seconds).
## Completed M-Step.
## Model Converged

summary(nukes10age)

## A topic model with 10 topics, 1066 documents and a 768 word dictionary.

## Topic 1 Top Words:
##       Highest Prob: 国家安全, 重要, 力量, 国防, 维护, 非常, 发达
##       FREX: 国家安全, 非常, 力量, 保证, 加强, 捍卫, 重要
##       Lift: 严峻, 挑战, 措施, 支撑, 久远, 摄, 有用
##       Score: 国家安全, 重要, 力量, 国防, 非常, 维护, 发达
## Topic 2 Top Words:
##       Highest Prob: 威慑, 核, 力, 我国, 经济, 发展, 增强
##       FREX: 威慑, 保持, 战略, 核, 不受, 增强, 经济
##       Lift: 关键, 出手, 华, 反, 恫吓, 政权, 杆子
##       Score: 威慑, 核, 力, 经济, 发展, 我国, 保持
## Topic 3 Top Words:
##       Highest Prob: 国家, 实力, 强大, 人民, 体现, 能够, 更好
##       FREX: 实力, 体现, 国家, 人民, 更加, 强大, 证明
##       Lift: 不然就, 发出, 声音, 武装, 留, 变, 侵入
##       Score: 国家, 实力, 强大, 体现, 人民, 更好, 证明
## Topic 4 Top Words:
##       Highest Prob: 保护, 保障, 保卫, 欺负, 代表, 象征, 防止
##       FREX: 保护, 保卫, 自我, 挨打, 保障, 权益, 落后
##       Lift: 土地, 教育, 随便, 丧, 国有, 当中, 提出
##       Score: 保护, 保障, 保卫, 欺负, 代表, 防止, 挨打
## Topic 5 Top Words:
##       Highest Prob: 中国, 安全, 地位, 国际, 提高, 提升, 国防
##       FREX: 地位, 增加, 提升, 国际, 关, 提高, 安全
##       Lift: 有益, 矮子, 行走, 路上, 制造, 开放, 控
##       Score: 中国, 安全, 地位, 国际, 提高, 提升, 增加
## Topic 6 Top Words:
##       Highest Prob: 慑, 和平, 震, 世界, 作用, 国, 使用
##       FREX: 保, 慑, 作用, 家, 武力, 震, 世界
##       Lift: 主动, 之路, 国泰, 富民, 攻陷, 根本, 民安
##       Score: 慑, 震, 和平, 国, 作用, 使用, 保
## Topic 7 Top Words:
##       Highest Prob: 核武器, 拥有, 没有, 有了, 权, 才有, 话语
##       FREX: 拥有, 核武器, 气, 底, 才不会, 谈判, 资本
##       Lift: 一道, 优势, 便, 权利, 王牌, 美方, 说话
```

```
##       Score: 核武器, 拥有, 有了, 才有, 气, 底, 没有
## Topic 8 Top Words:
##       Highest Prob: 军事, 威望, 自保, 自卫, 感觉, 重, 手段
##       FREX: 国之, 资源, 不太, 感觉, 了解, 自卫, 重
##       Lift: 也不, 也能, 事物, 产物, 优, 伟大, 关键时刻
##       Score: 军事, 威望, 自卫, 感觉, 自保, 器, 重
## Topic 9 Top Words:
##       Highest Prob: 强国, 不会, 核武, 要有, 维持, 和平, 受
##       FREX: 不会, 受, 要有, 核武, 欺, 强国, 列强
##       Lift: 一百, 不得已, 不惧, 东西, 主流, 依旧, 保驾
##       Score: 强国, 不会, 要有, 维持, 受, 核武, 列强
## Topic 10 Top Words:
##       Highest Prob: 武器, 战争, 能力, 威胁, 必须, 有效, 也要
##       FREX: 有效, 战争, 武器, 能力, 发动, 也要, 弱国无外交
##       Lift: 保全, 抵御外侮, 为国争光, 产品, 同意, 坦克, 好好
##       Score: 战争, 武器, 能力, 威胁, 有效, 也要, 抵抗
```