

# India Sociolinguistics Religion Associations Analyses

Ruthe Foushee

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| no_opinion_trials | n_children |
|-------------------|------------|
| 1                 | 22         |
| 2                 | 24         |
| 3                 | 13         |
| 4                 | 5          |
| 5                 | 8          |
| 6                 | 3          |
| 7                 | 1          |
| 8                 | 1          |
| 9                 | 4          |
| 10                | 1          |
| 11                | 1          |
| 14                | 1          |

| language        | n  |
|-----------------|----|
| Mandarin        | 88 |
| English (U.S.)  | 52 |
| English (India) | 45 |
| Tamil           | 37 |
| Marathi         | 26 |
| Gujarati        | 11 |
| Hindi           | 8  |
| Urdu            | 6  |

“No opinion” selected on 273 trials by 84 children; all but 3 children selected single response.

```
##
##          buddhist    christian      hindu  hindu muslim
##          0          162        304      574          2
##          idk          jain jain buddhist    muslim
##          273          232          1      308
```

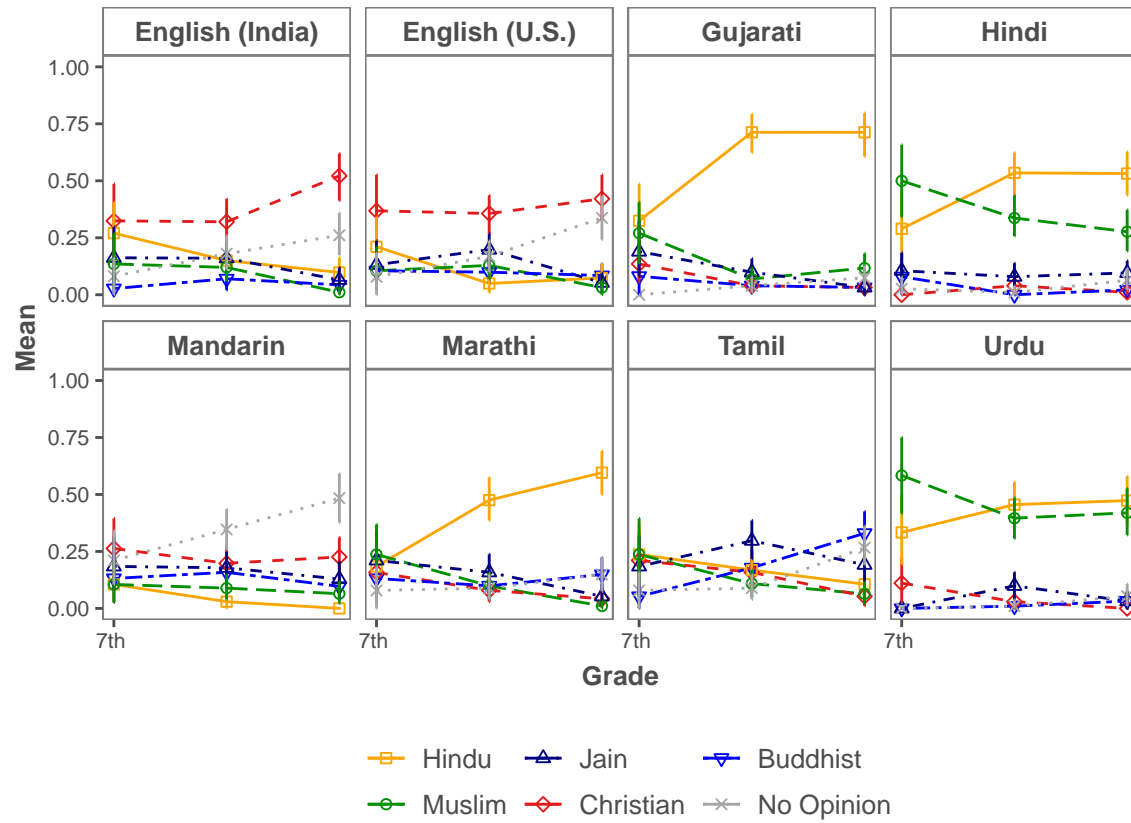
```
## [1] Z07A06 Z03C18
## 129 Levels: Z03A06 Z03A09 Z03A16 Z03A51 Z03A59 Z03A60 Z03B58 Z03C01 ... Z07B55
```

```
## [1] Z07A06
## 129 Levels: Z03A06 Z03A09 Z03A16 Z03A51 Z03A59 Z03A60 Z03B58 Z03C01 ... Z07B55
```

Multiple religions selected on three trials (“hindu and muslim” twice in response to audio clips of spoken Urdu; “jain and buddhist” once in response to an audio clip of spoken Tamil)

## Over Time

### By Standard



### With Age.

### Models: Odds of Religion Selection

#### Hindu

|                                  |      | 2.5 % | 97.5 %  |
|----------------------------------|------|-------|---------|
| (Intercept)                      | 5.30 | 0.40  | 72.17   |
| child_age                        | 0.73 | 0.56  | 0.92    |
| languageEnglish (U.S.)           | 0.37 | 0.01  | 24.64   |
| languageGujarati                 | 0.02 | 0.00  | 0.41    |
| languageHindi                    | 0.06 | 0.00  | 1.65    |
| languageMandarin                 | 1.18 | 0.00  | 1187.75 |
| languageMarathi                  | 0.00 | 0.00  | 0.08    |
| languageTamil                    | 0.17 | 0.00  | 6.32    |
| languageUrdu                     | 0.08 | 0.00  | 2.22    |
| child_religionmuslim             | 0.94 | 0.44  | 2.01    |
| child_age:languageEnglish (U.S.) | 0.97 | 0.65  | 1.45    |
| child_age:languageGujarati       | 1.91 | 1.41  | 2.62    |
| child_age:languageHindi          | 1.65 | 1.22  | 2.27    |

|   |      | 2.5 % | 97.5 % |
|---|------|-------|--------|
| child_age:languageMandarin                  | 0.72 | 0.35  | 1.31   |
| child_age:languageMarathi                   | 2.18 | 1.58  | 3.03   |
| child_age:languageTamil                     | 1.20 | 0.86  | 1.69   |
| child_age:languageUrdu                      | 1.57 | 1.15  | 2.15   |
| languageEnglish (U.S.):child_religionmuslim | 2.62 | 0.75  | 9.84   |
| languageGujarati:child_religionmuslim       | 0.55 | 0.21  | 1.42   |
| languageHindi:child_religionmuslim          | 0.18 | 0.07  | 0.46   |
| languageMandarin:child_religionmuslim       | 5.85 | 0.76  | 122.83 |
| languageMarathi:child_religionmuslim        | 0.19 | 0.07  | 0.50   |
| languageTamil:child_religionmuslim          | 0.80 | 0.27  | 2.29   |
| languageUrdu:child_religionmuslim           | 0.22 | 0.08  | 0.56   |

```
##
## Call:
## glm(formula = hindu ~ child_age * language + child_religion *
##       language, family = "binomial", data = a[a$child_religion !=
##       "other", ])
##
## Coefficients:
##               Estimate Std. Error z value
## (Intercept)      1.6669    1.3167    1.27
## child_age      -0.3213    0.1248   -2.57
## languageEnglish (U.S.) -0.9890    2.1342   -0.46
## languageGujarati  -4.1793    1.6806   -2.49
## languageHindi    -2.8063    1.6924   -1.66
## languageMandarin    0.1665    3.3159    0.05
## languageMarathi   -5.9076    1.7499   -3.38
## languageTamil    -1.7470    1.8374   -0.95
## languageUrdu     -2.5028    1.6872   -1.48
## child_religionmuslim -0.0571    0.3866   -0.15
## child_age:languageEnglish (U.S.) -0.0255    0.2033   -0.13
## child_age:languageGujarati  0.6474    0.1582    4.09
## child_age:languageHindi    0.5037    0.1586    3.18
## child_age:languageMandarin -0.3325    0.3266   -1.02
## child_age:languageMarathi  0.7780    0.1649    4.72
## child_age:languageTamil    0.1831    0.1721    1.06
## child_age:languageUrdu    0.4493    0.1577    2.85
## languageEnglish (U.S.):child_religionmuslim  0.9617    0.6521    1.47
## languageGujarati:child_religionmuslim -0.6062    0.4864   -1.25
## languageHindi:child_religionmuslim -1.7338    0.4898   -3.54
## languageMandarin:child_religionmuslim  1.7672    1.1814    1.50
## languageMarathi:child_religionmuslim -1.6686    0.4991   -3.34
## languageTamil:child_religionmuslim -0.2288    0.5397   -0.42
## languageUrdu:child_religionmuslim -1.5368    0.4880   -3.15
##
##               Pr(>|z|)
## (Intercept)    0.20555
## child_age      0.01003 *
## languageEnglish (U.S.) 0.64307
## languageGujarati  0.01289 *
## languageHindi    0.09728 .
## languageMandarin  0.95995
## languageMarathi  0.00074 ***
```

```

## languageTamil 0.34170
## languageUrdu 0.13796
## child_religionmuslim 0.88259
## child_age:languageEnglish (U.S.) 0.89999
## child_age:languageGujarati 4.3e-05 ***
## child_age:languageHindi 0.00150 **
## child_age:languageMandarin 0.30869
## child_age:languageMarathi 2.4e-06 ***
## child_age:languageTamil 0.28733
## child_age:languageUrdu 0.00438 **
## languageEnglish (U.S.):child_religionmuslim 0.14027
## languageGujarati:child_religionmuslim 0.21264
## languageHindi:child_religionmuslim 0.00040 ***
## languageMandarin:child_religionmuslim 0.13468
## languageMarathi:child_religionmuslim 0.00083 ***
## languageTamil:child_religionmuslim 0.67162
## languageUrdu:child_religionmuslim 0.00164 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 2207.8 on 1771 degrees of freedom
## Residual deviance: 1590.4 on 1748 degrees of freedom
## (141 observations deleted due to missingness)
## AIC: 1638
##
## Number of Fisher Scoring iterations: 7

## Analysis of Deviance Table (Type II tests)
##
## Response: hindu
##
## LR Chisq Df Pr(>Chisq)
## child_age 6 1 0.012 *
## language 461 7 < 2e-16 ***
## child_religion 66 1 4.0e-16 ***
## child_age:language 50 7 1.3e-08 ***
## language:child_religion 50 7 1.5e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

## Muslim

|                        | 2.5 % 97.5 % |      |      |
|------------------------|--------------|------|------|
| (Intercept)            | 1.24         | 0.37 | 3.99 |
| child_age              | 0.76         | 0.70 | 0.84 |
| child_religionmuslim   | 1.32         | 0.48 | 3.68 |
| languageEnglish (U.S.) | 0.85         | 0.29 | 2.47 |
| languageGujarati       | 1.00         | 0.35 | 2.82 |
| languageHindi          | 2.30         | 0.98 | 5.89 |
| languageMandarin       | 1.69         | 0.68 | 4.44 |
| languageMarathi        | 2.15         | 0.90 | 5.51 |

|   |      | 2.5 % | 97.5 % |
|---|------|-------|--------|
| languageTamil                               | 1.69 | 0.68  | 4.44   |
| languageUrdu                                | 5.50 | 2.51  | 13.42  |
| child_religionmuslim:languageEnglish (U.S.) | 1.60 | 0.39  | 6.62   |
| child_religionmuslim:languageGujarati       | 2.23 | 0.59  | 8.70   |
| child_religionmuslim:languageHindi          | 5.99 | 1.79  | 19.99  |
| child_religionmuslim:languageMandarin       | 0.38 | 0.09  | 1.53   |
| child_religionmuslim:languageMarathi        | 0.19 | 0.04  | 0.83   |
| child_religionmuslim:languageTamil          | 0.74 | 0.19  | 2.75   |
| child_religionmuslim:languageUrdu           | 2.94 | 0.91  | 9.39   |

