

Final Report

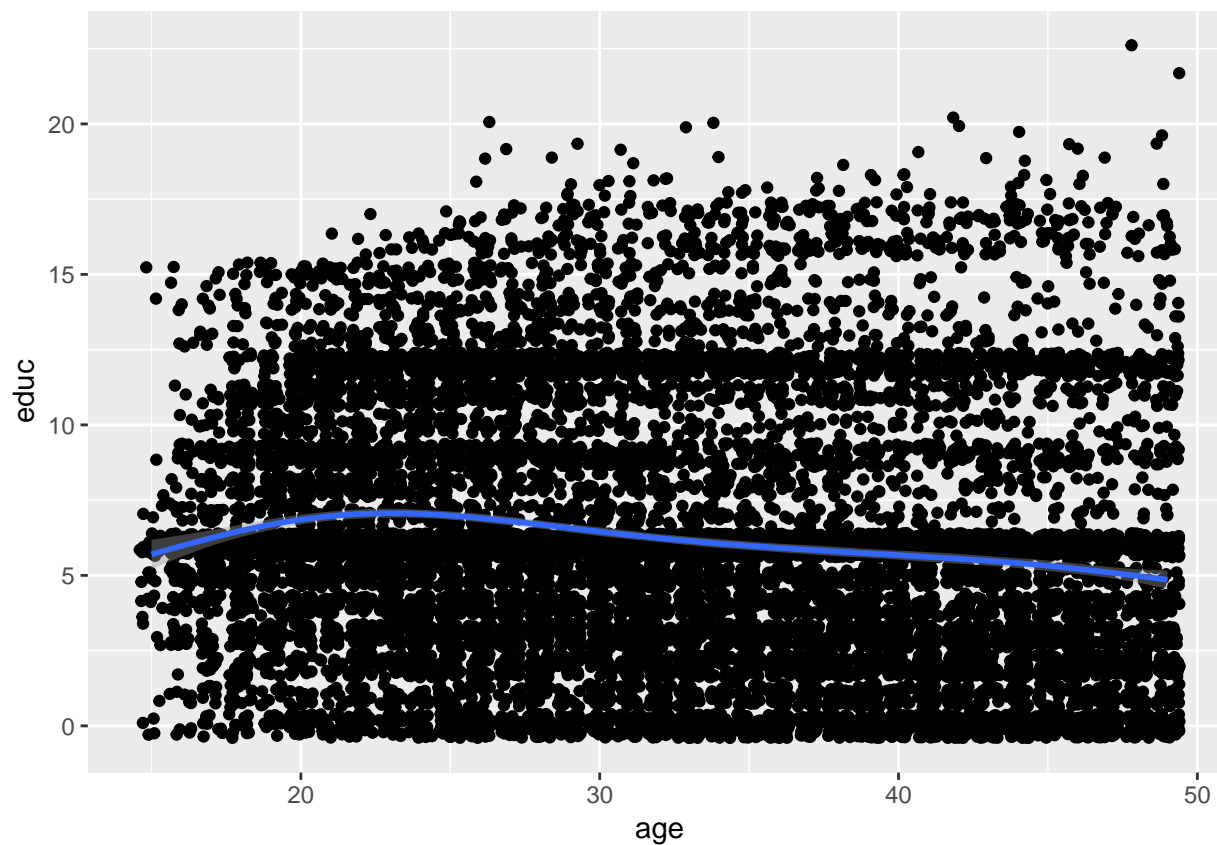
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March 02, 2019



```
data$religion <- relevel(data$religion, ref="Other")

fit1 <- lm(educ ~ religion + age + region + wealthCat + urban, data=data)
summary(fit1)
```

```
##
```

```
## Call:
```

```
## lm(formula = educ ~ religion + age + region + wealthCat + urban,
```

```
##     data = data)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
```

```
## -12.602  -2.146  -0.146   1.821  14.603
```

##

Coefficients:

