



$$\hat{IAT} = \hat{\beta}_0 + \hat{\beta}_1 I(Rel = not) + \hat{\beta}_2 I(Rel = not + very) + \hat{\beta}_3 I(Rel = some) + \hat{\beta}_4 I(Rel = very)$$

+ all vars not including race & religion

$$+ \hat{\beta}_5 I(Race = 1) + \hat{\beta}_6 I(Race = 2) + \dots + \hat{\beta}_{12} I(Race = 7) +$$

$$\hat{\beta}_{13} I(Rel = not) \cdot \hat{\beta}_{all} I(Rel = 1) +$$

predict()

Questions to answer:

- As religiosity inc, what does IAT do in general? (inc, dec, stay same, mixed?)

ppl who neutral in —, women,

- Which races have a noteworthy difference in religiosity effect?  
(~~any~~ w identify biggest effect & smallest)

effect modifier:  $X_2$  is EMM  
 $X_1$  is my main var

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \underbrace{\hat{\beta}_3 X_1 \cdot X_2}_{\text{interaction}}$$

model if  $X_2$  is EMM  
for  $X_1$

$X_3$  confounder:

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \underbrace{\hat{\beta}_3 X_3}_{\text{main effect}} + \underbrace{\hat{\beta}_4 X_1 \cdot X_2}_{\text{interaction}}$$

$X_3$  is a confounder  $X_1$  vs  $Y$   
 $X_2$  is EMM for  $X_1$  vs  $Y$

model adjusted  $X_2$  &  $X_3$ : both confounders

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3$$

model w/  $X_2$  <sup>EMM</sup> interaction & adjusted for  $X_3$ : <sup>confounder</sup>

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + \hat{\beta}_4 X_1 \cdot X_2$$

if interactions:

## Methods for life expectancy

- Data were collected from Gapminder and World Bank with 197 countries in 2011
- We performed a complete case analysis on 72 countries
- We generated categorized variables for CO2 emissions and income levels
  - CO2 emissions used quartiles
  - Income levels used the specified groupings by Gapminder
- We used purposeful model selection, a combination of field expertise and statistical methods, to determine the final model
- We performed linear regression on our outcome, life expectancy, with a main effect for female literacy rate while adjusting for confounders

$$\widehat{LE} = \hat{\beta}_0 + \hat{\beta}_1 FLR + \text{other confounders} + \text{interactions w/ EMMs}$$

- **We adjusted for:** CO2 emissions, income levels, world region, access to improved water, food supply, and intergovernmental groups
- We investigated model assumptions and diagnostics using standardized residuals, leverage, Cook's distance, and variance inflation factors (VIF)
- We used R version 4.4.1 to analyze data

• EMMs: income levels, etc. .