```
> #DV: Spelling
> model0_mijiref_spell<-</pre>
lmer(spell~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0 mijiref spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula: spell ~ male + BL_ses + age_child + wave + (1 + wave |
child id)
  Data: kenyadata
REML criterion at convergence: 35392.1
Scaled residuals:
   Min
             10 Median
                             3Q
                                    Max
-2.8979 -0.5451 -0.0095 0.5457 3.1441
Random effects:
Groups
         Name
                     Variance Std.Dev. Corr
 child_id (Intercept) 6.3911
                               2.5281
                      0.6383
                               0.7989
                                        -0.61
         wave
                      7.4473 2.7290
Residual
Number of obs: 6513, groups: child_id, 2428
Fixed effects:
                    Estimate Std. Error
                                                df t value
Pr(>|t|)
                    12.73122
                                0.35618 2426.04756 35.744 <
(Intercept)
2e-16 ***
maleMale
                    -0.11520
                                0.14190\ 2357.05615\ -0.812
0.416973
BL_sesLess poor
                    -0.89737
                                0.23127 2352.96133 -3.880
0.000107 ***
                                0.23083 2366.38700 -6.362
BL_sesMedian poor
                    -1.46856
2.38e-10 ***
                                0.23009\ 2380.91786\ -6.818
BL sesPoor
                    -1.56889
1.16e-11 ***
                    -2.06089
                                0.22462\ 2359.95853\ -9.175\ <
BL sesPoorest
2e-16 ***
                     0.06523
                                0.04260 2397.37725
                                                     1.531
age_child
0.125882
                     1.73631
                                0.04517 2280.00252 38.437 <
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
           -0.082
maleMale
BL sesLsspr -0.299 -0.009
BL sesMdnpr -0.260 -0.022 0.523
BL_sesPoor -0.234 -0.026 0.526 0.533
BL_sesPorst -0.211 -0.001 0.541 0.549 0.555
age_child -0.858 -0.123 -0.041 -0.084 -0.113
                                                -0.155
wave
            0.087 -0.006 -0.008 -0.005 -0.001
                                                -0.008
                                                          0.008
> model1_mijiref_spell<-</pre>
lmer(spell~male+BL ses+age child+wave+lang3 swaref+BL gll1 bgsnd
s+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1 mijiref spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula:
spell ~ male + BL ses + age child + wave + lang3 swaref +
BL_gll1_bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id)
  Data: kenyadata
REML criterion at convergence: 34902.8
Scaled residuals:
            10 Median
   Min
                            3Q
                                   Max
-2.7264 -0.5607 -0.0201 0.5531 2.8991
Random effects:
 Groups
                     Variance Std.Dev. Corr
        Name
 child_id (Intercept) 5.1777 2.2755
                     0.6814 0.8255
                                       -0.29
         wave
                     7.4072
 Residual
                             2.7216
Number of obs: 6513, groups: child_id, 2428
Fixed effects:
                       Estimate Std. Error df t value
Pr(>|t|)
                        7.42414
                                   0.44473 2432.61222 16.694
(Intercept)
< 2e-16 ***
maleMale
                       -0.32542 0.12865 2357.23954 -2.530
0.0115 *
                      -0.49794 0.21035 2346.49283 -2.367
BL_sesLess poor
0.0180 *
```

```
0.21127 2362.37708 -3.984
BL sesMedian poor
                       -0.84167
6.98e-05 ***
                                  0.21187 2375.61088
BL sesPoor
                       -0.87029
                                                     -4.108
4.13e-05 ***
                                  0.20847 2351.66155
BL sesPoorest
                       -1.24476
                                                     -5.971
2.72e-09 ***
                                  0.03983 2396.54206
                                                     -2.507
age child
                       -0.09984
0.0123 *
                                  0.04533 2262.95891
wave
                       1.73576
                                                     38.295
< 2e-16 ***
lang3_swarefMijikenda -0.06744
                                 0.18731 2394.46983
                                                     -0.360
0.7188
lang3_swarefKamba
                       0.23148
                                  0.23932 2360.78041
                                                     0.967
0.3335
BL gll1 bgsnds
                       0.44322
                                  0.02810 2336.13281
                                                     15.774
< 2e-16 ***
BL_gll3_rcplang
                       0.21290
                                 0.01685 2374.39137 12.635
< 2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
           (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
wave
      lng3_M
maleMale
           0.008
BL_sesLsspr -0.241 -0.016
BL_sesMdnpr -0.268 -0.036 0.529
BL_sesPoor -0.236 -0.040 0.532 0.547
BL_sesPorst -0.229 -0.017 0.543 0.563 0.575
age_child -0.505 -0.107 -0.051 -0.091 -0.111
                                               -0.146
            0.089 -0.005 -0.007 -0.005 -0.001
                                               -0.007
                                                        0.008
wave
lng3_swrfMj -0.276 -0.015 -0.073 -0.060 -0.116
                                               -0.137
                                                       -0.124
-0.010
lng3_swrfKm -0.300 -0.023 -0.089 -0.021 -0.037
                                                        0.024
                                               -0.030
-0.012 0.623
BL_gll1_bgs -0.034 0.001 0.020 0.014 0.039 0.045
                                                       -0.148
-0.001 -0.021
BL_gll3_rcp -0.595 -0.095 0.073 0.141 0.127 0.141
                                                       -0.081
-0.003 0.092
           lng3_K BL_g1_
maleMale
BL_sesLsspr
BL_sesMdnpr
BL_sesPoor
BL sesPorst
age_child
wave
```

```
lng3 swrfMi
lng3_swrfKm
BL_gll1_bgs -0.017
BL_gl13_rcp 0.068 -0.294
>
> model2_mijiref_spell<-</pre>
lmer(spell~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_rc
plang) + lang3_swaref* (BL_gll1_bgsnds+BL_gll3_rcplang) + (1+wave|chi
ld_id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula: spell ~ male + BL ses + age child + wave *
(BL_gll1_bgsnds +
    BL_gl13_rcplang) + lang3_swaref * (BL_gl11_bgsnds +
BL_gll3_rcplang) +
    (1 + wave | child_id)
   Data: kenyadata
REML criterion at convergence: 34836.4
Scaled residuals:
     Min
               10
                    Median
                                         Max
                                 3Q
-2.92523 -0.56079 -0.00406 0.55810 2.89969
Random effects:
 Groups
          Name
                      Variance Std.Dev. Corr
 child_id (Intercept) 4.990
                               2.2338
                      0.469
                               0.6848
                                        -0.48
          wave
 Residual
                      7.444
                               2.7283
Number of obs: 6513, groups: child_id, 2428
Fixed effects:
                                         Estimate Std. Error
df t value
                                                     0.88502
(Intercept)
                                          7.65605
2561.56915
             8.651
                                         -0.32288
maleMale
                                                     0.12851
2354.88008 -2.513
                                                     0.21047
BL_sesLess poor
                                         -0.46249
2343.27631 -2.197
BL_sesMedian poor
                                         -0.80936
                                                     0.21147
2359.23838 -3.827
                                         -0.85617
                                                     0.21163
BL sesPoor
2372.69874 -4.046
```

```
BL sesPoorest
                                        -1.22458
                                                    0.20832
2348.43990 -5.878
                                                    0.03988
age child
                                        -0.10191
2392.82211 -2.555
                                         3.24531
                                                    0.20565
wave
2273.92917 15.781
                                         0.26631
                                                    0.07598
BL_gll1_bgsnds
2573.47722
             3.505
BL_gll3_rcplang
                                         0.24798
                                                    0.04566
2628.79734
             5.430
lang3_swarefMijikenda
                                         1.00069
                                                    0.88691
2408.82236
             1.128
lang3_swarefKamba
                                         2.20862
                                                    1.16371
2386.67764
            1.898
wave:BL gll1 bgsnds
                                        -0.14024
                                                    0.01941
2242.17180 -7.226
wave:BL_gll3_rcplang
                                        -0.04243
                                                    0.01153
2272.72242 -3.681
BL_gll1_bgsnds:lang3_swarefMijikenda
                                        0.06419
                                                    0.08089
2384.16009
            0.794
BL_gll1_bgsnds:lang3_swarefKamba
                                         0.10738
                                                    0.10705
2368.29613
             1.003
BL_gll3_rcplang:lang3_swarefMijikenda
                                        -0.07433
                                                    0.04828
2426.65782 -1.540
BL_gll3_rcplang:lang3_swarefKamba
                                        -0.13780
                                                    0.06572
2404.01803 -2.097
                                      Pr(>|t|)
                                       < 2e-16 ***
(Intercept)
                                      0.012053 *
maleMale
BL_sesLess poor
                                      0.028084 *
                                      0.000133 ***
BL_sesMedian poor
BL_sesPoor
                                      5.38e-05 ***
                                      4.73e-09 ***
BL_sesPoorest
age_child
                                      0.010677 *
                                       < 2e-16 ***
wave
BL_gll1_bgsnds
                                      0.000464 ***
BL gll3 rcplang
                                      6.13e-08 ***
lang3_swarefMijikenda
                                      0.259310
lang3 swarefKamba
                                      0.057827 .
                                      6.77e-13 ***
wave:BL_gll1_bgsnds
wave:BL_gl13_rcplang
                                      0.000238 ***
BL_gll1_bgsnds:lang3_swarefMijikenda
                                      0.427506
BL_gll1_bgsnds:lang3_swarefKamba
                                      0.315906
BL_gll3_rcplang:lang3_swarefMijikenda 0.123799
BL_gll3_rcplang:lang3_swarefKamba
                                      0.036123 *
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE)
    vcov(x)
                   if you need it
> model3_mijiref_spell<-</pre>
lmer(spell~male+BL ses+age child+wave*lang3 swaref*(BL gll1 bgsn
ds+BL_gll3_rcplang)+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula:
spell ~ male + BL ses + age child + wave * lang3 swaref *
(BL_gll1_bgsnds +
    BL_gll3_rcplang) + (1 + wave | child_id)
   Data: kenyadata
REML criterion at convergence: 34851.3
Scaled residuals:
     Min
               10
                    Median
                                 3Q
                                         Max
-2.96984 -0.56017 -0.00636 0.55962 2.90044
Random effects:
                      Variance Std.Dev. Corr
 Groups
          Name
 child_id (Intercept) 4.997
                               2.2355
          wave
                      0.471
                               0.6863
                                        -0.48
 Residual
                      7.438
                               2.7274
Number of obs: 6513, groups: child_id, 2428
Fixed effects:
                                              Estimate Std. Error
df
(Intercept)
                                               7.80139
                                                          1.00198
2286.48884
                                              -0.32151
                                                          0.12852
maleMale
2354.55386
                                              -0.46803
                                                          0.21050
BL_sesLess poor
2343.15261
                                              -0.81273
                                                          0.21149
BL_sesMedian poor
2359.02636
                                              -0.85937
                                                          0.21165
BL sesPoor
2372.61288
```