```
##
## Call:
## glm(formula = muslim ~ child_age + child_religion * language,
##      family = "binomial", data = a[a$child_religion != "other",
##      ])
##
## Coefficients:
##                      Estimate Std. Error z value
## (Intercept)          0.21647    0.60686    0.36
## child_age          -0.27002    0.04678   -5.77
## child_religionmuslim    0.28065    0.50952    0.55
## languageEnglish (U.S.) -0.15796    0.53695   -0.29
## languageGujarati      0.00035    0.52022    0.00
## languageHindi         0.83491    0.45292    1.84
## languageMandarin      0.52341    0.47209    1.11
## languageMarathi       0.76334    0.45686    1.67
## languageTamil         0.52341    0.47209    1.11
## languageUrdu          1.70435    0.42263    4.03
## child_religionmuslim:languageEnglish (U.S.) 0.46719    0.71346    0.65
## child_religionmuslim:languageGujarati      0.80421    0.68154    1.18
## child_religionmuslim:languageHindi         1.78958    0.60995    2.93
## child_religionmuslim:languageMandarin     -0.97701    0.72551   -1.35
## child_religionmuslim:languageMarathi     -1.64743    0.77146   -2.14
## child_religionmuslim:languageTamil       -0.30643    0.67168   -0.46
## child_religionmuslim:languageUrdu         1.07935    0.58849    1.83
##                      Pr(>|z|)
## (Intercept)          0.7213
## child_age            7.8e-09 ***
## child_religionmuslim    0.5818
## languageEnglish (U.S.) 0.7686
## languageGujarati      0.9995
## languageHindi         0.0653 .
## languageMandarin      0.2676
## languageMarathi       0.0948 .
## languageTamil         0.2676
## languageUrdu          5.5e-05 ***
## child_religionmuslim:languageEnglish (U.S.) 0.5126
## child_religionmuslim:languageGujarati      0.2380
## child_religionmuslim:languageHindi         0.0033 **
## child_religionmuslim:languageMandarin      0.1781
## child_religionmuslim:languageMarathi       0.0327 *
## child_religionmuslim:languageTamil         0.6482
```

```
## child_religionmuslim:languageUrdu          0.0666 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 1579.5  on 1771  degrees of freedom
## Residual deviance: 1287.6  on 1755  degrees of freedom
## (141 observations deleted due to missingness)
## AIC: 1322
##
## Number of Fisher Scoring iterations: 5

## Analysis of Deviance Table (Type II tests)
##
## Response: muslim
##               LR Chisq Df Pr(>Chisq)
## child_age           34.4  1   4.4e-09 ***
## child_religion       32.6  1   1.1e-08 ***
## language            181.8  7   < 2e-16 ***
## child_religion:language  51.7  7   6.5e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## Jain

```
##               V1 2.5 % 97.5 %  toss
## child_age           0.84 0.76  0.92 FALSE
## languageTamil       2.86 1.40  6.13 FALSE
## child_religionmuslim:languageMarathi 3.48 1.01 12.91 FALSE

##
## Call:
## glm(formula = jain ~ child_age + child_religion * language, family = "binomial",
##      data = a[a$child_religion != "other", ])
##
## Coefficients:
##
##               Estimate Std. Error z value
## (Intercept)      -0.3088    0.5840   -0.53
## child_age         -0.1768    0.0473   -3.74
## child_religionmuslim    0.3567    0.4209    0.85
## languageEnglish (U.S.)  0.4530    0.3988    1.14
## languageGujarati     -0.3167    0.4625   -0.68
## languageHindi        -0.0126    0.4316   -0.03
## languageMandarin      0.1612    0.4178    0.39
## languageMarathi      -0.7629    0.5188   -1.47
## languageTamil        1.0494    0.3730    2.81
## languageUrdu         -0.7506    0.5188   -1.45
## child_religionmuslim:languageEnglish (U.S.) -0.8576    0.5956   -1.44
## child_religionmuslim:languageGujarati     -0.0793    0.6401   -0.12
## child_religionmuslim:languageHindi        -0.6298    0.6378   -0.99
## child_religionmuslim:languageMandarin      0.3830    0.5634    0.68
## child_religionmuslim:languageMarathi      1.2472    0.6435    1.94
```

```

## child_religionmuslim:languageTamil      -0.6271      0.5350     -1.17
## child_religionmuslim:languageUrdu       -0.3796      0.7513     -0.51
##                                           Pr(>|z|)
## (Intercept)                             0.59697
## child_age                               0.00019 ***
## child_religionmuslim                    0.39678
## languageEnglish (U.S.)                  0.25598
## languageGujarati                        0.49354
## languageHindi                           0.97668
## languageMandarin                        0.69955
## languageMarathi                         0.14140
## languageTamil                           0.00491 **
## languageUrdu                            0.14800
## child_religionmuslim:languageEnglish (U.S.) 0.14985
## child_religionmuslim:languageGujarati      0.90142
## child_religionmuslim:languageHindi         0.32342
## child_religionmuslim:languageMandarin      0.49665
## child_religionmuslim:languageMarathi       0.05259 .
## child_religionmuslim:languageTamil        0.24113
## child_religionmuslim:languageUrdu         0.61336
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 1313.7  on 1771  degrees of freedom
## Residual deviance: 1240.2  on 1755  degrees of freedom
## (141 observations deleted due to missingness)
## AIC: 1274
##
## Number of Fisher Scoring iterations: 5

## Analysis of Deviance Table (Type II tests)
##
## Response: jain
##               LR Chisq Df Pr(>Chisq)
## child_age           14.0  1   0.00018 ***
## child_religion        2.4  1   0.12006
## language            38.7  7   2.2e-06 ***
## child_religion:language 18.1  7   0.01142 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

## Christian

```

##               V1 2.5 %      97.5 %  toss
## (Intercept)      0.06 0.01      0.41 FALSE
## child_age        1.27 1.06      1.53 FALSE
## languageTamil    82.09 2.81    2523.47 FALSE
## languageUrdu    1933.09 5.03 1885086.60 FALSE
## child_age:languageGujarati 0.55 0.35      0.85 FALSE
## child_age:languageMandarin 0.75 0.57      0.99 FALSE
## child_age:languageMarathi 0.57 0.39      0.81 FALSE

```

```

## child_age:languageTamil          0.55  0.39      0.75 FALSE
## child_age:languageUrdu           0.34  0.16      0.62 FALSE
## languageMarathi:child_religionmuslim 4.64  1.44     16.85 FALSE
## languageTamil:child_religionmuslim  2.94  1.10      8.04 FALSE