##	Estimate	Std. Error	t value
## (Intercept)	8.73904	0.36817	23.74
## religionCatholic	0.45810	0.33303	1.38
## religionEvangelical / Protestant	0.12439	0.33242	0.37
## religionNo religion	-0.34007	0.34014	-1.00
## age	-0.09624	0.00294	-32.75
## regionCholul	0.45189	0.16164	2.80
## regionColima	-0.14107	0.16369	-0.86
## regionComayagua	0.42010	0.16055	2.62
## regionCopan	-0.91155	0.16493	-5.53
## regionCortez	-0.65717	0.14164	-4.64
## regionEl Paraíso	0.89467	0.16139	5.54
## regionFrancisco Morazán	0.81296	0.14026	5.80
## regionGracias a Dios	2.01383	0.18753	10.74
## regionIntibuc	0.43491	0.16783	2.59
## regionIslas de la Bahía	-0.04356	0.19951	-0.22
## regionLa Paz	0.69689	0.16240	4.29
## regionLempira	0.10312	0.16791	0.61
## regionOcotepeque	-0.43198	0.16473	-2.62
## regionOlancho	0.54658	0.16145	3.39
## regionSanta Bárbara	-0.23473	0.16416	-1.43
## regionValle	1.09966	0.16569	6.64
## regionYoro	-0.10323	0.15881	-0.65
## wealthCatPoorer	-1.31890	0.08251	-15.99
## wealthCatPoorest	-2.77674	0.08587	-32.34

## wealthCatRicher	1.82872	0.08625	21.20
## wealthCatRichest	4.60238	0.09301	49.48
## urban	0.22292	0.06769	3.29
##		Pr(> t)	
## (Intercept)	< 0.0000000000000002	***	
## religionCatholic		0.16898	
## religionEvangelical / Protestant		0.70825	
## religionNo religion		0.31742	
## age	< 0.0000000000000002	***	
## regionCholuteca		0.00518	**
## regionCol?n		0.38881	
## regionComayagua		0.00889	**
## regionCop?n	0.000000033138	***	
## regionCort?s	0.000003517724	***	
## regionEl Para?so	0.000000030099	***	
## regionFrancisco Moraz?n	0.000000006911	***	
## regionGracias a Dios	< 0.0000000000000002	***	
## regionIntibuc?		0.00957	**
## regionIslas de la Bah?a		0.82716	
## regionLa Paz	0.000017883298	***	
## regionLempira		0.53915	
## regionOcotepeque		0.00874	**
## regionOlancho		0.00071	***
## regionSanta B?rbara		0.15276	
## regionValle	0.000000000033	***	
## regionYoro		0.51571	
## wealthCatPoorer	< 0.0000000000000002	***	

```
## wealthCatPoorest          < 0.0000000000000002 ***
## wealthCatRicher          < 0.0000000000000002 ***
## wealthCatRichest         < 0.0000000000000002 ***
## urban                     0.00099 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.21 on 15809 degrees of freedom
## Multiple R-squared:  0.382, Adjusted R-squared:  0.381
## F-statistic: 376 on 26 and 15809 DF, p-value: <0.0000000000000002
```

```
fit2 <- lmer(educ ~ religion + age + wealthCat + urban + (1|region),
             data = data,
             REML = FALSE)
summary(fit2)
```

```
## Linear mixed model fit by maximum likelihood ['lmerMod']
## Formula: educ ~ religion + age + wealthCat + urban + (1 | region)
## Data: data
##
##      AIC      BIC  logLik deviance df.resid
## 81996.7 82088.7 -40986.3 81972.7    15824
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.916 -0.669 -0.046  0.566  4.548
##
## Random effects:
```

```

## Groups      Name      Variance Std.Dev.
## region      (Intercept) 0.441    0.664
## Residual                10.323    3.213
## Number of obs: 15836, groups: region, 18
##
## Fixed effects:
##
##                                Estimate Std. Error t value
## (Intercept)                   9.00690    0.38238   23.55
## religionCatholic                0.46108    0.33292    1.38
## religionEvangelical / Protestant 0.12752    0.33232    0.38
## religionNo religion            -0.34154    0.34004   -1.00
## age                           -0.09623    0.00294  -32.76
## wealthCatPoorer               -1.31413    0.08244  -15.94
## wealthCatPoorest              -2.76633    0.08571  -32.28
## wealthCatRicher                1.82346    0.08619   21.16
## wealthCatRichest              4.59673    0.09294   49.46
## urban                         0.22507    0.06764    3.33
##
## Correlation of Fixed Effects:
##              (Intr) rlgnCt rlgE/P rlgnNr age    wlthCtPrr wlthCtPrs
## relignCthlc -0.855
## rlgnEvngl/P -0.858  0.986
## relignNrln -0.843  0.964  0.964
## age        -0.241 -0.015 -0.008  0.013
## wealthCtPrr -0.125 -0.012 -0.008 -0.011  0.022
## welthCtPrst -0.138 -0.012 -0.003 -0.008  0.042  0.595
## welthCtRchr -0.089  0.007  0.007  0.012 -0.007  0.398  0.360