BL_sesPoorest	-1.22805	0.20835
2348.32865 age_child	-0.10215	0.03989
2392.45119 wave	3.40756	0.57641
2308.24512 lang3_swarefMijikenda	0.89135	1.03929
2175.20742 lang3_swarefKamba	1.86723	1.35041
2134.36699 BL_gll1_bgsnds	0.25097	0.08693
2179.89047 BL_gll3_rcplang	0.25357	0.05262
2223.61563 wave:lang3_swarefMijikenda	-0.12511	0.62439
2303.63273 wave:lang3_swarefKamba	-0.40303	0.81027
2250.29899 wave:BL_gll1_bgsnds	-0.15678	0.05241
2309.25115 wave:BL_gll3_rcplang	-0.03633	0.03152
2353.04172 lang3_swarefMijikenda:BL_gll1_bgsnds	0.09292	0.09463
2164.38207		
lang3_swarefKamba:BL_gll1_bgsnds 2161.49759	0.06080	0.12485
lang3_swarefMijikenda:BL_gll3_rcplang 2205.62077	-0.08584	0.05697
<pre>lang3_swarefKamba:BL_gll3_rcplang 2158.58213</pre>	-0.12196	0.07677
<pre>wave:lang3_swarefMijikenda:BL_gll1_bgsnds 2294.88606</pre>	0.03293	0.05710
<pre>wave:lang3_swarefKamba:BL_gll1_bgsnds 2289.17789</pre>	-0.05762	0.07557
<pre>wave:lang3_swarefMijikenda:BL_gll3_rcplang 2338.60543</pre>	-0.01325	0.03426
<pre>wave:lang3_swarefKamba:BL_gll3_rcplang 2282.43309</pre>	0.01929	0.04610
(Intercept) maleMale BL_sesLess poor BL_sesMedian poor BL_sesPoor BL_sesPoorest age_child wave	t value Pr(> 7.786 1.046 -2.502 0.012 -2.223 0.026 -3.843 0.000 -4.060 5.066 -5.894 4.306 -2.561 0.010 5.912 3.896	2-14 *** 2427 * 5279 * 0125 *** 2-05 *** 2-09 ***

```
lang3_swarefMijikenda
                                              0.858 0.391176
lang3_swarefKamba
                                              1.383 0.166898
BL_gll1_bgsnds
                                              2.887 0.003927 **
BL_gl13_rcplang
                                             4.819 1.54e-06 ***
wave:lang3_swarefMijikenda
                                            -0.200 0.841203
wave:lang3_swarefKamba
                                             -0.497 0.618953
wave:BL_gll1_bgsnds
                                             -2.991 0.002807 **
wave:BL_gl13_rcplang
                                             -1.153 0.249203
lang3_swarefMijikenda:BL_gll1_bgsnds
                                             0.982 0.326206
lang3_swarefKamba:BL_gll1_bgsnds
                                              0.487 0.626306
lang3_swarefMijikenda:BL_gll3_rcplang
                                            -1.507 0.132026
lang3_swarefKamba:BL_gll3_rcplang
                                            -1.589 0.112275
wave:lang3_swarefMijikenda:BL_gll1_bgsnds
                                             0.577 0.564164
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                            -0.762 \ 0.445897
wave:lang3_swarefMijikenda:BL_gll3_rcplang
                                            -0.387 0.699000
wave:lang3_swarefKamba:BL_gl13_rcplang
                                              0.418 0.675708
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE)
                               or
    vcov(x)
                   if you need it
>
>
anova(model0_mijiref_spell,model1_mijiref_spell,model2_mijiref_s
pell, model3_mijiref_spell)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_spell: spell ~ male + BL_ses + age_child + wave +
(1 + wave | child_id)
model1_mijiref_spell: spell ~ male + BL_ses + age_child + wave +
lang3\_swaref + BL\_gll1\_bgsnds +
model1_mijiref_spell:
                          BL_gll3_rcplang + (1 + wave |
child_id)
model2_mijiref_spell: spell ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds +
model2_mijiref_spell:
                          BL_gl13_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
model2_mijiref_spell:
                       (1 + wave | child_id)
model3_mijiref_spell: spell ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds +
model3_mijiref_spell:
                          BL_g113_rcplang) + (1 + wave |
child_id)
                     Df
                               BIC logLik deviance Chisq Chi
                          AIC
Df Pr(>Chisq)
```

```
model0_mijiref_spell 12 35396 35477 -17686
                                              35372
model1_mijiref_spell 16 34898 35007 -17433
                                              34866 505.5986
      <2e-16
model2_mijiref_spell 22 34816 34965 -17386
                                              34772 94.5872
      <2e-16
model3_mijiref_spell 28 34820 35010 -17382
                                              34764
                                                     7.4454
      0.2816
model0_mijiref_spell
model1_mijiref_spell ***
model2_mijiref_spell ***
model3_mijiref_spell
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model2_mijiref_spell, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
> ranova(model2_mijiref_spell)
ANOVA-like table for random-effects: Single term deletions
Model:
spell ~ male + BL_ses + age_child + wave + BL_gll1_bgsnds +
BL gll3 rcplang +
    lang3_swaref + (1 + wave | child_id) + wave:BL_gll1_bgsnds +
    wave:BL_gl13_rcplang + BL_gl11_bgsnds:lang3_swaref +
BL_gl13_rcplang:lang3_swaref
                                                   LRT Df
                              npar logLik
                                            AIC
Pr(>Chisq)
<none>
                                22 -17418 34880
wave in (1 + wave | child_id) 20 -17461 34962 85.432 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: English Letter per Minute
> model0 mijiref leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula: lpm_eng ~ male + BL_ses + age_child + wave + (1 + wave
child_id)
  Data: kenyadata
```

REML criterion at convergence: 52936.2

Scaled residuals:

Min 10 Median 3 Q Max -3.7780 -0.4827 -0.0685 0.4502 4.2362

Random effects:

Variance Std.Dev. Corr Groups Name

child_id (Intercept) 259.78 16.118

> 29.33 0.67 wave 5.416

Residual 94.18 9.705

Number of obs: 6484, groups: child_id, 2423

Fixed effects:

	Estimate	Std. Error	df	t value	
Pr(> t)					
(Intercept)	31.2300	1.4609	2591.6920	21.377	< 2e-
16 ***					
maleMale	-0.5936	0.5764	2416.4996	-1.030	
0.30323					
BL_sesLess poor	-1.4026	0.9386	2408.2460	-1.494	
0.13523					
BL_sesMedian poor	-0.8471	0.9361	2413.1189	-0.905	
0.36559					
BL_sesPoor	-1.6912	0.9316	2417.4932	-1.815	
0.06959 .					
BL_sesPoorest	-2.9053	0.9129	2410.4807	-3.183	
0.00148 **					
age_child	0.3553	0.1723	2424.3335	2.063	
0.03926 *					
wave	8.2504	0.1925	2147.9469	42.854	< 2e-
16 ***					

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

(Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl

maleMale -0.084

BL sesLsspr -0.294 -0.008

BL_sesMdnpr -0.254 -0.019 0.521

BL_sesPoor -0.228 -0.024 0.524 0.532

BL_sesPorst -0.204 0.002 0.537 0.545 0.553

age_child -0.846 -0.122 -0.042 -0.086 -0.117 -0.1580.188 - 0.004 - 0.002 - 0.002 0.000

wave

> model1_mijiref_leng<-</pre>

lmer(lpm_eng~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs

-0.003

0.003

nds+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
lmerModLmerTest]
Formula:
lpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
BL_gll3_rcplang + (1 + wave | child_id)
Data: kenyadata

REML criterion at convergence: 52688.3

Scaled residuals:

Min 1Q Median 3Q Max -3.8062 -0.4888 -0.0600 0.4459 4.2642

Random effects:

11100 0110000	Estimate	Std. Error	df	t value
Pr(> t)				
(Intercept)	17.35959	1.90698	2524.26994	9.103
< 2e-16 ***				
maleMale	-1.23189	0.55042	2410.30575	-2.238
0.0253 *				
BL_sesLess poor	-0.29313	0.89963	2398.65510	-0.326
0.7446				
BL_sesMedian poor	1.03720	0.90272	2404.98577	1.149
0.2507				
BL_sesPoor	0.56635	0.90413	2408.81842	0.626
0.5311	0 05004	0.00006	0.400 0.6000	0 400
BL_sesPoorest	-0.35921	0.89286	2402.06830	-0.402
0.6875	0 0000	0 16050	0445 44050	0 505
age_child	-0.09087	0.16972	2417.44079	-0.535
0.5924	0 05006	0 10050	2140 72000	40.060
wave	8.25086	0.19250	2149.73809	42.860
< 2e-16 ***	1 12601	0 50544	0446 85500	4 405
lang3_swarefMijikenda	-1.13621	0./9/44	2416.75598	-1.425
0.1543				

```
lang3 swarefKamba
                   1.17691
                                   1.02276 2407.00141
                                                        1.151
0.2500
BL_gll1_bgsnds
                        1.37997
                                   0.12041 2394.43272
                                                       11.461
< 2e-16 ***
                                   0.07208 2425.13979
BL gll3 rcplang
                        0.51975
                                                        7.210
7.43e-13 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
wave
      lng3 M
maleMale
            0.007
BL sesLsspr -0.240 -0.015
BL_sesMdnpr -0.265 -0.034 0.527
BL_sesPoor -0.234 -0.038 0.530 0.546
BL_sesPorst -0.224 -0.015 0.540 0.560 0.574
          -0.498 -0.105 -0.053 -0.093 -0.115
age child
                                                -0.150
wave
            0.145 -0.004 -0.002 -0.002 0.000
                                                -0.003
                                                          0.003
lng3 swrfMj -0.272 -0.014 -0.075 -0.063 -0.118
                                                -0.141
                                                         -0.126
-0.004
lng3 swrfKm -0.293 -0.022 -0.092 -0.023 -0.038
                                                -0.033
                                                          0.020
-0.005 0.618
BL_gll1_bgs -0.035 0.001 0.022 0.015 0.043
                                                0.048
                                                         -0.151
-0.001 -0.023
BL_gll3_rcp -0.593 -0.098 0.076 0.142 0.127
                                                 0.141
                                                         -0.084
0.000 0.094
            lng3_K BL_g1_
maleMale
BL_sesLsspr
BL_sesMdnpr
BL_sesPoor
BL_sesPorst
age_child
wave
lng3_swrfMj
lng3 swrfKm
BL_gll1_bgs -0.018
BL gll3 rcp 0.069 -0.293
> model2_mijiref_leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave*(BL_gl11_bgsnds+BL_gl13_
rcplang) + lang3_swaref*(BL_gll1_bgsnds+BL_gll3_rcplang) + (1+wave|c
hild_id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method [
```

lmerModLmerTest]

Formula: lpm_eng ~ male + BL_ses + age_child + wave *

(BL_gll1_bgsnds +

BL_gl13_rcplang) + lang3_swaref * (BL_gl11_bgsnds +

BL_gll3_rcplang) +

(1 + wave | child_id)

Data: kenyadata

REML criterion at convergence: 52695.6

Scaled residuals:

Min 1Q Median 3Q Max -3.8063 -0.4864 -0.0611 0.4466 4.2591

Random effects:

Groups Name Variance Std.Dev. Corr

child_id (Intercept) 238.93 15.457

wave 29.42 5.424 0.69

Residual 94.14 9.702

Number of obs: 6484, groups: child_id, 2423

	Estimate Sto	d. Error
df t value		
(Intercept)	16.62469	3.92442
2921.98136 4.236		
maleMale	-1.22347	0.55079
2406.09917 -2.221		
BL_sesLess poor	-0.26274	0.90180
2394.30227 -0.291		
BL_sesMedian poor	1.03048	0.90520
2400.02334 1.138	0 5 6 5 4 5	
BL_sesPoor	0.56745	0.90473
2404.51996 0.627	0 24710	0 00200
BL_sesPoorest	-0.34719	0.89388
2397.85218 -0.388	0 00700	0 17007
age_child	-0.09789	0.17027
2412.74816 -0.575	7.37017	0.89420
wave 2176.29752 8.242	7.37017	0.89420
BL_gl11_bgsnds	0.98981	0.33776
2962.15834 2.931	0.90901	0.55770
BL_gll3_rcplang	0.67471	0.20284
3004.48546 3.326	0.07171	0.20201
lang3_swarefMijikenda	-1.57377	3.81072
2467.46552 -0.413	_ • • • • • • • • • • • • • • • • • • •	2.020.2

```
lang3 swarefKamba
                                        -0.05912
                                                    4.99645
2454.54223 -0.012
                                        -0.08123
                                                     0.08410
wave:BL_gll1_bgsnds
2146.98999 -0.966
                                         0.07265
                                                     0.05004
wave:BL gll3 rcplang
2175.87334
            1.452
BL_gll1_bgsnds:lang3_swarefMijikenda
                                                     0.34492
                                         0.30278
             0.878
2398.06619
BL_gll1_bgsnds:lang3_swarefKamba
                                         0.42231
                                                     0.45751
2394.35306
           0.923
BL_gll3_rcplang:lang3_swarefMijikenda
                                        -0.06198
                                                     0.20613
2444.22326 -0.301
BL_gll3_rcplang:lang3_swarefKamba
                                        -0.05257
                                                     0.28076
2437.94959 -0.187
                                      Pr(>|t|)
                                      2.34e-05 ***
(Intercept)
maleMale
                                      0.026423 *
                                      0.770806
BL_sesLess poor
BL_sesMedian poor
                                      0.255067
BL sesPoor
                                      0.530585
                                      0.697751
BL_sesPoorest
age child
                                      0.565384
                                      2.89e-16 ***
wave
BL_gll1_bgsnds
                                      0.003410 **
BL_gll3_rcplang
                                      0.000891 ***
lang3_swarefMijikenda
                                      0.679654
lang3_swarefKamba
                                      0.990560
wave:BL_gll1_bgsnds
                                      0.334193
wave:BL gll3 rcplang
                                      0.146667
BL_gll1_bgsnds:lang3_swarefMijikenda
                                      0.380127
BL_gll1_bgsnds:lang3_swarefKamba
                                      0.356070
BL_gll3_rcplang:lang3_swarefMijikenda 0.763677
BL_gll3_rcplang:lang3_swarefKamba
                                      0.851496
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
    vcov(x)
                   if you need it
> model3_mijiref_leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bg
snds+BL_gl13_rcplang)+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_leng)
```

Linear mixed model fit by REML. t-tests use Satterthwaite's method [

lmerModLmerTest1

Formula:

lpm_eng ~ male + BL_ses + age_child + wave * lang3_swaref *
(BL_gll1_bgsnds +

BL_gl13_rcplang) + (1 + wave | child_id)

Data: kenyadata

REML criterion at convergence: 52696.1

Scaled residuals:

Min 1Q Median 3Q Max -3.8061 -0.4855 -0.0596 0.4477 4.2954

Random effects:

Groups Name Variance Std.Dev. Corr child_id (Intercept) 239.00 15.460 wave 29.52 5.433 0.69 Residual 94.13 9.702 Number of obs: 6484, groups: child_id, 2423

	_
Estimate	Std. Error
16.58398	5.16170
-1.22371	0.55076
-0.25818	0.90179
1.02569	0.90516
0.56730	0.90468
-0.34962	0.89384
-0.09782	0.17027
7.31065	2.54772
-1.93592	5.42929
3.48435	7.08112
1.34217	0.45409
	16.58398 -1.22371 -0.25818 1.02569 0.56730 -0.34962 -0.09782 7.31065 -1.93592 3.48435