##
## Call:
## glm(formula = christian ~ child_age * language + child_religion *
##       language, family = "binomial", data = r[r$child_religion !=
##       "other", ])
##
## Coefficients:
##
##               Estimate Std. Error z value
## (Intercept)      -2.8758    1.0341  -2.78
## child_age         0.2398    0.0932   2.57
## languageEnglish (U.S.) 1.6835    1.4385   1.17
## languageGujarati  3.6560    2.3563   1.55
## languageHindi     -0.0482    3.6139  -0.01
## languageMandarin  2.3768    1.5416   1.54
## languageMarathi   3.1499    1.9800   1.59
## languageTamil     4.4079    1.7295   2.55
## languageUrdu      7.5669    3.2006   2.36
## child_religionmuslim -0.3328    0.2835  -1.17
## child_age:languageEnglish (U.S.) -0.1404    0.1301  -1.08
## child_age:languageGujarati -0.5951    0.2248  -2.65
## child_age:languageHindi -0.3484    0.3335  -1.04
## child_age:languageMandarin -0.2844    0.1400  -2.03
## child_age:languageMarathi -0.5658    0.1851  -3.06
## child_age:languageTamil -0.6055    0.1621  -3.73
## child_age:languageUrdu -1.0735    0.3314  -3.24
## languageEnglish (U.S.):child_religionmuslim -0.3741    0.4004  -0.93
## languageGujarati:child_religionmuslim  0.2501    0.6897   0.36
## languageHindi:child_religionmuslim  0.5024    1.0497   0.48
## languageMandarin:child_religionmuslim -0.2898    0.4394  -0.66
## languageMarathi:child_religionmuslim  1.5343    0.6185   2.48
## languageTamil:child_religionmuslim  1.0776    0.5043   2.14
## languageUrdu:child_religionmuslim  0.6184    0.8546   0.72
##
##               Pr(>|z|)
## (Intercept)      0.00542 **
## child_age        0.01010 *
## languageEnglish (U.S.) 0.24187
## languageGujarati  0.12076
## languageHindi     0.98936
## languageMandarin  0.12313
## languageMarathi   0.11163
## languageTamil     0.01082 *
## languageUrdu      0.01807 *
## child_religionmuslim 0.24044
## child_age:languageEnglish (U.S.) 0.28062
## child_age:languageGujarati 0.00813 **
## child_age:languageHindi 0.29627
## child_age:languageMandarin 0.04216 *
## child_age:languageMarathi 0.00224 **
## child_age:languageTamil 0.00019 ***

```



```

## child_age:languageUrdu 0.00120 **
## languageEnglish (U.S.):child_religionmuslim 0.35008
## languageGujarati:child_religionmuslim 0.71692
## languageHindi:child_religionmuslim 0.63219
## languageMandarin:child_religionmuslim 0.50957
## languageMarathi:child_religionmuslim 0.01311 *
## languageTamil:child_religionmuslim 0.03262 *
## languageUrdu:child_religionmuslim 0.46928
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1592.5 on 1771 degrees of freedom
## Residual deviance: 1263.3 on 1748 degrees of freedom
## (28 observations deleted due to missingness)
## AIC: 1311
##
## Number of Fisher Scoring iterations: 7

## Analysis of Deviance Table (Type II tests)
##
## Response: christian
##
## LR Chisq Df Pr(>Chisq)
## child_age 0.8 1 0.367
## language 275.0 7 < 0.0000000000000002 ***
## child_religion 1.9 1 0.172
## child_age:language 32.2 7 0.000037 ***
## language:child_religion 18.3 7 0.011 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

## Buddhist

```

## [1] V1 2.5 % 97.5 % toss
## <0 rows> (or 0-length row.names)

##
## Call:
## glm(formula = buddhist ~ child_age * language + child_religion *
## language, family = "binomial", data = r[r$child_religion !=
## "other", ])
##
## Coefficients:
## Estimate Std. Error z value
## (Intercept) -2.8236 2.0870 -1.35
## child_age -0.0289 0.1889 -0.15
## languageEnglish (U.S.) 0.2206 2.6300 0.08
## languageGujarati 2.5698 3.0420 0.84
## languageHindi 2.8403 3.7235 0.76
## languageMandarin 1.1516 2.5173 0.46
## languageMarathi -1.7978 2.6525 -0.68
## languageTamil -2.4692 2.4750 -1.00

```

```

## languageUrdu -8.1542 5.6617 -1.44
## child_religionmuslim 0.5448 0.6025 0.90
## child_age:languageEnglish (U.S.) 0.0247 0.2376 0.10
## child_age:languageGujarati -0.2254 0.2827 -0.80
## child_age:languageHindi -0.3244 0.3548 -0.91
## child_age:languageMandarin -0.0502 0.2281 -0.22
## child_age:languageMarathi 0.1427 0.2356 0.61
## child_age:languageTamil 0.4162 0.2223 1.87
## child_age:languageUrdu 0.6667 0.4748 1.40
## languageEnglish (U.S.):child_religionmuslim 0.2644 0.7615 0.35
## languageGujarati:child_religionmuslim -0.8366 0.8970 -0.93
## languageHindi:child_religionmuslim -0.8423 1.1082 -0.76
## languageMandarin:child_religionmuslim 0.5698 0.7388 0.77
## languageMarathi:child_religionmuslim 1.5702 0.8252 1.90
## languageTamil:child_religionmuslim -1.0453 0.6922 -1.51
## languageUrdu:child_religionmuslim -1.4247 1.3154 -1.08
## Pr(>|z|)
## (Intercept) 0.176
## child_age 0.879
## languageEnglish (U.S.) 0.933
## languageGujarati 0.398
## languageHindi 0.446
## languageMandarin 0.647
## languageMarathi 0.498
## languageTamil 0.318
## languageUrdu 0.150
## child_religionmuslim 0.366
## child_age:languageEnglish (U.S.) 0.917
## child_age:languageGujarati 0.425
## child_age:languageHindi 0.361
## child_age:languageMandarin 0.826
## child_age:languageMarathi 0.545
## child_age:languageTamil 0.061 .
## child_age:languageUrdu 0.160
## languageEnglish (U.S.):child_religionmuslim 0.728
## languageGujarati:child_religionmuslim 0.351
## languageHindi:child_religionmuslim 0.447
## languageMandarin:child_religionmuslim 0.441
## languageMarathi:child_religionmuslim 0.057 .
## languageTamil:child_religionmuslim 0.131
## languageUrdu:child_religionmuslim 0.279
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1065.33 on 1771 degrees of freedom
## Residual deviance: 922.35 on 1748 degrees of freedom
## (28 observations deleted due to missingness)
## AIC: 970.3
##
## Number of Fisher Scoring iterations: 7

## Analysis of Deviance Table (Type II tests)

```

```
##
## Response: buddhist
##               LR Chisq Df               Pr(>Chisq)
## child_age           2.3  1               0.12628
## language            90.6  7 < 0.0000000000000002 ***
## child_religion       7.9  1               0.00503 **
## child_age:language   16.6  7               0.02052 *
## language:child_religion 26.2  7               0.00047 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## No Opinion

```
##               V1 2.5 % 97.5 % toss
## (Intercept)    0.01  0.00   0.03 FALSE
## child_age      1.36  1.23   1.50 FALSE
## languageGujarati 0.18  0.08   0.35 FALSE
## languageHindi   0.14  0.06   0.29 FALSE
## languageMandarin 2.37  1.54   3.68 FALSE
## languageMarathi  0.46  0.27   0.79 FALSE
## languageUrdu    0.10  0.04   0.23 FALSE

##
## Call:
## glm(formula = buddhist ~ child_age * language + child_religion *
##       language, family = "binomial", data = r[r$child_religion !=
##       "other", ])
##
## Coefficients:
##
##               Estimate Std. Error z value
## (Intercept)      -2.8236     2.0870   -1.35
## child_age        -0.0289     0.1889   -0.15
## languageEnglish (U.S.)  0.2206     2.6300    0.08
## languageGujarati   2.5698     3.0420    0.84
## languageHindi     2.8403     3.7235    0.76
## languageMandarin   1.1516     2.5173    0.46
## languageMarathi   -1.7978     2.6525   -0.68
## languageTamil     -2.4692     2.4750   -1.00
## languageUrdu      -8.1542     5.6617   -1.44
## child_religionmuslim  0.5448     0.6025    0.90
## child_age:languageEnglish (U.S.)  0.0247     0.2376    0.10
## child_age:languageGujarati -0.2254     0.2827   -0.80
## child_age:languageHindi -0.3244     0.3548   -0.91
## child_age:languageMandarin -0.0502     0.2281   -0.22
## child_age:languageMarathi  0.1427     0.2356    0.61
## child_age:languageTamil  0.4162     0.2223    1.87
## child_age:languageUrdu  0.6667     0.4748    1.40
## languageEnglish (U.S.):child_religionmuslim  0.2644     0.7615    0.35
## languageGujarati:child_religionmuslim -0.8366     0.8970   -0.93
## languageHindi:child_religionmuslim -0.8423     1.1082   -0.76
## languageMandarin:child_religionmuslim  0.5698     0.7388    0.77
## languageMarathi:child_religionmuslim  1.5702     0.8252    1.90
## languageTamil:child_religionmuslim -1.0453     0.6922   -1.51
```

```

## languageUrdu:child_religionmuslim          -1.4247      1.3154    -1.08
##                                           Pr(>|z|)
## (Intercept)                                0.176
## child_age                                  0.879
## languageEnglish (U.S.)                    0.933
## languageGujarati                          0.398
## languageHindi                             0.446
## languageMandarin                          0.647
## languageMarathi                           0.498
## languageTamil                             0.318
## languageUrdu                              0.150
## child_religionmuslim                      0.366
## child_age:languageEnglish (U.S.)          0.917
## child_age:languageGujarati                0.425
## child_age:languageHindi                   0.361
## child_age:languageMandarin                0.826
## child_age:languageMarathi                 0.545
## child_age:languageTamil                   0.061 .
## child_age:languageUrdu                    0.160
## languageEnglish (U.S.):child_religionmuslim 0.728
## languageGujarati:child_religionmuslim      0.351
## languageHindi:child_religionmuslim         0.447
## languageMandarin:child_religionmuslim      0.441
## languageMarathi:child_religionmuslim       0.057 .
## languageTamil:child_religionmuslim         0.131
## languageUrdu:child_religionmuslim          0.279
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 1065.33  on 1771  degrees of freedom
## Residual deviance:  922.35  on 1748  degrees of freedom
##    (28 observations deleted due to missingness)
## AIC: 970.3
##
## Number of Fisher Scoring iterations: 7

## Analysis of Deviance Table (Type II tests)
##
## Response: buddhist
##
##             LR Chisq Df          Pr(>Chisq)
## child_age           2.3  1          0.12628
## language           90.6  7 < 0.0000000000000002 ***
## child_religion       7.9  1          0.00503 **
## child_age:language  16.6  7          0.02052 *
## language:child_religion 26.2  7          0.00047 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