```

```
## wlthCtRchst -0.064  0.006  0.010  0.022 -0.057  0.345      0.301
## urban      -0.099  0.021  0.017  0.015  0.009  0.242      0.316
##           wlthCtRchr wlthCtRchs
## relignCthlc
## rlgnEvngl/P
## relignNrlgn
## age
## wealthCtPrr
## welthCtPrst
## welthCtRchr
## wlthCtRchst  0.488
## urban      -0.178      -0.264
```

```
data$age2 <- data$age^2
```

```
fit3 <- lm(educ ~ religion + age + age2 + region + wealthCat + urban, data=data)
summary(fit3)
```

```
##
```

```
## Call:
```

```
## lm(formula = educ ~ religion + age + age2 + region + wealthCat +
```

```
##      urban, data = data)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q  Median      3Q      Max
```

```
## -12.574  -2.148  -0.146   1.813  14.632
```

```
##
```

```
## Coefficients:
```

##	Estimate	Std. Error	t value
## (Intercept)	8.158005	0.494958	16.48
## religionCatholic	0.452495	0.333021	1.36
## religionEvangelical / Protestant	0.119827	0.332410	0.36
## religionNo religion	-0.342596	0.340117	-1.01
## age	-0.057835	0.022064	-2.62
## age2	-0.000584	0.000333	-1.76
## regionCholuteca	0.450385	0.161627	2.79
## regionCol?n	-0.135500	0.163710	-0.83
## regionComayagua	0.416663	0.160547	2.60
## regionCop?n	-0.911332	0.164923	-5.53
## regionCort?s	-0.659439	0.141638	-4.66
## regionEl Para?so	0.890014	0.161397	5.51
## regionFrancisco Moraz?n	0.810240	0.140255	5.78
## regionGracias a Dios	2.018013	0.187529	10.76
## regionIntibuc?	0.433822	0.167818	2.59
## regionIslas de la Bah?a	-0.047948	0.199513	-0.24
## regionLa Paz	0.693709	0.162401	4.27
## regionLempira	0.102983	0.167903	0.61
## regionOcotepeque	-0.437272	0.164743	-2.65
## regionOlancho	0.545583	0.161439	3.38
## regionSanta B?rbara	-0.237714	0.164155	-1.45
## regionValle	1.102679	0.165690	6.66
## regionYoro	-0.103126	0.158804	-0.65
## wealthCatPoorer	-1.316443	0.082515	-15.95
## wealthCatPoorest	-2.772002	0.085904	-32.27
## wealthCatRicher	1.825197	0.086268	21.16

## wealthCatRichest	4.599342	0.093019	49.45
## urban	0.225460	0.067699	3.33
##		Pr(> t)	
## (Intercept)	< 0.0000000000000002	***	
## religionCatholic		0.17424	
## religionEvangelical / Protestant		0.71849	
## religionNo religion		0.31381	
## age		0.00877	**
## age2		0.07906	.
## regionCholuteca		0.00533	**
## regionCol?n		0.40786	
## regionComayagua		0.00946	**
## regionCop?n	0.000000033316	***	
## regionCort?s	0.000003253352	***	
## regionEl Para?so	0.000000035540	***	
## regionFrancisco Moraz?n	0.000000007752	***	
## regionGracias a Dios	< 0.0000000000000002	***	
## regionIntibuc?		0.00974	**
## regionIslas de la Bah?a		0.81008	
## regionLa Paz	0.000019523508	***	
## regionLempira		0.53965	
## regionOcotepeque		0.00796	**
## regionOlancho		0.00073	***
## regionSanta B?rbara		0.14761	
## regionValle	0.000000000029	***	
## regionYoro		0.51609	
## wealthCatPoorer	< 0.0000000000000002	***	

```

## wealthCatPoorest          < 0.0000000000000002 ***
## wealthCatRicher           < 0.0000000000000002 ***
## wealthCatRichest          < 0.0000000000000002 ***
## urban                      0.00087 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.21 on 15808 degrees of freedom
## Multiple R-squared:  0.382, Adjusted R-squared:  0.381
## F-statistic: 362 on 27 and 15808 DF, p-value: <0.0000000000000002

fit4 <- lmer(educ ~ religion + age + age2 + wealthCat + urban + (1|region),
             data = data,
             REML = FALSE)

summary(fit4)

## Linear mixed model fit by maximum likelihood ['lmerMod']
## Formula: educ ~ religion + age + age2 + wealthCat + urban + (1 | region)
## Data: data
##
##      AIC      BIC  logLik deviance df.resid
## 81995.6 82095.4 -40984.8 81969.6    15823
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.908 -0.669 -0.046  0.563  4.558
##
## Random effects:

```

```

## Groups      Name      Variance Std.Dev.
## region      (Intercept) 0.442    0.665
## Residual                10.321    3.213
## Number of obs: 15836, groups: region, 18
##
## Fixed effects:
##
##              Estimate Std. Error t value
## (Intercept)      8.428533   0.505993   16.66
## religionCatholic      0.455504   0.332906    1.37
## religionEvangelical / Protestant 0.122983   0.332301    0.37
## religionNo religion   -0.344048   0.340007   -1.01
## age                -0.058069   0.022056   -2.63
## age2               -0.000581   0.000333   -1.75
## wealthCatPoorer     -1.311702   0.082442  -15.91
## wealthCatPoorest    -2.761627   0.085744  -32.21
## wealthCatRicher      1.819970   0.086203   21.11
## wealthCatRichest     4.593711   0.092949   49.42
## urban                0.227590   0.067653    3.36
##
## Correlation of Fixed Effects:
##              (Intr) rlgnCt rlgE/P rlgnNr age    age2    wlthCtPrr wlthCtPrs
## relignCthlc -0.640
## rlgnEvngl/P -0.643  0.986
## relignNrln -0.635  0.964  0.964
## age        -0.673 -0.012 -0.009 -0.002
## age2        0.655  0.010  0.008  0.004 -0.991
## wealthCtPrr -0.106 -0.012 -0.008 -0.011  0.020 -0.017

```

```
## welthCtPrst -0.125 -0.013 -0.003 -0.008 0.037 -0.032 0.596
## welthCtRchr -0.052 0.007 0.008 0.012 -0.024 0.023 0.397 0.359
## wlthCtRchst -0.036 0.006 0.010 0.023 -0.026 0.019 0.345 0.300
## urban -0.089 0.021 0.017 0.015 0.022 -0.021 0.242 0.316
##          wlthCtRchr wlthCtRchs
## relignCthlc
## rlgEvngl/P
## relignNrlgn
## age
## age2
## wealthCtPrr
## welthCtPrst
## welthCtRchr
## wlthCtRchst 0.489
## urban -0.178 -0.264
```

```
fit5 <- lm(educ ~ religion + age + wealthCat*region + urban, data = data)
summary(fit5)
```

```
##
## Call:
## lm(formula = educ ~ religion + age + wealthCat * region + urban,
##     data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -13.329  -2.122  -0.133   1.782  14.185
##
```

Coefficients:

##	Estimate	Std. Error	t value
## (Intercept)	8.724855	0.423070	20.62
## religionCatholic	0.460780	0.333088	1.38
## religionEvangelical / Protestant	0.130655	0.332500	0.39
## religionNo religion	-0.333219	0.340223	-0.98
## age	-0.096317	0.002940	-32.76
## wealthCatPoorer	-1.497766	0.374747	-4.00
## wealthCatPoorest	-2.384449	0.458293	-5.20
## wealthCatRicher	1.603930	0.331706	4.84
## wealthCatRichest	4.977524	0.340085	14.64
## regionCholuteca	-0.062187	0.355405	-0.17
## regionCol?n	-0.205182	0.326847	-0.63
## regionComayagua	0.249379	0.336935	0.74
## regionCop?n	-1.059506	0.378085	-2.80
## regionCort?s	-0.387165	0.300524	-1.29
## regionEl Para?so	1.291282	0.374631	3.45
## regionFrancisco Moraz?n	0.820081	0.294181	2.79
## regionGracias a Dios	2.955722	0.493468	5.99
## regionIntibuc?	0.867142	0.422441	2.05
## regionIslas de la Bah?a	-0.100694	0.418821	-0.24
## regionLa Paz	0.826901	0.372271	2.22
## regionLempira	0.236216	0.460033	0.51
## regionOcotepeque	-0.595489	0.341616	-1.74
## regionOlancho	0.256182	0.355876	0.72
## regionSanta B?rbara	0.069574	0.327500	0.21
## regionValle	1.047845	0.322892	3.25