BL_gl13_rcplang	0.60570	0.27370
2349.70650 wave:lang3_swarefMijikenda	-0.22618	2.75261
2231.62704 wave:lang3_swarefKamba	2.51112	3.55104
2158.93165 wave:BL_gll1_bgsnds	0.16504	0.22773
2212.34342		
<pre>wave:BL_gll3_rcplang 2273.64102</pre>	0.02603	0.13852
<pre>lang3_swarefMijikenda:BL_gll1_bgsnds 2284.95237</pre>	-0.12965	0.49498
lang3_swarefKamba:BL_gll1_bgsnds 2281.14842	0.22809	0.65299
lang3_swarefMijikenda:BL_gll3_rcplang 2325.52984	0.04146	0.29688
lang3_swarefKamba:BL_gll3_rcplang	-0.19434	0.40167
2266.52845 wave:lang3_swarefMijikenda:BL_gll1_bgsnds	-0.30288	0.24802
2197.54021 wave:lang3_swarefKamba:BL_gll1_bgsnds	-0.13622	0.32772
2201.70069 wave:lang3_swarefMijikenda:BL_gll3_rcplang	0.07105	0.15025
2256.63141 wave:lang3_swarefKamba:BL_gll3_rcplang	-0.10044	
2179.27185		
(Intercept)	t value Pr(> 3.213 0.00	0133 **
maleMale	-2.222 0.02	
BL_sesLess poor	-0.286 0.7	
BL_sesMedian poor	1.133 0.25	
BL_sesPoor	0.627 0.53 -0.391 0.69	
BL_sesPoorest age_child		9573 6568
wave		0415 **
lang3_swarefMijikenda		2145
lang3_swarefKamba		2272
BL_gll1_bgsnds		0315 **
BL_gl13_rcplang		2699 *
wave:lang3_swarefMijikenda	-0.082 0.93	3452
wave:lang3_swarefKamba	0.707 0.4	7955
	0.707 0.1	
wave:BL_gll1_bgsnds	0.725 0.4	6870
wave:BL_gl13_rcplang	0.725 0.4 0.188 0.8	5098
<pre>wave:BL_gll3_rcplang lang3_swarefMijikenda:BL_gll1_bgsnds</pre>	0.725 0.4 0.188 0.89 -0.262 0.79	5098 9340
<pre>wave:BL_gl13_rcplang lang3_swarefMijikenda:BL_gll1_bgsnds lang3_swarefKamba:BL_gll1_bgsnds</pre>	0.725 0.4 0.188 0.89 -0.262 0.79 0.349 0.73	5098 9340 2690
<pre>wave:BL_gll3_rcplang lang3_swarefMijikenda:BL_gll1_bgsnds</pre>	0.725 0.4 0.188 0.89 -0.262 0.79 0.349 0.72 0.140 0.88	5098 9340

```
wave:lang3_swarefMijikenda:BL_gll1_bgsnds
                                            -1.221
                                                    0.22215
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                            -0.416 0.67769
wave:lang3_swarefMijikenda:BL_gll3_rcplang
                                             0.473 0.63632
wave:lang3_swarefKamba:BL_gl13_rcplang
                                            -0.499 0.61775
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE)
    vcov(x)
                   if you need it
>
>
anova (model 0 mijiref leng, model 1 mijiref leng, model 2 mijiref len
g, model3 mijiref leng)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
+ (1 + wave | child id)
model1_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1 mijiref leng:
                        BL_gll3_rcplang + (1 + wave | child_id)
model2_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
* (BL_gll1_bgsnds +
model2_mijiref_leng:
                         BL_gl13_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
model2_mijiref_leng: (1 + wave | child_id)
model3_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
mode13_mijiref_leng:
                         BL_gll3_rcplang) + (1 + wave)
child_id)
                                                      Chisq Chi
                    Df
                         AIC
                               BIC logLik deviance
Df Pr(>Chisq)
model0_mijiref_leng 12 52963 53044 -26469
                                             52939
model1_mijiref_leng 16 52719 52827 -26343
                                             52687 251.7613
      <2e-16
model2_mijiref_leng 22 52727 52876 -26342
                                             52683
                                                     3.4143
      0.7553
model3_mijiref_leng 28 52735 52925 -26340
                                             52679
                                                     4.1408
      0.6576
model0_mijiref_leng
model1_mijiref_leng ***
model2_mijiref_leng
model3_mijiref_leng
```

```
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model1_mijiref_leng, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
> ranova(model1_mijiref_leng)
ANOVA-like table for random-effects: Single term deletions
Model:
lpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id)
                             npar logLik
                                          AIC LRT Df
Pr(>Chisq)
<none>
                                16 -26344 52720
wave in (1 + wave | child_id) 14 -26457 52942 225.8 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: English Word per Minute
> model0 mijiref weng2<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
singular fit
> summary(model0_mijiref_weng) #singular fit
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 46471.4
Scaled residuals:
            10 Median
                             3 Q
                                    Max
-2.3348 -0.5116 -0.1201 0.3633 9.6175
Random effects:
Groups
        Name
                    Variance Std.Dev.
 child_id (Intercept) 31.67
                               5.628
                               7.310
 Residual
                      53.43
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
```

```
Estimate Std. Error df t value
Pr(>|t|)
                   14.97094
                               0.75155 2653.93771 19.920
(Intercept)
2e-16 ***
                   0.02178
                               0.29702 2499.76288 0.073
maleMale
0.9416
                   -1.03677
                               0.48364\ 2490.97970\ -2.144
BL_sesLess poor
0.0322 *
                               0.48260 2502.80923 -4.805
BL_sesMedian poor
                   -2.31885
1.64e-06 ***
BL_sesPoor
                   -2.98209
                               0.48090\ 2515.94130\ -6.201
6.53e-10 ***
BL_sesPoorest
                   -3.52661
                               0.47019\ 2495.04220\ -7.500
8.79e-14 ***
age child
                   -0.12643
                               0.08901\ 2529.55927\ -1.420
0.1556
wave
                    5.70024
                               0.11331 4443.08104 50.306 <
2e-16 ***
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
           -0.083
BL_sesLsspr -0.297 -0.008
BL_sesMdnpr -0.257 -0.020 0.522
BL_sesPoor -0.231 -0.025 0.525 0.532
BL_sesPorst -0.208 0.001 0.539 0.547 0.553
          -0.850 -0.123 -0.041 -0.085 -0.114
age child
                                                -0.155
wave
            0.163 -0.006 -0.007 -0.005 -0.002
                                                -0.008
                                                          0.007
> model0_mijiref_weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+(1|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0_mijiref_weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 46471.4
Scaled residuals:
            10 Median
   Min
                            3Q
                                   Max
-2.3348 -0.5116 -0.1201 0.3633 9.6175
```

```
Random effects:
 Groups
        Name
                     Variance Std.Dev.
                               5.628
 child_id (Intercept) 31.67
 Residual
                      53.43
                               7.310
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                    Estimate Std. Error
                                                df t value
Pr(>|t|)
                                0.75155 2653.93771 19.920
(Intercept)
                    14.97094
2e-16 ***
                                0.29702 2499.76288
maleMale
                    0.02178
                                                   0.073
0.9416
BL sesLess poor
                   -1.03677
                                0.48364\ 2490.97970\ -2.144
0.0322 *
                                0.48260\ 2502.80923\ -4.805
BL sesMedian poor
                   -2.31885
1.64e-06 ***
                    -2.98209
                                0.48090\ 2515.94130\ -6.201
BL sesPoor
6.53e-10 ***
                                0.47019\ 2495.04220\ -7.500
BL sesPoorest
                    -3.52661
8.79e-14 ***
age child
                    -0.12643
                                0.08901\ 2529.55927\ -1.420
0.1556
                                0.11331 4443.08104 50.306 <
                     5.70024
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
            -0.083
BL_sesLsspr -0.297 -0.008
BL_sesMdnpr -0.257 -0.020 0.522
BL_sesPoor -0.231 -0.025 0.525 0.532
BL sesPorst -0.208 0.001 0.539 0.547 0.553
age_child -0.850 -0.123 -0.041 -0.085 -0.114
                                                 -0.155
wave
            0.163 -0.006 -0.007 -0.005 -0.002
                                                 -0.008
                                                           0.007
> model1 mijiref weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs
nds+BL_gll3_rcplang+(1|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
```

Formula: wpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref + BL_gll1_bgsnds + BL_gll3_rcplang + (1 |

child_id)

Data: kenyadata

REML criterion at convergence: 46169.2

Scaled residuals:

Min 1Q Median 3Q Max -2.1870 -0.5295 -0.1211 0.3572 9.7663

Random effects:

Groups Name Variance Std.Dev. child_id (Intercept) 25.44 5.044 Residual 53.42 7.309

Number of obs: 6484, groups: child_id, 2423

Fixed effects:

	Estimate	Std. Error	df	t value
Pr(> t)				
(Intercept)	7.82447	0.97128	2601.43438	8.056
1.19e-15 ***				
maleMale	-0.30207	0.28002	2488.14305	-1.079
0.280807				
BL_sesLess poor	-0.48633	0.45745	2472.67118	-1.063
0.287826				
BL_sesMedian poor	-1.32602	0.45937	2487.36514	-2.887
0.003928 **				
BL_sesPoor	-1.73892	0.46069	2500.44615	-3.775
0.000164 ***				
BL_sesPoorest	-2.11164	0.45378	2476.09594	-4.653
3.44e-06 ***	0 0 5 0 0 0	0 00550	0540 45005	4 056
age_child	-0.35292	0.08659	2519.45027	-4.076
4.72e-05 ***		0 11000	4460 00505	F0 400
wave	5.70230	0.11309	4463.29785	50.423
< 2e-16 ***	0.06804	0 40605	0545 50004	0 0 0 0 0
lang3_swarefMijikenda	-0.96734	0.40695	2517.50994	-2.377
0.017527 *	0 00404	0 50050	0.404 53040	1 510
lang3_swarefKamba	0.89491	0.52052	2491.53840	1.719
0.085692 .	0 02102	0 06115	2465 60102	12 606
BL_gll1_bgsnds	0.83193	0.06115	2465.68193	13.606
< 2e-16 ***	0 04440	0 00 6 7 4	0540 0005	6 581
BL_gll3_rcplang	0.24119	0.036/1	2510.77755	6.571
6.07e-11 ***				
	0 004 1	h. 0 04 Nic.	0.05.4.0	4

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
wave
       lng3_M lng3_K BL_g1_
maleMale
            0.008
BL sesLsspr -0.240 -0.015
BL_sesMdnpr -0.267 -0.035 0.528
BL_sesPoor -0.235 -0.039 0.531 0.546
BL_sesPorst -0.228 -0.015 0.542 0.561 0.574
age_child -0.500 -0.106 -0.051 -0.091 -0.112
                                                 -0.147
wave
             0.129 -0.006 -0.007 -0.005 -0.001
                                                 -0.007
                                                           0.007
lng3_swrfMj -0.275 -0.015 -0.074 -0.061 -0.117
                                                 -0.138
                                                          -0.125
-0.008
lng3_swrfKm -0.297 -0.023 -0.090 -0.022 -0.037
                                                 -0.031
                                                          0.022
-0.010 0.621
BL qll1 bqs -0.035 0.001 0.020 0.014 0.040 0.046
                                                          -0.150
-0.001 -0.021 -0.017
BL_gll3_rcp -0.594 -0.097 0.074 0.142 0.127 0.141
                                                          -0.082
0.000 \quad 0.093 \quad 0.069 \quad -0.292
>
> model2 mijiref weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_
rcplang) + lang3 swaref + (BL gll1 bgsnds + BL gll3 rcplang) + (1 child
id), data=kenyadata, na.action=na.omit)
> summary(model2 mijiref weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds +
   BL_gl13_rcplang) + lang3_swaref + (BL_gl11_bgsnds +
BL_g113_rcplang) +
                      (1 | child_id)
  Data: kenyadata
REML criterion at convergence: 45914.1
Scaled residuals:
   Min
             10 Median
                             3Q
                                    Max
-2.1332 -0.4997 -0.1013 0.3230
Random effects:
 Groups Name
                     Variance Std.Dev.
 child_id (Intercept) 26.43
                               5.141
 Residual
                      50.24
                               7.088
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                        Estimate Std. Error df t value
Pr(>|t|)
```

