PSC4375: Missing Data

Week 3: Lecture 6

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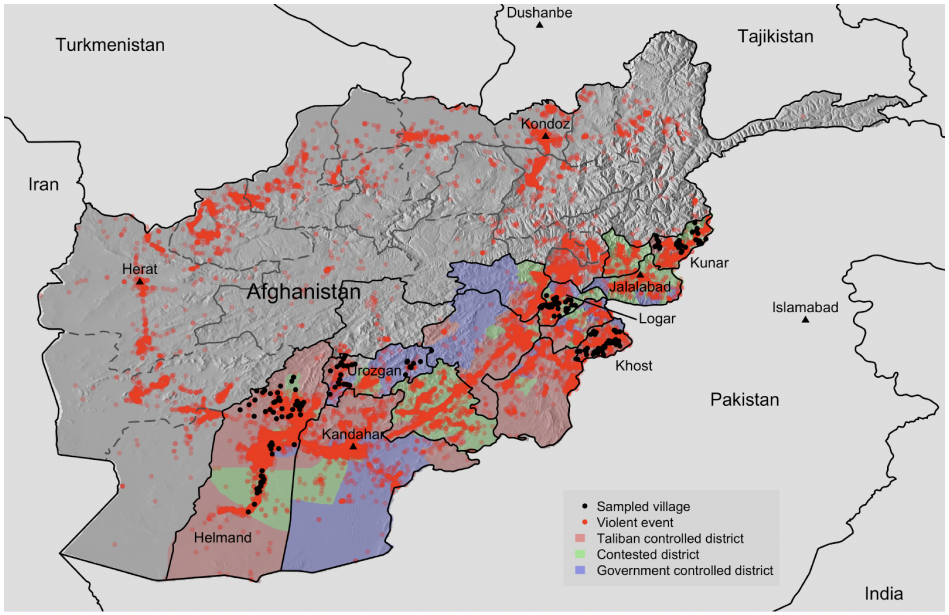
Civilian attitudes and war against insurgency

- War in Afghanistan: counter-insurgency war
  - Military against insurgents
  - Key to victory: winning hearts and minds of civilians
  - Aid provision, information campaign, minimizing civilian casualties
- How does exposure to violence affect support for Taliban coalition?



Afghan study

```
library(tidyverse)
data(afghan, package = "qss")
head(afghan[,1:8])
```

```
##   province     district village.id age educ.years employed
## 1    Logar Baraki Barak          80  26          10        0
## 2    Logar Baraki Barak          80  49           3        1
## 3    Logar Baraki Barak          80  60           0        1
## 4    Logar Baraki Barak          80  34          14        1
## 5    Logar Baraki Barak          80  21          12        1
## 6    Logar Baraki Barak          80  18          10        1
##          income violent.exp.ISAF
## 1 2,001-10,000                 0
## 2 2,001-10,000                 0
## 3 2,001-10,000                 1
## 4 2,001-10,000                 0
```

Missing data

- **Nonresponse**: respondent can't or won't answer question -Sensitive questions $\rightsquigarrow$ **social desirability bias** -Some countries lack official statistics like unemployment
  - Leads to missing data
- Missing data in R: a special value {\color{green}NA}
- Causes problems with calculating statistics:

```
## prop. of those who got hurt by ISAF
mean(afghan$violent.exp.ISAF)
```

```
## [1] NA
```

Handling missing data in R (UPDATE TIDY)

- Adding `na.rm = TRUE` to some functions removes missing data

```
afghan %>% summarize(mean(violent.exp.ISAF, na.rm = TRUE))
```

```
##   mean(violent.exp.ISAF, na.rm = TRUE)
## 1                            0.3748626
```

- Or, you can explicitly remove missing values using `na.omit()` function:

```
afghan %>% summarize(mean(na.omit(violent.exp.ISAF)))
```

```
##   mean(na.omit(violent.exp.ISAF))
## 1                       0.3748626
```

- See number of `NA`s with `count()` + `group_by()`

```
afghan %>%
```

Available-case vs. complete-case analysis

- **Available-case analysis**: use the data you have for that variable:

```
afghan %>%
  summarize(sum(!is.na(violent.exp.ISAF)))
```

```
##   sum(!is.na(violent.exp.ISAF))
## 1                          2729
```

```
afghan %>%
  summarize(mean(violent.exp.ISAF,na.rm=TRUE))
```

```
##   mean(violent.exp.ISAF, na.rm = TRUE)
## 1                            0.3748626
```

Available-case vs. complete-case analysis

- **Complete-case analysis**: only use units that have data on all variables
  - Also called **listwise deletion**

```
dim(na.omit(afghan))
```

```
## [1] 2554   11
```

```
afghan %>%
  na.omit() %>%
  summarize(mean(violent.exp.ISAF))
```

```
##   mean(violent.exp.ISAF)
## 1              0.3719655
```

Non-response and other biases

- Nonresponse can create bias
- More violent areas $\rightsquigarrow$ more non-response:

```
afghan %>%
  group_by(province) %>%
  summarize(violent.exp.taliban = mean(is.na(violent.exp.talib
            violent.exp.ISAF = mean(is.na(violent.exp.ISAF)))
```

```
## # A tibble: 5 x 3
##   province violent.exp.taliban violent.exp.ISAF
##   <chr>                  <dbl>            <dbl>
## 1 Helmand              0.0304           0.0164
## 2 Khost                0.00635          0.00476
## 3 Kunar                0                0
## 4 Logar                0                0
## 5 Uruzgan              0.0620           0.0207
```