## regionYoro	-0.068690	0.333814	-0.21
## urban	0.181511	0.068419	2.65
## wealthCatPoorer:regionCholuteca	0.546841	0.500354	1.09
## wealthCatPoorest:regionCholuteca	0.630199	0.559429	1.13
## wealthCatRicher:regionCholuteca	0.693185	0.518389	1.34
## wealthCatRichest:regionCholuteca	0.170946	0.537203	0.32
## wealthCatPoorer:regionCol?n	0.368512	0.501104	0.74
## wealthCatPoorest:regionCol?n	-0.045869	0.599676	-0.08
## wealthCatRicher:regionCol?n	0.264839	0.454245	0.58
## wealthCatRichest:regionCol?n	-0.390219	0.503730	-0.77
## wealthCatPoorer:regionComayagua	0.415402	0.479896	0.87
## wealthCatPoorest:regionComayagua	-0.690905	0.580053	-1.19
## wealthCatRicher:regionComayagua	0.647657	0.489857	1.32
## wealthCatRichest:regionComayagua	0.357910	0.500290	0.72
## wealthCatPoorer:regionCop?n	0.429544	0.517055	0.83
## wealthCatPoorest:regionCop?n	-0.402145	0.580848	-0.69
## wealthCatRicher:regionCop?n	0.190558	0.549547	0.35
## wealthCatRichest:regionCop?n	0.380601	0.538516	0.71
## wealthCatPoorer:regionCort?s	0.798498	0.554496	1.44
## wealthCatPoorest:regionCort?s	-0.785200	0.778823	-1.01
## wealthCatRicher:regionCort?s	-0.070679	0.394452	-0.18
## wealthCatRichest:regionCort?s	-0.769763	0.405937	-1.90
## wealthCatPoorer:regionEl Para?so	-0.347036	0.509901	-0.68
## wealthCatPoorest:regionEl Para?so	-0.885373	0.565065	-1.57
## wealthCatRicher:regionEl Para?so	-0.416482	0.569016	-0.73
## wealthCatRichest:regionEl Para?so	-0.052031	0.576710	-0.09
## wealthCatPoorer:regionFrancisco Moraz?n	0.279402	0.445492	0.63

## wealthCatPoorest:regionFrancisco Moraz?n	-0.697240	0.536087	-1.30
## wealthCatRicher:regionFrancisco Moraz?n	0.566750	0.406451	1.39
## wealthCatRichest:regionFrancisco Moraz?n	-0.470426	0.405906	-1.16
## wealthCatPoorer:regionGracias a Dios	-0.862196	0.631978	-1.36
## wealthCatPoorest:regionGracias a Dios	-1.367165	0.654658	-2.09
## wealthCatRicher:regionGracias a Dios	-1.173963	0.830166	-1.41
## wealthCatRichest:regionGracias a Dios	-1.969740	1.111170	-1.77
## wealthCatPoorer:regionIntibuc?	-0.237273	0.553416	-0.43
## wealthCatPoorest:regionIntibuc?	-0.994827	0.592821	-1.68
## wealthCatRicher:regionIntibuc?	0.552067	0.696437	0.79
## wealthCatRichest:regionIntibuc?	-0.392966	0.705151	-0.56
## wealthCatPoorer:regionIslas de la Bah?a	0.686809	0.970048	0.71
## wealthCatPoorest:regionIslas de la Bah?a	0.016699	1.936966	0.01
## wealthCatRicher:regionIslas de la Bah?a	0.483733	0.537314	0.90
## wealthCatRichest:regionIslas de la Bah?a	-0.485864	0.557585	-0.87
## wealthCatPoorer:regionLa Paz	-0.311022	0.505802	-0.61
## wealthCatPoorest:regionLa Paz	-0.712101	0.562549	-1.27
## wealthCatRicher:regionLa Paz	1.806528	0.567238	3.18
## wealthCatRichest:regionLa Paz	0.276595	0.638626	0.43
## wealthCatPoorer:regionLempira	-0.084737	0.580246	-0.15
## wealthCatPoorest:regionLempira	-0.564508	0.618161	-0.91
## wealthCatRicher:regionLempira	1.945787	0.841917	2.31
## wealthCatRichest:regionLempira	-0.049561	0.883545	-0.06
## wealthCatPoorer:regionOcotepeque	0.468343	0.485857	0.96
## wealthCatPoorest:regionOcotepeque	-0.334604	0.568623	-0.59
## wealthCatRicher:regionOcotepeque	0.265708	0.519658	0.51
## wealthCatRichest:regionOcotepeque	0.393178	0.551017	0.71