## Mixed Effects Multinomial Regression

```
##
```

```

## Iteration 1 - deviance = 3895 - criterion = 0.92
## Iteration 2 - deviance = 3826 - criterion = 0.043
## Iteration 3 - deviance = 3825 - criterion = 0.011
## Iteration 4 - deviance = 3823 - criterion = 0.0018
## Iteration 5 - deviance = 3823 - criterion = 0.000063
## Iteration 6 - deviance = 3823 - criterion = 0.00000016
## Iteration 7 - deviance = 3823 - criterion = 0.00000001
## Iteration 8 - deviance = 3823 - criterion = 0.00000000082
## converged

##
## Call:
## mblogit(formula = religion_labeled ~ language * age, data = r_for_plots,
##         random = ~1 | id)
##
## Equation for Buddhist vs Hindu:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.002    0.344   -2.91  0.00356 **
## languageEnglish (U.S.)    1.183    0.470    2.52  0.01188 *
## languageGujarati      -1.730    0.480   -3.60  0.00032 ***
## languageHindi         -2.210    0.604   -3.66  0.00025 ***
## languageMandarin        3.075    0.721    4.26  0.00002 ***
## languageMarathi       -0.306    0.406   -0.75  0.45097
## languageTamil          1.186    0.414    2.86  0.00420 **
## languageUrdu          -2.814    0.892   -3.16  0.00160 **
## age                  0.219    0.225    0.97  0.32975
## languageEnglish (U.S.):age  0.108    0.304    0.36  0.72146
## languageGujarati:age    -0.592    0.312   -1.90  0.05762 .
## languageHindi:age      -0.681    0.381   -1.79  0.07379 .
## languageMandarin:age    0.541    0.405    1.34  0.18107
## languageMarathi:age    -0.307    0.265   -1.16  0.24710
## languageTamil:age       0.237    0.272    0.87  0.38481
## languageUrdu:age        0.408    0.520    0.79  0.43200
##
## Equation for Christian vs Hindu:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      0.9843    0.2169    4.54 0.00000570207474982 ***
## languageEnglish (U.S.)  0.5999    0.3397    1.77    0.07746 .
## languageGujarati     -3.5678    0.3877   -9.20 < 0.0000000000000002 ***
## languageHindi        -4.0994    0.5078   -8.07 0.00000000000000069 ***
## languageMandarin      1.6307    0.6600    2.47    0.01348 *
## languageMarathi      -2.7957    0.3470   -8.06 0.00000000000000079 ***
## languageTamil        -1.2652    0.3376   -3.75    0.00018 ***
## languageUrdu         -4.2568    0.6607   -6.44 0.00000000011713190 ***
## age                  0.4223    0.1416    2.98    0.00286 **
## languageEnglish (U.S.):age -0.0172    0.2176   -0.08    0.93707
## languageGujarati:age  -0.8849    0.2449   -3.61    0.00030 ***
## languageHindi:age    -0.5159    0.3284   -1.57    0.11622
## languageMandarin:age  0.3684    0.3573    1.03    0.30251
## languageMarathi:age  -0.9612    0.2257   -4.26 0.00002056728934476 ***
## languageTamil:age    -0.6291    0.2197   -2.86    0.00419 **
## languageUrdu:age     -1.3495    0.3590   -3.76    0.00017 ***
##
## Equation for Jain vs Hindu:

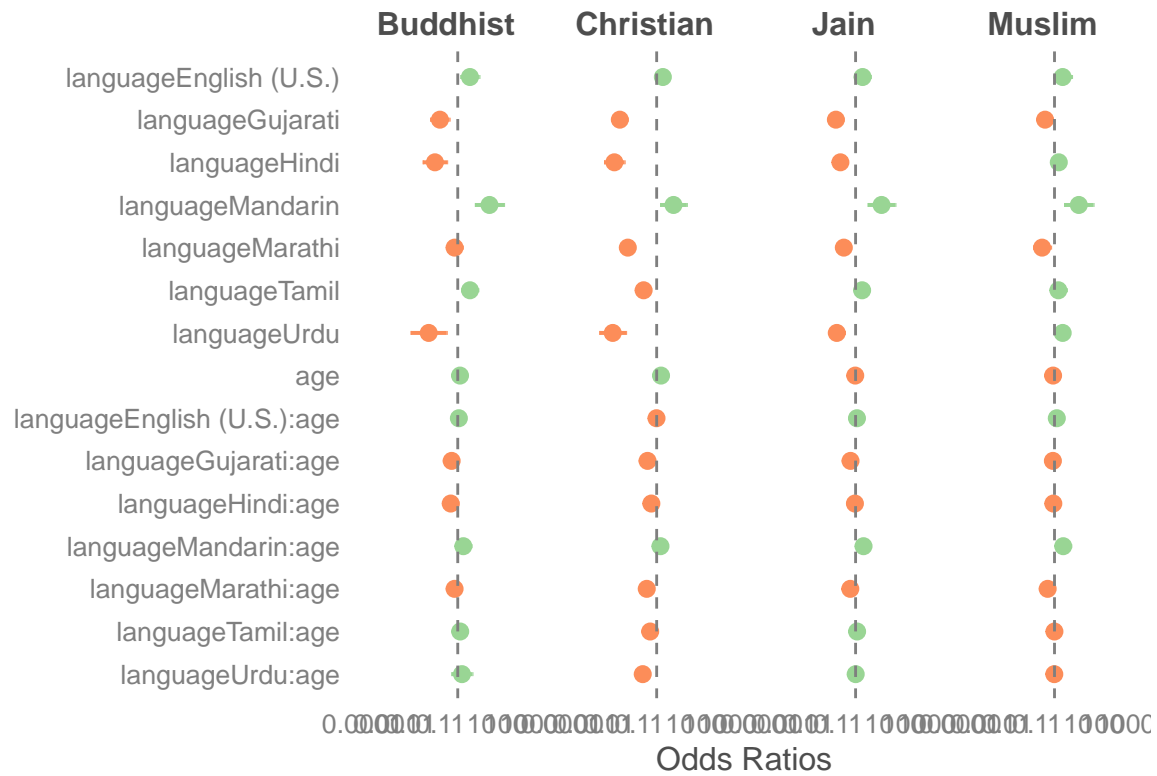
```

```

##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.20544    0.27264   -0.75   0.45113
## languageEnglish (U.S.)    0.67808    0.40809    1.66   0.09660 .
## languageGujarati      -1.90827    0.37734   -5.06 0.00000043 ***
## languageHindi         -1.47031    0.36089   -4.07 0.00004618 ***
## languageMandarin       2.51624    0.68549    3.67   0.00024 ***
## languageMarathi       -1.13903    0.35108   -3.24   0.00118 **
## languageTamil          0.63130    0.34546    1.83   0.06764 .
## languageUrdu          -1.82219    0.40409   -4.51 0.00000650 ***
## age                 -0.03419    0.17356   -0.20   0.84381
## languageEnglish (U.S.):age 0.13486    0.25741    0.52   0.60035
## languageGujarati:age   -0.49159    0.23917   -2.06   0.03984 *
## languageHindi:age     -0.06504    0.23342   -0.28   0.78053
## languageMandarin:age   0.76685    0.37458    2.05   0.04064 *
## languageMarathi:age   -0.51324    0.22817   -2.25   0.02449 *
## languageTamil:age      0.14687    0.22466    0.65   0.51327
## languageUrdu:age       0.00987    0.26559    0.04   0.97037
##
## Equation for Muslim vs Hindu:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.76612    0.32604   -2.35   0.0188 *
## languageEnglish (U.S.)    0.78735    0.46588    1.69   0.0910 .
## languageGujarati      -0.91538    0.38452   -2.38   0.0173 *
## languageHindi          0.41553    0.35531    1.17   0.2422
## languageMandarin       2.35648    0.72704    3.24   0.0012 **
## languageMarathi       -1.20352    0.44588   -2.70   0.0070 **
## languageTamil          0.37768    0.41854    0.90   0.3669
## languageUrdu          0.79162    0.35346    2.24   0.0251 *
## age                 -0.13693    0.19682   -0.70   0.4866
## languageEnglish (U.S.):age 0.22300    0.28279    0.79   0.4304
## languageGujarati:age   -0.15621    0.23588   -0.66   0.5078
## languageHindi:age     -0.11360    0.21725   -0.52   0.6011
## languageMandarin:age   0.84405    0.39490    2.14   0.0326 *
## languageMarathi:age   -0.66366    0.26887   -2.47   0.0136 *
## languageTamil:age     -0.00793    0.25845   -0.03   0.9755
## languageUrdu:age      -0.02054    0.21725   -0.09   0.9247
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Co-)Variances:
## Grouping level: id
##               Estimate               Std.Err.
## Buddhist~1    0.2516                0.00551
## Christian~1   0.1299 0.2687            0.00596 0.00667
## Jain~1        0.1091 0.1226 0.2607      0.00602 0.00667 0.00699
## Muslim~1      0.0570 0.0744 0.1204 0.3538 0.00599 0.00669 0.00715 0.00816
##
## Approximate residual deviance: 3820
## Number of Fisher scoring iterations: 8
## Number of observations
## Groups by id: 129
## Individual observations: 1580