```
1.11160 3996.01912
(Intercept)
                       0.14675
                                                      0.132
0.894980
                                   0.27938 2487.09154
                                                      -1.052
maleMale
                       -0.29393
0.292866
                                   0.45647 2472.20430
BL sesLess poor
                       -0.54746
                                                      -1.199
0.230513
                                   0.45833 2486.10138
BL_sesMedian poor
                       -1.34877
                                                      -2.943
0.003283 **
                                   0.45962 2498.79274
BL_sesPoor
                       -1.77407
                                                      -3.860
0.000116 ***
                       -2.13627
                                   0.45278 2475.10991
                                                      -4.718
BL_sesPoorest
2.51e-06 ***
age_child
                       -0.34539
                                   0.08637 2517.14301
                                                      -3.999
6.55e-05 ***
                                   0.51014 4483.91762
                                                       -2.568
wave
                       -1.30988
0.010270 *
BL_gll1_bgsnds
                       1.41109
                                   0.08036 5260.69449
                                                       17.560
< 2e-16 ***
                                   0.04817 5267.69822
BL_gl13_rcplang
                       0.49412
                                                       10.258
< 2e-16 ***
                                   0.40596\ 2515.65519\ -2.390
lang3_swarefMijikenda -0.97025
0.016921 *
                                   0.51932 2490.08518
lang3 swarefKamba
                       0.90671
                                                      1.746
0.080943 .
wave:BL_gll1_bgsnds
                     0.53301 0.04800 4432.10390
                                                      11.105
< 2e-16 ***
wave:BL_gll3_rcplang 0.23136
                                   0.02857 4473.99162
                                                        8.099
7.06e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 14 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   vcov(x)
> model3 mijiref weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bg
snds+BL gll3 rcplang)+(1|child id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 |
child id)
  Data: kenyadata
```

REML criterion at convergence: 45866.4

Scaled residuals:

Min 1Q Median 3Q Max -2.1975 -0.5016 -0.0969 0.3211 9.3889

Random effects:

Groups Name Variance Std.Dev. child_id (Intercept) 26.58 5.156 Residual 49.59 7.042

Number of obs: 6484, groups: child_id, 2423

		Estimate S	td. Error
df t value Pr(> t)			
(Intercept)		-1.25876	2.46454
5212.55536 -0.511 0.609549			
maleMale		-0.29432	0.27914
2484.06944 -1.054 0.291810			
BL_sesLess poor		-0.53979	0.45684
2468.66231 -1.182 0.237485			
BL_sesMedian poor		-1.33897	0.45887
2482.36799 -2.918 0.003555	**		
BL_sesPoor		-1.78412	0.45920
2495.69193 -3.885 0.000105	***		
BL_sesPoorest		-2.15992	0.45257
2471.69245 -4.773 1.93e-06	***		
age_child		-0.34742	0.08651
2512.97356 -4.016 6.09e-05	***		
wave		-0.82843	1.44375
4571.21457 -0.574 0.566127			
lang3_swarefMijikenda		1.17485	2.58090
5411.19278 0.455 0.648976			
lang3_swarefKamba		0.98566	3.35007
5316.27986 0.294 0.768602			
BL_gll1_bgsnds		1.48688	0.21580
5428.23580 6.890 6.21e-12	* * *		
BL_gl13_rcplang		0.62550	0.13072
5496.25043 4.785 1.75e-06	* * *		
wave:lang3_swarefMijikenda		-0.34790	1.55991
4557.07624 -0.223 0.823524			
wave:lang3_swarefKamba		-0.43053	2.00893
4497.68487 -0.214 0.830318			
wave:BL_gll1_bgsnds		0.50248	0.12894
4478.73277 3.897 9.88e-05	* * *		

```
wave:BL_gl13_rcplang
                                            0.28391
                                                        0.07849
            3.617 0.000301 ***
4564.06869
lang3 swarefMijikenda:BL gll1 bgsnds
                                            -0.06425
                                                        0.23493
5401.19053 -0.273 0.784487
lang3 swarefKamba:BL gll1 bgsnds
                                            -0.18691
                                                        0.30977
5378.87236 -0.603 0.546273
lang3_swarefMijikenda:BL_gll3_rcplang
                                                        0.14159
                                           -0.20786
5483.58199 -1.468 0.142130
lang3_swarefKamba:BL_gll3_rcplang
                                            0.05963
                                                        0.19061
            0.313 0.754426
5384.24873
wave:lang3_swarefMijikenda:BL_gll1_bgsnds 0.04976
                                                        0.14046
4467.86604
            0.354 0.723166
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                             0.01930
                                                        0.18585
4456.85866 0.104 0.917291
wave:lang3_swarefMijikenda:BL_gll3_rcplang -0.09591
                                                        0.08515
4547.49578 -1.126 0.260118
wave:lang3_swarefKamba:BL_gll3_rcplang
                                            0.02619
                                                        0.11385
4497.08076 0.230 0.818090
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
    vcov(x)
                  if you need it
>
anova (model0_mijiref_weng, model1_mijiref_weng, model2_mijiref_weng
g, model3 mijiref weng)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
+ (1 | child_id)
model1_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1_mijiref_weng: BL_gl13_rcplang + (1 | child_id)
model2_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
* (BL gll1 bgsnds +
model2_mijiref_weng:
                        BL_gll3_rcplang) + lang3_swaref +
(BL_gll1_bgsnds + BL_gll3_rcplang) +
                       (1 | child_id)
model2_mijiref_weng:
model3_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3_mijiref_weng:
                        BL_gll3_rcplang) + (1 | child_id)
                   Df
                        AIC BIC logLik deviance Chisq Chi
Df Pr(>Chisq)
```

```
model0_mijiref_weng 10 46483 46551 -23232
                                             46463
model1_mijiref_weng 14 46180 46275 -23076
                                             46152 311.682
   < 2.2e-16 ***
model2_mijiref_weng 16 45919 46027 -22943
                                            45887 264.866
   < 2.2e-16 ***
model3_mijiref_weng 26 45871 46047 -22909
                                            45819 67.962
10 1.096e-10 ***
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model3_mijiref_weng, show.se=TRUE, show.std=TRUE)
> ranova(model3_mijiref_weng)
ANOVA-like table for random-effects: Single term deletions
Model:
wpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref +
BL gll1 bgsnds +
    BL_gll3_rcplang + (1 | child_id) + wave:lang3_swaref +
wave:BL_gll1_bgsnds +
    wave:BL_gll3_rcplang + lang3_swaref:BL_gll1_bgsnds +
lang3 swaref:BL gll3 rcplang +
    wave:lang3_swaref:BL_gll1_bgsnds +
wave:lang3 swaref:BL gll3 rcplang
                                    LRT Df Pr(>Chisq)
               npar logLik
                             AIC
<none>
                 26 -22933 45918
(1 | child_id) 25 -23289 46627 710.97 1 < 2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
> #DV: Swahili Letter per Minute
> model0 mijiref lswa<-</pre>
lmer(lpm_swa~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
  method [lmerModLmerTest]
Formula:
lpm_swa ~ male + BL_ses + age_child + wave + (1 + wave |
child id)
   Data: kenyadata
REML criterion at convergence: 49579.2
Scaled residuals:
             10 Median
    Min
                             3Q
                                    Max
-2.9652 -0.4213 -0.2499 0.2226 6.3475
```

```
Random effects:
 Groups
          Name
                      Variance Std.Dev. Corr
 child_id (Intercept) 119.08
                               10.913
          wave
                       20.90
                                4.572
                                        0.85
Residual
                       78.95
                                8.885
Number of obs: 6454, groups: child_id, 2423
Fixed effects:
                    Estimate Std. Error
                                                df t value
(Intercept)
                    13.91909
                                0.92541 2771.07303
                                                    15.041
                    -0.02515
                                0.35859 2429.21592 -0.070
maleMale
BL sesLess poor
                    -2.19983
                                0.58363\ 2419.35143\ -3.769
                    -3.96666
                                0.58229 2426.52458 -6.812
BL_sesMedian poor
                                0.57979 2433.62222 -6.929
BL sesPoor
                    -4.01717
BL sesPoorest
                    -4.71109
                                0.56755 2421.86802 -8.301
age child
                                0.10729\ 2444.33452\ -2.391
                    -0.25650
wave
                     1.23780
                                0.17120 2233.44388 7.230
                  Pr(>|t|)
(Intercept)
                   < 2e-16 ***
maleMale
                  0.944088
                  0.000168 ***
BL_sesLess poor
BL sesMedian poor 1.21e-11 ***
                  5.42e-12 ***
BL sesPoor
BL_sesPoorest
                   < 2e-16 ***
age_child
                  0.016887 *
                  6.59e-13 ***
wave
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL sLp BL sMp BL sesPr BL ssPrs
maleMale
            -0.083
BL_sesLsspr -0.289 -0.007
BL_sesMdnpr -0.250 -0.019
                          0.521
BL sesPoor -0.224 -0.024 0.524
                                 0.531
BL_sesPorst -0.201 0.001
                           0.537 0.545 0.553
age child
           -0.832 -0.122 -0.042 -0.086 -0.116
                                                 -0.157
             0.260 - 0.004 - 0.003 - 0.003 - 0.001
wave
                                                 -0.005
            ag chl
maleMale
BL_sesLsspr
BL sesMdnpr
BL_sesPoor
BL_sesPorst
age_child
wave
             0.004
>
```