## wealthCatPoorer:regionOlancho	0.771553	0.498938	1.55
## wealthCatPoorest:regionOlancho	-0.036969	0.554649	-0.07
## wealthCatRicher:regionOlancho	0.617951	0.531506	1.16
## wealthCatRichest:regionOlancho	-0.749516	0.596830	-1.26
## wealthCatPoorer:regionSanta B?rbara	-0.137167	0.479202	-0.29
## wealthCatPoorest:regionSanta B?rbara	-0.759586	0.569972	-1.33
## wealthCatRicher:regionSanta B?rbara	-0.379033	0.489796	-0.77
## wealthCatRichest:regionSanta B?rbara	-0.651876	0.570671	-1.14
## wealthCatPoorer:regionValle	0.329914	0.494175	0.67
## wealthCatPoorest:regionValle	0.000977	0.551921	0.00
## wealthCatRicher:regionValle	0.163151	0.503924	0.32
## wealthCatRichest:regionValle	-0.974452	0.567960	-1.72
## wealthCatPoorer:regionYoro	0.179066	0.506852	0.35
## wealthCatPoorest:regionYoro	0.446717	0.561430	0.80
## wealthCatRicher:regionYoro	-0.336428	0.459398	-0.73
## wealthCatRichest:regionYoro	-0.696851	0.487297	-1.43
##		Pr(> t)	
## (Intercept)	< 0.0000000000000002	***	
## religionCatholic		0.16657	
## religionEvangelical / Protestant		0.69436	
## religionNo religion		0.32739	
## age	< 0.0000000000000002	***	
## wealthCatPoorer	0.0000645136	***	
## wealthCatPoorest	0.0000001987	***	
## wealthCatRicher	0.0000013413	***	
## wealthCatRichest	< 0.0000000000000002	***	
## regionCholuteca		0.86110	

## regionCol?n	0.53017
## regionComayagua	0.45923
## regionCop?n	0.00508 **
## regionCort?s	0.19766
## regionEl Para?so	0.00057 ***
## regionFrancisco Moraz?n	0.00532 **
## regionGracias a Dios	0.0000000021 ***
## regionIntibuc?	0.04012 *
## regionIslas de la Bah?a	0.81001
## regionLa Paz	0.02635 *
## regionLempira	0.60763
## regionOcotepeque	0.08133 .
## regionOlancho	0.47162
## regionSanta B?rbara	0.83177
## regionValle	0.00118 **
## regionYoro	0.83697
## urban	0.00799 **
## wealthCatPoorer:regionCholuteca	0.27445
## wealthCatPoorest:regionCholuteca	0.25997
## wealthCatRicher:regionCholuteca	0.18118
## wealthCatRichest:regionCholuteca	0.75033
## wealthCatPoorer:regionCol?n	0.46211
## wealthCatPoorest:regionCol?n	0.93903
## wealthCatRicher:regionCol?n	0.55988
## wealthCatRichest:regionCol?n	0.43855
## wealthCatPoorer:regionComayagua	0.38672
## wealthCatPoorest:regionComayagua	0.23363

## wealthCatRicher:regionComayagua	0.18614
## wealthCatRichest:regionComayagua	0.47437
## wealthCatPoorer:regionCop?n	0.40613
## wealthCatPoorest:regionCop?n	0.48873
## wealthCatRicher:regionCop?n	0.72878
## wealthCatRichest:regionCop?n	0.47973
## wealthCatPoorer:regionCort?s	0.14988
## wealthCatPoorest:regionCort?s	0.31338
## wealthCatRicher:regionCort?s	0.85780
## wealthCatRichest:regionCort?s	0.05794 .
## wealthCatPoorer:regionEl Para?so	0.49614
## wealthCatPoorest:regionEl Para?so	0.11717
## wealthCatRicher:regionEl Para?so	0.46422
## wealthCatRichest:regionEl Para?so	0.92811
## wealthCatPoorer:regionFrancisco Moraz?n	0.53055
## wealthCatPoorest:regionFrancisco Moraz?n	0.19341
## wealthCatRicher:regionFrancisco Moraz?n	0.16322
## wealthCatRichest:regionFrancisco Moraz?n	0.24649
## wealthCatPoorer:regionGracias a Dios	0.17250
## wealthCatPoorest:regionGracias a Dios	0.03678 *
## wealthCatRicher:regionGracias a Dios	0.15734
## wealthCatRichest:regionGracias a Dios	0.07630 .
## wealthCatPoorer:regionIntibuc?	0.66812
## wealthCatPoorest:regionIntibuc?	0.09334 .
## wealthCatRicher:regionIntibuc?	0.42796
## wealthCatRichest:regionIntibuc?	0.57734
## wealthCatPoorer:regionIslas de la Bah?a	0.47895