```

## Religion: This speaker is...



religion\_labeled: Buddhist

religion\_labeled: Christian

religion\_labeled: Jain

religion\_labeled: Muslim

Predictors

Odds Ratios

CI

P

Odds Ratios

CI

P

Odds Ratios

CI

P

Odds Ratios

CI

P

(Intercept)  
 0.37  
 0.19 – 0.72  
 0.004  
 2.68  
 1.75 – 4.09  
 <0.001  
 0.81  
 0.48 – 1.39  
 0.451  
 0.46  
 0.25 – 0.88  
 0.019  
 languageEnglish (U.S.)  
 3.26  
 1.30 – 8.20  
 0.012  
 1.82  
 0.94 – 3.55  
 0.077  
 1.97  
 0.89 – 4.38  
 0.097  
 2.20  
 0.88 – 5.48  
 0.091  
 languageGujarati  
 0.18  
 0.07 – 0.45  
 <0.001  
 0.03  
 0.01 – 0.06  
 <0.001  
 0.15  
 0.07 – 0.31  
 <0.001



0.40  
 0.19 – 0.85  
 0.017  
 languageHindi  
 0.11  
 0.03 – 0.36  
 <0.001  
 0.02  
 0.01 – 0.04  
 <0.001  
 0.23  
 0.11 – 0.47  
 <0.001  
 1.52  
 0.76 – 3.04  
 0.242  
 languageMandarin  
 21.66  
 5.27 – 89.06  
 <0.001  
 5.11  
 1.40 – 18.62  
 0.013  
 12.38  
 3.23 – 47.47  
 <0.001  
 10.55  
 2.54 – 43.89  
 0.001  
 languageMarathi  
 0.74  
 0.33 – 1.63  
 0.451  
 0.06  
 0.03 – 0.12  
 <0.001

0.32  
 0.16 – 0.64  
 0.001  
 0.30  
 0.13 – 0.72  
 0.007  
 languageTamil  
 3.28  
 1.45 – 7.38  
 0.004  
 0.28  
 0.15 – 0.55  
 <0.001  
 1.88  
 0.96 – 3.70  
 0.068  
 1.46  
 0.64 – 3.31  
 0.367  
 languageUrdu  
 0.06  
 0.01 – 0.34  
 0.002  
 0.01  
 0.00 – 0.05  
 <0.001  
 0.16  
 0.07 – 0.36  
 <0.001  
 2.21  
 1.10 – 4.41  
 0.025  
 age  
 1.24  
 0.80 – 1.93  
 0.330

1.53  
 1.16 – 2.01  
 0.003  
 0.97  
 0.69 – 1.36  
 0.844  
 0.87  
 0.59 – 1.28  
 0.487  
 languageEnglish (U.S.):age  
 1.11  
 0.61 – 2.02  
 0.721  
 0.98  
 0.64 – 1.51  
 0.937  
 1.14  
 0.69 – 1.90  
 0.600  
 1.25  
 0.72 – 2.18  
 0.430  
 languageGujarati:age  
 0.55  
 0.30 – 1.02  
 0.058  
 0.41  
 0.26 – 0.67  
 <0.001  
 0.61  
 0.38 – 0.98  
 0.040  
 0.86  
 0.54 – 1.36  
 0.508  
 languageHindi:age

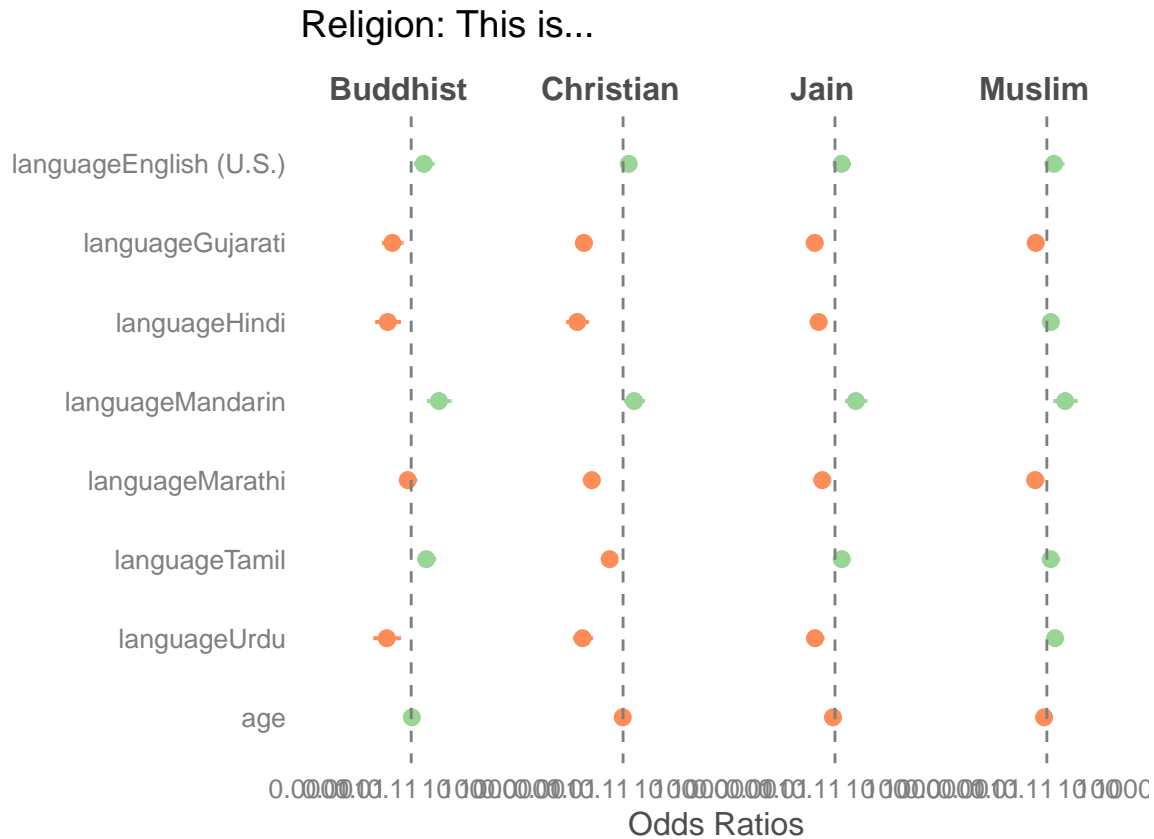
0.51  
 0.24 – 1.07  
 0.074  
 0.60  
 0.31 – 1.14  
 0.116  
 0.94  
 0.59 – 1.48  
 0.781  
 0.89  
 0.58 – 1.37  
 0.601  
 languageMandarin:age  
 1.72  
 0.78 – 3.80  
 0.181  
 1.45  
 0.72 – 2.91  
 0.303  
 2.15  
 1.03 – 4.49  
 0.041  
 2.33  
 1.07 – 5.04  
 0.033  
 languageMarathi:age  
 0.74  
 0.44 – 1.24  
 0.247  
 0.38  
 0.25 – 0.60  
 <0.001  
 0.60  
 0.38 – 0.94  
 0.024  
 0.51

```

0.30 – 0.87
0.014
languageTamil:age
1.27
0.74 – 2.16
0.385
0.53
0.35 – 0.82
0.004
1.16
0.75 – 1.80
0.513
0.99
0.60 – 1.65
0.976
languageUrdu:age
1.50
0.54 – 4.16
0.432
0.26
0.13 – 0.52
<0.001
1.01
0.60 – 1.70
0.970
0.98
0.64 – 1.50
0.925
N id
129
Observations
1580

##
## Iteration 1 - deviance = 3981 - criterion = 0.92
## Iteration 2 - deviance = 3922 - criterion = 0.028
## Iteration 3 - deviance = 3924 - criterion = 0.0019
## Iteration 4 - deviance = 3923 - criterion = 0.000027
## Iteration 5 - deviance = 3923 - criterion = 0.0000000083
## converged