```
> model1_mijiref_lswa<-</pre>
lmer(lpm_swa~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs
nds+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1 mijiref lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
 method [lmerModLmerTest]
Formula:
lpm_swa ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id)
   Data: kenyadata
REML criterion at convergence: 49362.8
Scaled residuals:
    Min
             10 Median
                             3Q
                                    Max
-2.9911 -0.4460 -0.2184
                         0.2378
                                  6.3235
Random effects:
                      Variance Std.Dev. Corr
Groups
          Name
 child_id (Intercept) 108.25
                               10.404
          wave
                       21.03
                                4.586
                                         0.86
Residual
                       78.82
                                8.878
Number of obs: 6454, groups: child_id, 2423
Fixed effects:
                        Estimate Std. Error
                                                     df t value
                         5.57724
                                     1.20625 2631.80835
                                                          4.624
(Intercept)
maleMale
                        -0.43307
                                     0.34441 2422.77401
                                                         -1.257
BL_sesLess poor
                        -1.45492
                                     0.56249 2408.18575
                                                         -2.587
BL_sesMedian poor
                        -2.86877
                                     0.56472 2417.68948
                                                         -5.080
BL sesPoor
                        -2.75643
                                     0.56588 2423.87810
                                                         -4.871
BL_sesPoorest
                        -3.33438
                                     0.55827 2412.78690
                                                         -5.973
                                     0.10631 2437.22432
age child
                        -0.56904
                                                         -5.353
                                     0.17099 2240.65712
wave
                         1.24669
                                                          7.291
lang3 swarefMijikenda
                        -0.47763
                                     0.49944 2433.57693
                                                         -0.956
lang3_swarefKamba
                                     0.63982 2419.19480
                                                         -0.989
                        -0.63267
                                     0.07523 2401.00616
BL gll1 bgsnds
                         0.76136
                                                         10.120
                                     0.04516 2441.11813
BL_gll3_rcplang
                         0.35793
                                                          7.926
                      Pr(>|t|)
(Intercept)
                      3.95e-06 ***
maleMale
                       0.20872
BL_sesLess poor
                       0.00975 **
                      4.06e-07 ***
BL_sesMedian poor
                      1.18e-06 ***
BL sesPoor
                      2.68e-09 ***
BL_sesPoorest
```

```
age_child
                      9.47e-08 ***
wave
                      4.24e-13 ***
lang3_swarefMijikenda 0.33900
lang3 swarefKamba
                       0.32285
BL gll1 bgsnds
                       < 2e-16 ***
BL_gll3_rcplang
                      3.42e-15 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs
maleMale
            0.008
BL_sesLsspr -0.237 -0.015
BL sesMdnpr -0.262 -0.034
                          0.527
BL_sesPoor -0.231 -0.039 0.530 0.546
BL_sesPorst -0.223 -0.015 0.540 0.560 0.574
age_child -0.493 -0.105 -0.052 -0.093 -0.114
                                                 -0.149
            0.198 -0.004 -0.003 -0.003 -0.001
wave
                                                 -0.005
                                                 -0.140
lng3_swrfMj -0.271 -0.015 -0.075 -0.063 -0.118
lng3 swrfKm -0.292 -0.022 -0.092 -0.024 -0.038
                                                 -0.032
BL_gll1_bgs -0.035 0.002 0.021 0.015 0.041
                                                 0.047
BL_gl13_rcp -0.588 -0.099 0.074 0.142
                                         0.127
                                                  0.141
           ag chl wave
                         lng3_M lng3_K BL_g1_
maleMale
BL_sesLsspr
BL_sesMdnpr
BL_sesPoor
BL_sesPorst
age child
wave
            0.004
lng3_swrfMj -0.126 -0.005
lng3_swrfKm 0.020 -0.007 0.619
BL_gll1_bgs -0.151 0.000 -0.022 -0.018
BL_gll3_rcp -0.084 0.000 0.095 0.069 -0.291
> model2_mijiref_lswa<-</pre>
lmer(lpm_swa~male+BL_ses+age_child+wave*(BL_gl11_bgsnds+BL_gl13_
rcplang) + lang3_swaref*(BL_gll1_bgsnds+BL_gll3_rcplang) + (1+wave|c
hild id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_swa ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds + BL_gll3_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
    (1 + wave | child id)
  Data: kenyadata
```

REML criterion at convergence: 49362.2

Scaled residuals:

Min 1Q Median 3Q Max -2.9907 -0.4458 -0.2188 0.2328 6.3108

Random effects:

Groups Name Variance Std.Dev. Corr child_id (Intercept) 107.59 10.373 wave 20.70 4.549 0.86 Residual 78.81 8.878 Number of obs: 6454, groups: child_id, 2423

TIACC CITCOLS.	Fetimate	Std. Error
<pre>df t value Pr(> t)</pre>	БСТПасс	bea. Hiloi
(Intercept)	1.426e+00	2.577e+00
3.279e+03 0.554 0.579945		
maleMale	-4.288e-01	3.446e-01
2.418e+03 -1.245 0.213432		
BL_sesLess poor	-1.465e+00	5.637e-01
2.403e+03 -2.599 0.009403 **		
BL_sesMedian poor	-2.886e+00	5.661e-01
2.412e+03 -5.098 3.69e-07 ***		
BL_sesPoor	-2.768e+00	5.661e-01
2.419e+03 -4.889 1.08e-06 ***		
BL_sesPoorest	-3.344e+00	5.588e-01
2.408e+03 -5.984 2.51e-09 ***		
age_child	-5.755e-01	1.066e-01
2.431e+03 -5.398 7.39e-08 ***		
wave	-1.665e+00	7.894e-01
2.260e+03 -2.110 0.035010 *	0 200 04	0 005 04
BL_gll1_bgsnds	8.329e-01	2.235e-01
3.385e+03 3.727 0.000197 ***	F (01 - 01	1 244 - 01
BL_gl13_rcplang 3 4230+03	5.691e-01	1.344e-01
3.423e 03 4.233 2.33e 03	1 712 00	2.20500
lang3_swarefMijikenda 2.483e+03 0.007 0.994297	1.713e-02	2.395e+00
lang3_swarefKamba	-2.036e+00	3.139e+00
2.478e+03 -0.649 0.516652	-2.0300+00	3.1396+00
wave:BL_gll1_bgsnds	6.837e-02	7.458e-02
2.234e+03 0.917 0.359369	0.0376 02	7.4500 02
wave:BL_gll3_rcplang	1.411e-01	4.425e-02
2.262e+03 3.188 0.001450 **		_ , , ,
BL_gll1_bgsnds:lang3_swarefMijikenda	-1.022e-03	2.158e-01
2.415e+03 -0.005 0.996223		