## wealthCatPoorest:regionIslas de la Bah?a	0.99312
## wealthCatRicher:regionIslas de la Bah?a	0.36799
## wealthCatRichest:regionIslas de la Bah?a	0.38356
## wealthCatPoorer:regionLa Paz	0.53862
## wealthCatPoorest:regionLa Paz	0.20559
## wealthCatRicher:regionLa Paz	0.00145 **
## wealthCatRichest:regionLa Paz	0.66494
## wealthCatPoorer:regionLempira	0.88389
## wealthCatPoorest:regionLempira	0.36115
## wealthCatRicher:regionLempira	0.02084 *
## wealthCatRichest:regionLempira	0.95527
## wealthCatPoorer:regionOcotepeque	0.33508
## wealthCatPoorest:regionOcotepeque	0.55624
## wealthCatRicher:regionOcotepeque	0.60914
## wealthCatRichest:regionOcotepeque	0.47552
## wealthCatPoorer:regionOlancho	0.12203
## wealthCatPoorest:regionOlancho	0.94686
## wealthCatRicher:regionOlancho	0.24499
## wealthCatRichest:regionOlancho	0.20920
## wealthCatPoorer:regionSanta B?rbara	0.77470
## wealthCatPoorest:regionSanta B?rbara	0.18266
## wealthCatRicher:regionSanta B?rbara	0.43903
## wealthCatRichest:regionSanta B?rbara	0.25335
## wealthCatPoorer:regionValle	0.50440
## wealthCatPoorest:regionValle	0.99859
## wealthCatRicher:regionValle	0.74612
## wealthCatRichest:regionValle	0.08624 .

```
## wealthCatPoorer:regionYoro 0.72388
## wealthCatPoorest:regionYoro 0.42623
## wealthCatRicher:regionYoro 0.46398
## wealthCatRichest:regionYoro 0.15273
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.21 on 15741 degrees of freedom
## Multiple R-squared:  0.388, Adjusted R-squared:  0.384
## F-statistic: 106 on 94 and 15741 DF, p-value: <0.00000000000000002
```

```
fit6 <- lmer(educ ~ (1|region),
             data = data,
             REML = FALSE)
summary(fit6)
```

```
## Linear mixed model fit by maximum likelihood ['lmerMod']
## Formula: educ ~ (1 | region)
## Data: data
##
##      AIC      BIC  logLik deviance df.resid
## 88587.6 88610.6 -44290.8 88581.6    15833
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.008 -0.663 -0.097  0.489  4.391
##
## Random effects:
```

```
## Groups      Name          Variance Std.Dev.
## region      (Intercept)    0.972    0.986
## Residual                    15.663    3.958
## Number of obs: 15836, groups: region, 18
##
## Fixed effects:
##              Estimate Std. Error t value
## (Intercept)    6.098      0.235      26
```

```
fit7 <- lmer(educ ~ religion + age + urban + (1 + wealthCat|region),
             data = data,
             REML = FALSE)
summary(fit7)
```

```
## Linear mixed model fit by maximum likelihood ['lmerMod']
## Formula: educ ~ religion + age + urban + (1 + wealthCat | region)
## Data: data
##
##      AIC      BIC   logLik deviance df.resid
## 82057.3 82226.0 -41006.6 82013.3    15814
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.269 -0.664 -0.044  0.561  4.496
##
## Random effects:
## Groups      Name          Variance Std.Dev. Corr
## region      (Intercept)    1.22    1.10
```

```

##          wealthCatPoorer    1.69    1.30    0.68
##          wealthCatPoorest    7.37    2.71    0.73    0.99
##          wealthCatRicher     3.78    1.95   -0.71 -1.00 -1.00
##          wealthCatRichest   22.12    4.70   -0.79 -0.98 -0.99    0.99
## Residual                    10.28    3.21
## Number of obs: 15836, groups:  region, 18
##
## Fixed effects:
##
##                                Estimate Std. Error t value
## (Intercept)                   9.86036    0.36125   27.30
## religionCatholic                0.46242    0.33246    1.39
## religionEvangelical / Protestant 0.13000    0.33193    0.39
## religionNo religion            -0.33772    0.33960   -0.99
## age                           -0.09589    0.00293  -32.71
## urban                          0.19274    0.06761    2.85
##
## Correlation of Fixed Effects:
##          (Intr)  rlgnCt  rlgE/P  rlgnNr  age
## relignCthlc -0.906
## rlgnEvngl/P -0.907  0.986
## relignNrln  -0.892  0.964  0.964
## age          -0.258 -0.015 -0.008  0.013
## urban        -0.083  0.022  0.018  0.016  0.007
## convergence code: 0
## singular fit