```



```
##
## Iteration 1 - deviance = 3544 - criterion = 0.91
## Iteration 2 - deviance = 3478 - criterion = 0.037
## Iteration 3 - deviance = 3478 - criterion = 0.0049
## Iteration 4 - deviance = 3477 - criterion = 0.0026
## Iteration 5 - deviance = 3476 - criterion = 0.0025
## Iteration 6 - deviance = 3476 - criterion = 0.0024
## Iteration 7 - deviance = 3476 - criterion = 0.0024
## Iteration 8 - deviance = 3476 - criterion = 0.0023
## Iteration 9 - deviance = 3476 - criterion = 0.0022
## Iteration 10 - deviance = 3476 - criterion = 0.0021
## Iteration 11 - deviance = 3476 - criterion = 0.002
## Iteration 12 - deviance = 3476 - criterion = 0.0019
## Iteration 13 - deviance = 3476 - criterion = 0.0018
## Iteration 14 - deviance = 3476 - criterion = 0.0017
## Iteration 15 - deviance = 3476 - criterion = 0.0016
## Iteration 16 - deviance = 3476 - criterion = 0.0016
## Iteration 17 - deviance = 3476 - criterion = 0.0015
## Iteration 18 - deviance = 3476 - criterion = 0.0014
## Iteration 19 - deviance = 3476 - criterion = 0.0013
## Iteration 20 - deviance = 3476 - criterion = 0.0013
## Iteration 21 - deviance = 3476 - criterion = 0.0012
## Iteration 22 - deviance = 3476 - criterion = 0.0011
## Iteration 23 - deviance = 3476 - criterion = 0.0011
## Iteration 24 - deviance = 3476 - criterion = 0.001
## Iteration 25 - deviance = 3476 - criterion = 0.00097
```

```
##
## Call:
## mblogit(formula = religion_labeled ~ language * id_correct +
##       age, data = ri, random = ~1 | id)
##
## Equation for Buddhist vs Hindu:
##
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.7558    0.5569  -1.36  0.1747
## languageEnglish (U.S.)    0.6936    1.1705   0.59  0.5535
## languageGujarati    -0.3559    0.7667  -0.46  0.6425
## languageHindi      -1.3723    1.2078  -1.14  0.2558
## languageMandarin     1.1761    0.8107   1.45  0.1469
## languageMarathi      0.5292    0.6719   0.79  0.4309
## languageTamil        0.8920    0.6211   1.44  0.1510
## languageUrdu       -2.4544    0.7555  -3.25  0.0012 **
## id_correct         -0.8799    0.7837  -1.12  0.2615
## age                0.1329    0.0744   1.79  0.0741 .
## languageEnglish (U.S.):id_correct  0.9260    1.3407   0.69  0.4898
## languageGujarati:id_correct -1.3416    1.0532  -1.27  0.2027
## languageHindi:id_correct  -0.2552    1.4247  -0.18  0.8579
## languageMandarin:id_correct  2.6907    1.2332   2.18  0.0291 *
## languageMarathi:id_correct  -0.8830    0.9254  -0.95  0.3399
## languageTamil:id_correct   1.3675    0.9434   1.45  0.1472
## languageUrdu:id_correct -21.1887 131921.8712   0.00  0.9999
##
## Equation for Christian vs Hindu:
##
##               Estimate Std. Error z value      Pr(>|z|)
## (Intercept)        0.9401    0.3833   2.45      0.01418
## languageEnglish (U.S.) -0.2030    0.9697  -0.21      0.83416
## languageGujarati    -3.7379    1.1053  -3.38      0.00072
## languageHindi     -27.1536 104498.0771   0.00      0.99979
## languageMandarin     0.5170    0.6309   0.82      0.41246
## languageMarathi    -1.3663    0.5481  -2.49      0.01268
## languageTamil     -1.0507    0.4830  -2.18      0.02961
## languageUrdu      -4.0816    0.6382  -6.40 0.00000000016
## id_correct         0.2183    0.4649   0.47      0.63872
## age                0.0314    0.0647   0.49      0.62716
## languageEnglish (U.S.):id_correct  0.6286    1.0416   0.60      0.54618
## languageGujarati:id_correct  -0.0876    1.1909  -0.07      0.94136
## languageHindi:id_correct  22.7969 104498.0771   0.00      0.99983
## languageMandarin:id_correct   0.9033    1.0073   0.90      0.36984
## languageMarathi:id_correct  -2.6406    0.7693  -3.43      0.00060
## languageTamil:id_correct  -0.2042    0.7600  -0.27      0.78815
## languageUrdu:id_correct -22.4150 134546.5299   0.00      0.99987
##
## (Intercept) *
## languageEnglish (U.S.)
## languageGujarati ***
## languageHindi
## languageMandarin
## languageMarathi *
## languageTamil *
## languageUrdu ***
## id_correct
```

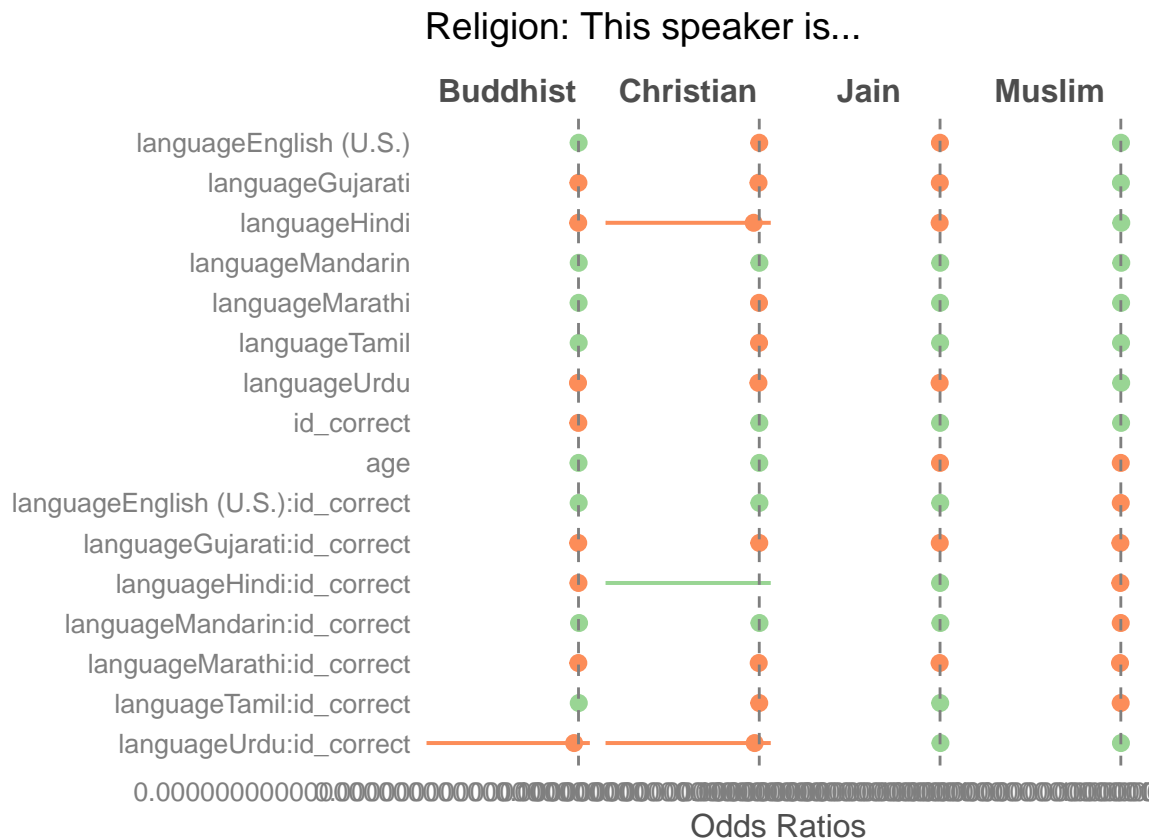
```

## age
## languageEnglish (U.S.):id_correct
## languageGujarati:id_correct
## languageHindi:id_correct
## languageMandarin:id_correct
## languageMarathi:id_correct ***
## languageTamil:id_correct
## languageUrdu:id_correct
##
## Equation for Jain vs Hindu:
##
## Estimate Std. Error z value Pr(>|z|)
## (Intercept) -0.3002 0.4839 -0.62 0.5350
## languageEnglish (U.S.):id_correct -0.4558 1.3298 -0.34 0.7318
## languageGujarati -1.0519 0.7129 -1.48 0.1401
## languageHindi -1.8057 1.1724 -1.54 0.1235
## languageMandarin 0.8920 0.7332 1.22 0.2238
## languageMarathi 0.1434 0.5961 0.24 0.8099
## languageTamil 0.4137 0.5590 0.74 0.4593
## languageUrdu -1.8580 0.5869 -3.17 0.0015 **
## id_correct 0.2263 0.5858 0.39 0.6993
## age -0.1403 0.0648 -2.17 0.0303 *
## languageEnglish (U.S.):id_correct 0.8777 1.4083 0.62 0.5331
## languageGujarati:id_correct -1.2811 0.8514 -1.50 0.1324
## languageHindi:id_correct 0.2451 1.2474 0.20 0.8442
## languageMandarin:id_correct 1.6898 1.0966 1.54 0.1233
## languageMarathi:id_correct -1.9998 0.7607 -2.63 0.0086 **
## languageTamil:id_correct 0.7848 0.7721 1.02 0.3094
## languageUrdu:id_correct 1.9365 1.2181 1.59 0.1119
##
## Equation for Muslim vs Hindu:
##
## Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.7363 0.7825 -2.22 0.02649 *
## languageEnglish (U.S.):id_correct 0.6559 1.4836 0.44 0.65841
## languageGujarati 0.5726 0.9118 0.63 0.53003
## languageHindi 2.2596 0.9120 2.48 0.01323 *
## languageMandarin 2.1799 0.9581 2.28 0.02289 *
## languageMarathi 1.3355 0.8610 1.55 0.12088
## languageTamil 1.1130 0.8554 1.30 0.19320
## languageUrdu 1.6898 0.7969 2.12 0.03395 *
## id_correct 1.3274 0.8595 1.54 0.12249
## age -0.1989 0.0593 -3.35 0.00080 ***
## languageEnglish (U.S.):id_correct -0.2318 1.5660 -0.15 0.88233
## languageGujarati:id_correct -2.0136 1.0147 -1.98 0.04721 *
## languageHindi:id_correct -2.2281 0.9966 -2.24 0.02537 *
## languageMandarin:id_correct -0.3062 1.2975 -0.24 0.81345
## languageMarathi:id_correct -3.8516 1.0695 -3.60 0.00032 ***
## languageTamil:id_correct -0.5823 1.0467 -0.56 0.57800
## languageUrdu:id_correct 0.5656 1.1739 0.48 0.62994
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Co-)Variances:
## Grouping level: id
## Estimate Std.Err.