```
BL qll1 bqsnds:lang3 swarefKamba 1.742e-01 2.861e-01
2.407e+03 0.609 0.542565
BL_gll3_rcplang:lang3_swarefMijikenda -2.630e-02 1.294e-01
2.464e+03 -0.203 0.838956
BL_gll3_rcplang:lang3_swarefKamba 2.791e-02 1.762e-01
2.463e+03 0.158 0.874136
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
    vcov(x)
                  if you need it
> model3 mijiref lswa<-</pre>
lmer(lpm swa~male+BL ses+age child+wave*lang3 swaref*(BL gll1 bg
snds+BL_gl13_rcplang)+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: 1pm swa ~ male + BL ses + age child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 +
wave | child_id)
  Data: kenyadata
REML criterion at convergence: 49351.3
Scaled residuals:
   Min 10 Median
                            3 Q
                                   Max
-2.9890 -0.4470 -0.2163 0.2347 6.3087
Random effects:
 Groups
                     Variance Std.Dev. Corr
         Name
 child_id (Intercept) 106.91
                             10.340
         wave
                      20.28
                               4.503
                                       0.86
 Residual
                      78.86
                               8.880
Number of obs: 6454, groups: child_id, 2423
Fixed effects:
                                            Estimate Std. Error
df t value Pr(>|t|)
(Intercept)
                                             1.49457
                                                        3.86768
2354.76127 0.386 0.69922
                                            -0.42890 0.34468
maleMale
2417.28450 -1.244 0.21349
```

BL_sesLess poor	-1.47503	0.56391
2402.24954 -2.616 0.00896 **		
BL_sesMedian poor	-2.89600	0.56629
2411.27074 -5.114 3.40e-07 ***		
BL_sesPoor	-2.76440	0.56631
2418.20740 -4.881 1.12e-06 ***		
BL_sesPoorest	-3.35051	0.55896
2407.02745 -5.994 2.35e-09 ***		
age_child	-0.57589	0.10666
2430.37706 -5.400 7.33e-08 ***		
wave	-1.68793	2.23351
2328.92051 -0.756 0.44989	1.00733	2.23331
lang3_swarefMijikenda	0.72153	4.10259
2229.10077 0.176 0.86041	0.72133	4.10233
	4 22670	E 22E02
lang3_swarefKamba	-4.22678	5.33583
2179.30193 -0.792 0.42836	4 50560	0 0 4 5 0 0
BL_gll1_bgsnds	1.52569	0.34508
2267.42717 4.421 1.03e-05 ***		
BL_gl13_rcplang	0.45858	0.20848
2306.76102 2.200 0.02793 *		
<pre>wave:lang3_swarefMijikenda</pre>	0.57337	2.41433
2317.89663 0.237 0.81230		
<pre>wave:lang3_swarefKamba</pre>	-1.49384	3.12079
2247.89127 -0.479 0.63222		
wave:BL_gll1_bgsnds	0.56439	0.20156
2310.23689 2.800 0.00515 **		
wave:BL_gl13_rcplang	0.06528	0.12227
2379.98787 0.534 0.59344		
lang3_swarefMijikenda:BL_gll1_bgsnds	-0.75361	0.37563
2249.05435 -2.006 0.04495 *	0.73301	0.37303
lang3_swarefKamba:BL_gll1_bgsnds	-0.87847	0.49429
2243.74926 -1.777 0.07566 .	0.07047	0.49429
lang3_swarefMijikenda:BL_gll3_rcplang	0.04395	0.22588
2283.55662 0.195 0.84576	0.04393	0.22300
	0.34751	0 20400
lang3_swarefKamba:BL_gll3_rcplang	0.34/51	0.30400
2216.75441 1.143 0.25311	0 50000	0.04046
wave:lang3_swarefMijikenda:BL_gll1_bgsnds	-0.53893	0.21946
2293.12989 -2.456 0.01414 *		
<pre>wave:lang3_swarefKamba:BL_gll1_bgsnds</pre>	-0.75578	0.28965
2287.63734 -2.609 0.00913 **		
<pre>wave:lang3_swarefMijikenda:BL_gll3_rcplang</pre>	0.04676	0.13258
2358.72317 0.353 0.72433		
<pre>wave:lang3_swarefKamba:BL_gl13_rcplang</pre>	0.22546	0.17741
2276.35739 1.271 0.20392		
	0 05 0 1	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                   if you need it
>
anova(model0_mijiref_lswa,model1_mijiref_lswa,model2_mijiref_lsw
a, model3 mijiref lswa)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
+ (1 + wave | child_id)
model1 mijiref lswa: lpm swa ~ male + BL ses + age child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1 mijiref lswa:
                        BL_gll3_rcplang + (1 + wave | child_id)
model2_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
* (BL_gll1_bgsnds +
model2_mijiref_lswa:
                         BL_gl13_rcplang) + lang3_swaref *
(BL gll1 bgsnds + BL gll3 rcplang) +
model2_mijiref_lswa: (1 + wave | child_id)
model3_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3 mijiref lswa:
                         BL_g113_rcplang) + (1 + wave)
child_id)
                   Df
                               BIC logLik deviance Chisq Chi
                         AIC
Df Pr(>Chisq)
model0_mijiref_lswa 12 49599 49680 -24787
                                             49575
model1 mijiref 1swa 16 49383 49491 -24675
                                             49351 223.947
 < 2.2e-16 ***
model2_mijiref_1swa 22 49379 49528 -24668
                                             49335
                                                   15.495
    0.016740 *
model3_mijiref_1swa 28 49374 49564 -24659
                                             49318 17.072
   0.009024 **
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model3_mijiref_lswa, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
> ranova(model3_mijiref_lswa)
ANOVA-like table for random-effects: Single term deletions
Model:
lpm_swa ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
```

```
BL_gll3_rcplang + (1 + wave | child_id) + wave:lang3_swaref
+
   wave:BL_gll1_bgsnds + wave:BL_gll3_rcplang +
lang3_swaref:BL_gll1_bgsnds +
    lang3 swaref:BL gll3 rcplang +
wave:lang3_swaref:BL_gll1_bgsnds +
   wave:lang3_swaref:BL_gl13_rcplang
                                                  LRT Df
                             npar logLik
                                           AIC
Pr(>Chisq)
<none>
                               28 -24676 49407
wave in (1 + wave | child_id) 26 -24816 49683 279.87 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: Swahili Word per Minute
> model0_mijiref_wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave+(1|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0 mijiref wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 49567.8
Scaled residuals:
   Min
            10 Median
                            3Q
                                   Max
-1.8890 -0.5755 -0.0990 0.4686 5.3036
Random effects:
 Groups
                     Variance Std.Dev.
         Name
                              6.785
 child_id (Intercept) 46.03
 Residual
                     92.38
                              9.612
Number of obs: 6457, groups: child_id, 2423
Fixed effects:
                   Estimate Std. Error df t value
Pr(>|t|)
                   20.10426
                               0.94100 2673.02510 21.365 <
(Intercept)
2e-16 ***
                   -0.56981
maleMale
                              0.37136 2506.86077 -1.534
0.12506
                  -1.16223 0.60445 2495.27817 -1.923
BL_sesLess poor
0.05462 .
```

```
-2.14986 0.60300 2504.23258 -3.565
BL sesMedian poor
0.00037 ***
                   -3.14537
                              0.60113 2520.67199 -5.232
BL sesPoor
1.81e-07 ***
                               0.58800\ 2504.75430\ -6.144
BL sesPoorest
                   -3.61251
9.35e-10 ***
                   -0.00779
                               0.11132 2538.55023 -0.070
age child
0.94422
wave
                    8.62175
                               0.14940 4453.56611 57.708 <
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
           -0.083
BL_sesLsspr -0.296 -0.009
BL_sesMdnpr -0.256 -0.020 0.522
BL_sesPoor -0.230 -0.025 0.525 0.532
BL_sesPorst -0.207 0.001 0.538 0.547 0.553
age_child -0.849 -0.123 -0.040 -0.084 -0.114
                                                -0.155
            0.171 - 0.006 - 0.006 - 0.006 - 0.001
                                                -0.006
                                                          0.008
wave
> model1_mijiref_wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs
nds+BL_gll3_rcplang+(1|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave +
lang3_swaref + BL_gll1_bgsnds + BL_gll3_rcplang + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 49246.6
Scaled residuals:
            10 Median
   Min
                            3 Q
                                   Max
-1.8942 - 0.5782 - 0.1130 0.4562
                               5.4436
Random effects:
 Groups
        Name
                     Variance Std.Dev.
 child_id (Intercept) 35.78
                              5.982
Residual
                      92.36
                              9.610
Number of obs: 6457, groups: child_id, 2423
```

Fixed effects:		1	16 .	7
Pr(> t)	ESTIMATE ST	d. Error	ai t	value
(Intercept)	10.89499	1.21111 261	13.14454	8.996
< 2e-16 *** maleMale	-0.98682	0.34875 249)1.35259 -	-2.830
0.00470 **	0.30002	0.310,3 213	. 1 . 3 3 2 3 3	2.030
BL_sesLess poor 0.43777	-0.44190	0.56939 247	/1.88746 -	-0.776
BL_sesMedian poor	-0.86432	0.57172 248	34.57547 -	-1.512
_	-1.54647	0.57367 250)1.81061 -	-2.696
	-1.79558	0.56525 248	31.58503 -	-3.177
0.00151 ** age_child	-0.30260	0.10788 252	25.69931 -	-2.805
0.00507 ** wave	8.62257	0.14907 445	74.94122 5	57.842
< 2e-16 *** lang3_swarefMijikenda	-1.26423	0.50720 252	25.62990 -	-2.493
0.01275 * lang3_swarefKamba	1.01687	0.64849 249	97.83855	1.568
0.11700 BL_gll1_bgsnds	1.06294	0.07617 247	71.98933 1	.3.955
< 2e-16 *** BL_gll3_rcplang	0 31611	0.04571 251	11 92443	6 915
5.9e-12 ***	0.31011	0.043/1 231	-I. • JZ = IJ	0.919
Signif. codes: 0 ***'	0.001 '**'	0.01 *' 0.0)5 '.' 0.1	` ' 1
Correlation of Fixed Ef	fects:			
(Intr) male	Ml BL_sLp BI	_sMp BL_sesI	Pr BL_ssPrs	s ag_chl
<pre>wave lng3_M lng3_K BL maleMale 0.008</pre>	_g1_			
BL_sesLsspr -0.240 -0.0				
BL_sesMdnpr -0.267 -0.0) F4C		
BL_sesPoor -0.234 -0.0 BL_sesPorst -0.227 -0.0				
age_child -0.499 -0.1	06 -0.050 -0	0.091 -0.112	-0.147	
wave 0.137 -0.0				
lng3_swrfMj -0.276 -0.0 -0.011	16 -0.073 -0	0.061 -0.11/	-0.137	-0.125
lng3_swrfKm -0.298 -0.0	23 -0.089 -0	0.022 -0.037	-0.031	0.021
-0.011 0.622 BL_gll1_bgs -0.035 0.0	01 0.020 0	0.014 0.040	0.045	-0.150
-0.002 -0.020 -0.016		2.2.20		- · - -

```
BL_gll3_rcp -0.593 -0.097 0.073 0.142 0.127 0.141
                                                         -0.083
-0.001 0.094 0.069 -0.292
> model2_mijiref_wswa<-</pre>
lmer(wpm swa~male+BL ses+age child+wave*(BL gll1 bgsnds+BL gll3
rcplang)+lang3_swaref*(BL_gll1_bgsnds+BL_gll3_rcplang)+(1|child_
id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave *
(BL gll1 bgsnds +
   BL_gll3_rcplang) + lang3_swaref * (BL_gll1_bgsnds +
BL gll3 rcplang) +
                       (1 | child id)
   Data: kenyadata
REML criterion at convergence: 49044
Scaled residuals:
   Min
            10 Median
                             3Q
                                   Max
-2.2826 -0.5662 -0.0946 0.4227
                                 5.5813
Random effects:
Groups
                     Variance Std.Dev.
        Name
child_id (Intercept) 37.12
                              6.093
 Residual
                      87.91
                               9.376
Number of obs: 6457, groups: child_id, 2423
Fixed effects:
                                        Estimate Std. Error
df t value Pr(>|t|)
                                        -1.37248
                                                    2.47606
(Intercept)
3027.91612 -0.554
                   0.57941
maleMale
                                                    0.34800
                                        -0.96866
2487.90720
                    0.00542 **
          -2.784
BL_sesLess poor
                                        -0.45711
                                                    0.56914
2468.03205
          -0.803
                   0.42196
                                        -0.82089
BL sesMedian poor
                                                    0.57165
2480.29942 -1.436
                   0.15113
```