```

```
fit8 <- lmer(educ ~ religion + age + urban + wealthCat + (1 + wealthCat|region),
            data = data,
            REML = FALSE)
summary(fit8)
```

```
## Linear mixed model fit by maximum likelihood ['lmerMod']
## Formula: educ ~ religion + age + urban + wealthCat + (1 + wealthCat |
##      region)
##      Data: data
##
##      AIC      BIC   logLik deviance df.resid
## 81986.9 82186.3 -40967.4 81934.9    15810
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -4.158 -0.665 -0.044  0.561  4.528
##
## Random effects:
##  Groups   Name                Variance Std.Dev. Corr
##  region  (Intercept)          0.5202  0.721
##          wealthCatPoorer     0.0195  0.140   -1.00
##          wealthCatPoorest    0.0711  0.267   -0.39  0.39
##          wealthCatRicher     0.1250  0.354    0.17 -0.17 -0.71
##          wealthCatRichest    0.2246  0.474   -0.47  0.47 -0.23  0.76
## Residual                    10.2786  3.206
## Number of obs: 15836, groups:  region, 18
##
```

Fixed effects:

##	Estimate	Std. Error	t value
## (Intercept)	9.00616	0.38776	23.23
## religionCatholic	0.46022	0.33247	1.38
## religionEvangelical / Protestant	0.12739	0.33191	0.38
## religionNo religion	-0.33985	0.33959	-1.00
## age	-0.09605	0.00293	-32.75
## urban	0.20202	0.06787	2.98
## wealthCatPoorer	-1.29194	0.08919	-14.48
## wealthCatPoorest	-2.71502	0.10908	-24.89
## wealthCatRicher	1.92930	0.12313	15.67
## wealthCatRichest	4.65561	0.15138	30.75

##

Correlation of Fixed Effects:

##	(Intr)	rlgnCt	rlgE/P	rlgnNr	age	urban	wlthCtPrr	wlthCtPrs
## relignCthlc	-0.842							
## rlgnEvngl/P	-0.844	0.986						
## relignNr	-0.830	0.964	0.964					
## age	-0.238	-0.015	-0.007	0.013				
## urban	-0.097	0.021	0.017	0.015	0.007			
## wealthCtPrr	-0.278	-0.012	-0.008	-0.011	0.020	0.219		
## wlthCtPrst	-0.206	-0.010	-0.003	-0.007	0.034	0.238	0.527	
## wlthCtRchr	-0.010	0.003	0.003	0.006	-0.004	-0.123	0.221	-0.054
## wlthCtRchst	-0.196	0.004	0.006	0.011	-0.033	-0.170	0.350	0.082
##								
##	wlthCtRchr							
## relignCthlc								
## rlgnEvngl/P								


```
## relignNrlgn
## age
## urban
## wealthCtPrr
## welthCtPrst
## welthCtRchr
## wlthCtRchst 0.637
## convergence code: 0
## singular fit
```

Introduction and Motivation

Here we can introduce our central research question. I don't believe citations are crucial to this project, but we can include them if necessary (McFakerson and Shenanigans 2019).

Data

Here is where we explain where the data comes from. Any descriptive statistics would be included here.

Analysis

In this section we explain how our model is set up and any necessary assumptions. Model selection criteria should be included here as well.

Model	BIC	MAE
1	82160.475989	2.49675
2	82088.731745	2.496738

Model	BIC	MAE
3	82167.056438	2.496008
4	82095.354913	2.495984
5	82675.284135	2.490587
6	88610.561414	3.051729
7	82225.994572	2.48947
8	82186.317703	2.487023

Results

We present the results of the model, including tables and/or figures. This should have the direct numerical interpretation of the key coefficients.

Conclusion

Discussion of the substantive interpretation of the model, including any meaningful impact of findings as well as limitations of model.

References

McFakerson, Fakey F., and Bull Shenanigans. 2019. “An Example Citation: Examples from an Article of Examples.” *QJBS* 1 (1): 50–90.