```



```
## Buddhist~1 0.2486 0.00684
## Christian~1 0.1486 0.2403 0.00628 0.00585
## Jain~1 0.1294 0.1195 0.2336 0.00620 0.00571 0.00575
## Muslim~1 0.0799 0.0477 0.0840 0.2945 0.00527 0.00475 0.00488 0.00484
##
## Approximate residual deviance: 3480
## Number of Fisher scoring iterations: 25
## Number of observations
## Groups by id: 120
## Individual observations: 1456
## Note: Algorithm did not converge.
## (135 observations deleted due to missingness)
```



religion\_labeled: Buddhist

religion\_labeled: Christian

religion\_labeled: Jain

religion\_labeled: Muslim

Predictors

Odds Ratios

CI

p

|                        |
|------------------------|
| Odds Ratios            |
| CI                     |
| p                      |
| Odds Ratios            |
| CI                     |
| p                      |
| Odds Ratios            |
| CI                     |
| p                      |
| (Intercept)            |
| 0.47                   |
| 0.16 – 1.40            |
| 0.175                  |
| 2.56                   |
| 1.21 – 5.43            |
| 0.014                  |
| 0.74                   |
| 0.29 – 1.91            |
| 0.535                  |
| 0.18                   |
| 0.04 – 0.82            |
| 0.026                  |
| languageEnglish (U.S.) |
| 2.00                   |
| 0.20 – 19.85           |
| 0.553                  |
| 0.82                   |
| 0.12 – 5.46            |
| 0.834                  |
| 0.63                   |
| 0.05 – 8.59            |
| 0.732                  |
| 1.93                   |
| 0.11 – 35.31           |
| 0.658                  |
| languageGujarati       |

0.70  
0.16 – 3.15  
0.642  
0.02  
0.00 – 0.21  
0.001  
0.35  
0.09 – 1.41  
0.140  
1.77  
0.30 – 10.59  
0.530  
languageHindi  
0.25  
0.02 – 2.71  
0.256  
0.00  
0.00 – Inf  
1.000  
0.16  
0.02 – 1.64  
0.124  
9.58  
1.60 – 57.25  
0.013  
languageMandarin  
3.24  
0.66 – 15.89  
0.147  
1.68  
0.49 – 5.78  
0.412  
2.44  
0.58 – 10.27  
0.224  
8.85

1.35 – 57.86  
 0.023  
 languageMarathi  
 1.70  
 0.45 – 6.34  
 0.431  
 0.26  
 0.09 – 0.75  
 0.013  
 1.15  
 0.36 – 3.71  
 0.810  
 3.80  
 0.70 – 20.56  
 0.121  
 languageTamil  
 2.44  
 0.72 – 8.25  
 0.151  
 0.35  
 0.14 – 0.90  
 0.030  
 1.51  
 0.51 – 4.52  
 0.459  
 3.04  
 0.57 – 16.28  
 0.193  
 languageUrdu  
 0.09  
 0.02 – 0.38  
 0.001  
 0.02  
 0.00 – 0.06  
 <0.001  
 0.16

0.05 – 0.49

0.002

5.42

1.14 – 25.84

0.034

id\_correct

0.41

0.09 – 1.93

0.262

1.24

0.50 – 3.09

0.639

1.25

0.40 – 3.95

0.699

3.77

0.70 – 20.34

0.122

age

1.14

0.99 – 1.32

0.074

1.03

0.91 – 1.17

0.627

0.87

0.77 – 0.99

0.030

0.82

0.73 – 0.92

0.001

languageEnglish (U.S.):id\_correct

2.52

0.18 – 34.96

0.490

1.88

0.24 – 14.45  
0.546  
2.41  
0.15 – 38.03  
0.533  
0.79  
0.04 – 17.08  
0.882  
languageGujarati:id\_correct  
0.26  
0.03 – 2.06  
0.203  
0.92  
0.09 – 9.46  
0.941  
0.28  
0.05 – 1.47  
0.132  
0.13  
0.02 – 0.98  
0.047  
languageHindi:id\_correct  
0.77  
0.05 – 12.65  
0.858  
7953976227.59  
0.00 – Inf  
1.000  
1.28  
0.11 – 14.74  
0.844  
0.11  
0.02 – 0.76  
0.025  
languageMandarin:id\_correct  
14.74

1.31 – 165.37  
 0.029  
 2.47  
 0.34 – 17.78  
 0.370  
 5.42  
 0.63 – 46.51  
 0.123  
 0.74  
 0.06 – 9.37  
 0.813  
 languageMarathi:id\_correct  
 0.41  
 0.07 – 2.54  
 0.340  
 0.07  
 0.02 – 0.32  
 0.001  
 0.14  
 0.03 – 0.60  
 0.009  
 0.02  
 0.00 – 0.17  
 <0.001  
 languageTamil:id\_correct  
 3.93  
 0.62 – 24.95  
 0.147  
 0.82  
 0.18 – 3.62  
 0.788  
 2.19  
 0.48 – 9.96  
 0.309  
 0.56  
 0.07 – 4.35

0.578  
languageUrdu:id\_correct  
0.00  
0.00 – Inf  
1.000  
0.00  
0.00 – Inf  
1.000  
6.93  
0.64 – 75.52  
0.112  
1.76  
0.18 – 17.58  
0.630  
N id  
120  
Observations  
1456

##  
## Iteration 1 - deviance = 3447 - criterion = 0.91  
## Iteration 2 - deviance = 3363 - criterion = 0.057  
## Iteration 3 - deviance = 3354 - criterion = 0.028  
## Iteration 4 - deviance = 3348 - criterion = 0.037  
## Iteration 5 - deviance = 3344 - criterion = 0.12  
## Iteration 6 - deviance = 3343 - criterion = 0.073  
## Iteration 7 - deviance = 3342 - criterion = 0.08  
## Iteration 8 - deviance = 3342 - criterion = 0.044  
## Iteration 9 - deviance = 3341 - criterion = 0.029  
## Iteration 10 - deviance = 3341 - criterion = 0.021  
## Iteration 11 - deviance = 3341 - criterion = 0.016  
## Iteration 12 - deviance = 3341 - criterion = 0.013  
## Iteration 13 - deviance = 3341 - criterion = 0.01  
## Iteration 14 - deviance = 3341 - criterion = 0.0086  
## Iteration 15 - deviance = 3341 - criterion = 0.0072  
## Iteration 16 - deviance = 3341 - criterion = 0.0062  
## Iteration 17 - deviance = 3341 - criterion = 0.0053  
## Iteration 18 - deviance = 3341 - criterion = 0.0046  
## Iteration 19 - deviance = 3341 - criterion = 0.0041  
## Iteration 20 - deviance = 3341 - criterion = 0.0036  
## Iteration 21 - deviance = 3341 - criterion = 0.0032  
## Iteration 22 - deviance = 3341 - criterion = 0.0029  
## Iteration 23 - deviance = 3341 - criterion = 0.0026  
## Iteration 24 - deviance = 3341 - criterion = 0.0023  
## Iteration 25 - deviance = 3341 - criterion = 0.0022



```
##
## Call:
## mblogit(formula = religion_labeled ~ language * id_correct *
##       age, data = ri, random = ~1 | id)
##
## Equation for Buddhist vs Hindu:
##
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.7201    0.5639   -1.28  0.2016
## languageEnglish (U.S.) 204.5427 184576.3369    0.00  0.9991
## languageGujarati     -0.4788    0.7735   -0.62  0.5359
## languageHindi        -2.0508    2.1865   -0.94  0.3483
## languageMandarin      2.5436    1.3952    1.82  0.0683
## languageMarathi       0.4305    0.6775    0.64  0.5251
## languageTamil         0.5683    0.6509    0.87  0.3826
## languageUrdu         -2.9706    0.9948   -2.99  0.0028
## id_correct          -0.8378    0.7939   -1.06  0.2912
## age                  0.2764    0.4021    0.69  0.4918
## languageEnglish (U.S.):id_correct -202.9689 184576.3891    0.00  0.9991
## languageGujarati:id_correct  -1.2499    1.0801   -1.16  0.2472
## languageHindi:id_correct    0.4340    2.3176    0.19  0.8514
## languageMandarin:id_correct  1.3069    1.6799    0.78  0.4366
## languageMarathi:id_correct  -0.8319    0.9612   -0.87  0.3868
## languageTamil:id_correct    1.5906    0.9737    1.63  0.1024
## languageUrdu:id_correct  -20.6197 136784.8172    0.00  0.9999
## languageEnglish (U.S.):age    86.4054  77906.7338    0.00  0.9991
## languageGujarati:age     -0.3863    0.5466   -0.71  0.4797
## languageHindi:age     -1.3513    1.0299   -1.31  0.1895
## languageMandarin:age     0.6843    0.7163    0.96  0.3394
## languageMarathi:age     -0.2103    0.4736   -0.44  0.6570
## languageTamil:age       0.3012    0.4466    0.67  0.5001
## languageUrdu:age        0.3088    0.6150    0.50  0.6156
## id_correct:age          -0.0359    0.5261   -0.07  0.9456
## languageEnglish (U.S.):id_correct:age -86.2927  77906.7338    0.00  0.9991
## languageGujarati:id_correct:age  -0.3734    0.7151   -0.52  0.6016
## languageHindi:id_correct:age    0.7859    1.1363    0.69  0.4892
## languageMandarin:id_correct:age  -0.7619    0.9238   -0.82  0.4095
## languageMarathi:id_correct:age    0.0583    0.6287    0.09  0.9261
## languageTamil:id_correct:age   -0.1355    0.6609   -0.21  0.8375
## languageUrdu:id_correct:age   -0.8865  76189.9865    0.00  1.0000
##
## (Intercept)
## languageEnglish (U.S.)
## languageGujarati
## languageHindi
## languageMandarin
## languageMarathi
## languageTamil
## languageUrdu
## id_correct
## age
## languageEnglish (U.S.):id_correct
## languageGujarati:id_correct
## languageHindi:id_correct
## languageMandarin:id_correct
```

```

## languageMarathi:id_correct
## languageTamil:id_correct
## languageUrdu:id_correct
## languageEnglish (U.S.):age
## languageGujarati:age
## languageHindi:age
## languageMandarin:age
## languageMarathi:age
## languageTamil:age
## languageUrdu:age
## id_correct:age
## languageEnglish (U.S.):id_correct:age
## languageGujarati:id_correct:age
## languageHindi:id_correct:age
## languageMandarin:id_correct:age
## languageMarathi:id_correct:age
## languageTamil:id_correct:age
## languageUrdu:id_correct:age
##
## Equation for Christian vs Hindu:
##
##               Estimate   Std. Error z value Pr(>|z|)
## (Intercept)      0.9504      0.3923    2.42   0.0154
## languageEnglish (U.S.) 174.4751 195886.6551    0.00   0.9993
## languageGujarati    -6.9392     4.4535   -1.56   0.1192
## languageHindi   -27.1121 110936.1907    0.00   0.9998
## languageMandarin     2.0225     1.2908    1.57   0.1171
## languageMarathi    -1.7336     0.6124   -2.83   0.0046
## languageTamil     -1.1003     0.4952   -2.22   0.0263
## languageUrdu     -8.7537     3.8017   -2.30   0.0213
## id_correct         0.1586     0.4804    0.33   0.7413
## age                0.3437     0.2805    1.23   0.2205
## languageEnglish (U.S.):id_correct -173.9739 195886.6250    0.00   0.9993
## languageGujarati:id_correct      3.2422     4.4769    0.72   0.4689
## languageHindi:id_correct    22.8541 110936.1907    0.00   0.9998
## languageMandarin:id_correct   -0.6100     1.5168   -0.40   0.6876
## languageMarathi:id_correct   -2.0361     0.8298   -2.45   0.0141
## languageTamil:id_correct   -0.3522     0.8279   -0.43   0.6705
## languageUrdu:id_correct  -17.5895 136607.0432    0.00   0.9999
## languageEnglish (U.S.):age  107.5704  90987.7800    0.00   0.9991
## languageGujarati:age    -2.4571     1.9288   -1.27   0.2027
## languageHindi:age    -0.7091  57635.2903    0.00   1.0000
## languageMandarin:age     0.7721     0.6284    1.23   0.2192
## languageMarathi:age    -0.8507     0.4039   -2.11   0.0352
## languageTamil:age    -0.4836     0.3326   -1.45   0.1459
## languageUrdu:age     -3.1396     1.5438   -2.03   0.0420
## id_correct:age         0.0874     0.3270    0.27   0.7894
## languageEnglish (U.S.):id_correct:age -107.6957  90987.7800    0.00   0.9991
## languageGujarati:id_correct:age     1.6813     1.9497    0.86   0.3885
## languageHindi:id_correct:age     0.1577  57635.2903    0.00   1.0000
## languageMandarin:id_correct:age   -0.9094     0.8037   -1.13   0.2579
## languageMarathi:id_correct:age     0.1687     0.5380    0.31   0.7539
## languageTamil:id_correct:age   -0.3885     0.5747   -0.68   0.4990
## languageUrdu:id_correct:age     2.3872  75722.4630    0.00   1.0000
##

```

```

## (Intercept) *
## languageEnglish (U.S.)
## languageGujarati
## languageHindi
## languageMandarin
## languageMarathi **
## languageTamil *
## languageUrdu *
## id_correct
## age
## languageEnglish (U.S.):id_correct
## languageGujarati:id_correct
## languageHindi:id_correct
## languageMandarin:id_correct
## languageMarathi:id_correct *
## languageTamil:id_correct
## languageUrdu:id_correct
## languageEnglish (U.S.):age
## languageGujarati:age
## languageHindi:age
## languageMandarin:age
## languageMarathi:age *
## languageTamil:age
## languageUrdu:age *
## id_correct:age
## languageEnglish (U.S.):id_correct:age
## languageGujarati:id_correct:age
## languageHindi:id_correct:age
## languageMandarin:id_correct:age
## languageMarathi:id_correct:age
## languageTamil:id_correct:age
## languageUrdu:id_correct:age
##
## Equation for Jain vs Hindu:
##
## Estimate Std. Error z value Pr(>|z|)
## (Intercept) -0.2828 0.4938 -0.57 0.5668
## languageEnglish (U.S.) 117.9207 242013.4288 0.00 0.9996
## languageGujarati -3.1533 1.4730 -2.14 0.0323
## languageHindi -53.5854 111881.5141 0.00 0.9996
## languageMandarin 2.4746 1.3452 1.84 0.0658
## languageMarathi -0.1972 0.6485 -0.30 0.7611
## languageTamil 0.4072 0.5678 0.72 0.4733
## languageUrdu -1.8906 0.5978 -3.16 0.0016
## id_correct 0.1714 0.6048 0.28 0.7769
## age 0.0351 0.3471 0.10 0.9194
## languageEnglish (U.S.):id_correct -117.4599 242013.3943 0.00 0.9996
## languageGujarati:id_correct 0.8504 1.5520 0.55 0.5837
## languageHindi:id_correct 52.0693 111881.5141 0.00 0.9996
## languageMandarin:id_correct 0.1019 1.5779 0.06 0.9485
## languageMarathi:id_correct -1.5177 0.8143 -1.86 0.0623
## languageTamil:id_correct 0.8279 0.7896 1.05 0.2944
## languageUrdu:id_correct 2.0836 1.3009 1.60 0.1092
## languageEnglish (U.S.):age 131.8825 108604.1969 0.00 0.9990
## languageGujarati:age -1.7774 0.7812 -2.28 0.0229

```

```

## languageHindi:age                21.8812  46657.8291    0.00  0.9996
## languageMandarin:age              1.0187    0.6753    1.51  0.1314
## languageMarathi:age              -0.6214    0.4368   -1.42  0.1549
## languageTamil:age                 0.0651    0.3857    0.17  0.8661
## languageUrdu:age                 -0.0965    0.4129   -0.23  0.8152
## id_correct:age                   -0.1206    0.4034   -0.30  0.7650
## languageEnglish (U.S.):id_correct:age -131.8204 108604.1969    0.00  0.9990
## languageGujarati:id_correct:age    1.4352    0.8364    1.72  0.0862
## languageHindi:id_correct:age      -21.9476  46657.8291    0.00  0.9996
## languageMandarin:id_correct:age    -0.7975    0.8493   -0.94  0.3477
## languageMarathi:id_correct:age     0.4018    0.5337    0.75  0.4515
## languageTamil:id_correct:age       0.2643    0.5479    0.48  0.6295
## languageUrdu:id_correct:age        0.0436    0.7776    0.06  0.9552
##
## (Intercept)
## languageEnglish (U.S.)
## languageGujarati                  *
## languageHindi                      .
## languageMarathi
## languageTamil
## languageUrdu                      **
## id_correct
## age
## languageEnglish (U.S.):id_correct
## languageGujarati:id_correct
## languageHindi:id_correct
## languageMandarin:id_correct
## languageMarathi:id_correct        .
## languageTamil:id_correct
## languageUrdu:id_correct
## languageEnglish (U.S.):age
## languageGujarati:age              *
## languageHindi:age
## languageMandarin:age
## languageMarathi:age
## languageTamil:age
## languageUrdu:age
## id_correct:age
## languageEnglish (U.S.):id_correct:age
## languageGujarati:id_correct:age   .
## languageHindi:id_correct:age
## languageMandarin:id_correct:age
## languageMarathi:id_correct:age
## languageTamil:id_correct:age
## languageUrdu:id_correct:age
##
## Equation for Muslim vs Hindu:
##
## Estimate Std. Error z value Pr(>|z|)
## (Intercept)          -2.636      1.391   -1.89  0.0582 .
## languageEnglish (U.S.) -241.739 247924.180    0.00  0.9992
## languageGujarati      -0.335      1.829   -0.18  0.8545
## languageHindi          3.199      1.488    2.15  0.0316 *
## languageMandarin       4.644      1.876    2.48  0.0133 *

```

```

## languageMarathi          1.967      1.459      1.35      0.1777
## languageTamil            1.938      1.441      1.35      0.1785
## languageUrdu             2.578      1.399      1.84      0.0654 .
## id_correct               2.188      1.442      1.52      0.1292
## age                      -0.881      0.767     -1.15      0.2507
## languageEnglish (U.S.):id_correct 242.246 247924.180      0.00      0.9992
## languageGujarati:id_correct -1.087      1.888     -0.58      0.5649
## languageHindi:id_correct  -3.126      1.548     -2.02      0.0435 *
## languageMandarin:id_correct -2.961      2.087     -1.42      0.1560
## languageMarathi:id_correct -4.599      1.645     -2.80      0.0052 **
## languageTamil:id_correct  -1.374      1.569     -0.88      0.3813
## languageUrdu:id_correct   -0.215      1.696     -0.13      0.8990
## languageEnglish (U.S.):age -84.927  87173.842      0.00      0.9992
## languageGujarati:age      -0.746      0.982     -0.76      0.4473
## languageHindi:age         0.314      0.816      0.38      0.7004
## languageMandarin:age      1.763      0.959      1.84      0.0659 .
## languageMarathi:age       0.300      0.812      0.37      0.7116
## languageTamil:age         0.658      0.795      0.83      0.4079
## languageUrdu:age          0.769      0.774      0.99      0.3204
## id_correct:age            0.769      0.797      0.97      0.3344
## languageEnglish (U.S.):id_correct:age 85.085  87173.842      0.00      0.9992
## languageGujarati:id_correct:age 0.799      1.020      0.78      0.4334
## languageHindi:id_correct:age -0.387      0.853     -0.45      0.6503
## languageMandarin:id_correct:age -1.228      1.110     -1.11      0.2689
## languageMarathi:id_correct:age -1.154      0.933     -1.24      0.2160
## languageTamil:id_correct:age -0.489      0.907     -0.54      0.5897
## languageUrdu:id_correct:age -1.134      0.943     -1.20      0.2291
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Co-)Variances:
## Grouping level: id
##      Estimate      Std.Err.
## Buddhist~1  0.2538      0.00588
## Christian~1 0.1359 0.2700      0.00626 0.00685
## Jain~1      0.1072 0.1267 0.2697      0.00635 0.00689 0.00730
## Muslim~1    0.0570 0.0556 0.1124 0.3323      0.00558 0.00602 0.00657 0.00676
##
## Approximate residual deviance: 3340
## Number of Fisher scoring iterations: 25
## Number of observations
##   Groups by id: 120
##   Individual observations: 1456
## Note: Algorithm did not converge.
##   (135 observations deleted due to missingness)

```