-1.58671

-1.81220

-0.29587

0.28469

0.57238

0.56426

0.10790

0.67610

BL sesPoor

age_child

4499.73379

wave

BL sesPoorest

2497.73811 -2.772

2477.28771 -3.212

2520.27435 -2.742

0.421

0.00561 **

0.00134 **

0.00615 **

0.67372

```
BL gll1 bgsnds
                                        1.64660
                                                   0.21255
            7.747 1.27e-14 ***
3088.61075
BL_gll3_rcplang
                                        0.80875
                                                   0.12819
3151.06086
            6.309 3.20e-10 ***
                                        2.13945
                                                   2.41984
lang3 swarefMijikenda
2582.26973 0.884 0.37671
                                        5.32833
                                                   3.16767
lang3_swarefKamba
2553.41422
            1.682 0.09267 .
wave:BL_gll1_bgsnds
                                        0.63775
                                                   0.06377
4450.49313 10.001 < 2e-16 ***
wave:BL_gl13_rcplang
                                        0.27343
                                                   0.03781
4485.05348
            7.232 5.59e-13 ***
BL_gll1_bgsnds:lang3_swarefMijikenda
                                        0.14958
                                                   0.21853
2506.54881 0.684 0.49373
BL gll1 bgsnds:lang3 swarefKamba
                                        0.03293
                                                   0.28959
2503.44808 0.114 0.90949
BL_gll3_rcplang:lang3_swarefMijikenda
                                       -0.22174
                                                   0.13108
2574.71581 -1.692 0.09082 .
BL_gll3_rcplang:lang3_swarefKamba
                                       -0.23696
                                                   0.17830
2552.33540 -1.329 0.18395
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   vcov(x)
> model3 mijiref wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bg
snds+BL_gl13_rcplang) + (1 | child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 49008.4
Scaled residuals:
   Min
            10 Median
                            3Q
                                   Max
-2.3244 -0.5612 -0.0878 0.4106 5.3970
Random effects:
```

Groups Name Variance Std.Dev. child_id (Intercept) 37.30 6.107 Residual 87.18 9.337

Number of obs: 6457, groups: child_id, 2423

Fixed effects:		v. 7 —
35 1 - 1 - p./. [1]	Estimate S	Std. Error
<pre>df t value Pr(> t)</pre>	0 2451	2 1022
(Intercept)	-0.3451	3.1823
5454.2469 -0.108 0.913635	0.0650	0 2470
maleMale	-0.9659	0.3478
2488.1618 -2.778 0.005517 **	0 4400	0 5600
BL_sesLess poor	-0.4480	0.5688
2468.7057 -0.788 0.430964	0 0045	0 5512
BL_sesMedian poor	-0.8245	0.5713
2480.7216 -1.443 0.149062	4 5000	0 5500
BL_sesPoor	-1.5992	0.5720
2498.3123 -2.796 0.005217 **	1 0016	0 5600
BL_sesPoorest	-1.8316	0.5639
2477.8432 -3.248 0.001177 **		
age_child	-0.2963	0.1078
2520.3338 -2.748 0.006039 **		
wave	1.2600	1.9308
4609.7218 0.653 0.514052		
lang3_swarefMijikenda	0.5307	3.3373
5638.8538 0.159 0.873671		
lang3_swarefKamba	7.5703	4.3141
5536.4611 1.755 0.079352 .		
BL_gll1_bgsnds	1.2439	0.2781
5637.9371 4.472 7.88e-06 ***		
BL_gll3_rcplang	0.9449	0.1690
5706.6909 5.591 2.36e-08 ***		
wave:lang3_swarefMijikenda	-1.5114	2.0838
4592.4436 -0.725 0.468300		
<pre>wave:lang3_swarefKamba</pre>	2.0739	2.6768
4521.8992 0.775 0.438510		
wave:BL_gll1_bgsnds	0.2878	0.1718
4504.7309 1.675 0.093944 .		
<pre>wave:BL_gll3_rcplang</pre>	0.3880	0.1048
4598.5453 3.703 0.000215 ***		
lang3_swarefMijikenda:BL_gll1_bgsnds	0.6314	0.3026
5613.1353 2.086 0.036987 *		
lang3_swarefKamba:BL_gll1_bgsnds	0.5094	0.4003
5616.2678 1.273 0.203225		
lang3_swarefMijikenda:BL_gll3_rcplang	-0.3825	0.1828
5690.4596 -2.093 0.036406 *		

```
0.2454
lang3 swarefKamba:BL gll3 rcplang
                                            -0.4848
5592.6209 -1.975 0.048294 *
wave:lang3_swarefMijikenda:BL_gll1_bgsnds
                                                         0.1871
                                            0.4227
           2.259 0.023903 *
wave:lang3 swarefKamba:BL gll1 bgsnds
                                                         0.2484
                                             0.4122
4490.1875 1.660 0.097070 .
wave:lang3_swarefMijikenda:BL_gll3_rcplang
                                            -0.1375
                                                         0.1135
4578.3283
         -1.211 0.225966
wave:lang3_swarefKamba:BL_gl13_rcplang
                                            -0.2173
                                                         0.1516
4520.1212 -1.434 0.151769
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
>
>
anova(model0 mijiref wswa, model1 mijiref wswa, model2 mijiref wsw
a, model3_mijiref_wswa)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
+ (1 | child_id)
model1_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
                        BL_gl13_rcplang + (1 | child_id)
model1 mijiref wswa:
model2_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
* (BL_gll1_bgsnds +
model2_mijiref_wswa:
                        BL_gll3_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
model2_mijiref_wswa:
                        (1 | child_id)
model3_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3 mijiref wswa:
                        BL_gll3_rcplang) + (1 | child_id)
                              BIC logLik deviance
                   Df
                        AIC
                                                     Chisq Chi
Df Pr(>Chisq)
model0_mijiref_wswa 10 49583 49651 -24782
                                             49563
model1_mijiref_wswa 14 49262 49357 -24617
                                             49234 329.023
4 < 2.2e-16 ***
model2_mijiref_wswa 20 49056 49192 -24508 49016 218.077
 < 2.2e-16 ***
model3_mijiref_wswa 26 49025 49201 -24486
                                           48973 43.751
6 8.281e-08 ***
```

```
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '1
> tab_model(model3_mijiref_wswa, show.se=TRUE, show.std=TRUE)
> ranova(model3_mijiref_wswa)
ANOVA-like table for random-effects: Single term deletions
Model:
wpm_swa ~ male + BL_ses + age_child + wave + lang3_swaref +
BL gll1 bgsnds +
    BL_gll3_rcplang + (1 | child_id) + wave:lang3_swaref +
wave:BL_gll1_bgsnds +
    wave:BL_gll3_rcplang + lang3_swaref:BL_gll1_bgsnds +
lang3 swaref:BL gll3 rcplang +
   wave:lang3_swaref:BL_gll1_bgsnds +
wave:lang3 swaref:BL gll3 rcplang
               npar logLik
                            AIC
                                   LRT Df Pr(>Chisq)
                 26 -24504 49060
<none>
(1 | child_id) 25 -24765 49580 522.01 1 < 2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> ###SWAHILI REFRENCE GROUP
> kenyadata$lang3 swaref<-relevel(kenyadata$lang3 swaref,</pre>
"Swahili")
> #DV: Spelling
> model0_mijiref_spell<-</pre>
lmer(spell~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0 mijiref spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: spell ~ male + BL_ses + age_child + wave + (1 + wave |
child id)
  Data: kenyadata
REML criterion at convergence: 35392.1
Scaled residuals:
             10 Median
   Min
                             3 Q
                                    Max
-2.8979 -0.5451 -0.0095 0.5457 3.1441
Random effects:
 Groups
         Name
                      Variance Std.Dev. Corr
 child_id (Intercept) 6.3911 2.5281
                      0.6383
                               0.7989
                                        -0.61
          wave
                      7.4473 2.7290
Residual
Number of obs: 6513, groups: child_id, 2428
```

```
Fixed effects:
                   Estimate Std. Error
                                              df t value
Pr(>|t|)
                   12.73122
                               0.35618 2426.04756 35.744 <
(Intercept)
2e-16 ***
                   -0.11520
                               0.14190 2357.05615 -0.812
maleMale
0.416973
BL_sesLess poor
                   -0.89737
                               0.23127 2352.96133 -3.880
0.000107 ***
BL_sesMedian poor
                   -1.46856
                               0.23083 \ 2366.38700 \ -6.362
2.38e-10 ***
BL_sesPoor
                   -1.56889
                               0.23009 2380.91786 -6.818
1.16e-11 ***
BL sesPoorest
                   -2.06089
                               0.22462\ 2359.95853\ -9.175\ <
2e-16 ***
age_child
                    0.06523
                               0.04260 2397.37725
                                                  1.531
0.125882
                    1.73631
                               0.04517 2280.00252 38.437 <
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
           -0.082
BL_sesLsspr -0.299 -0.009
BL_sesMdnpr -0.260 -0.022 0.523
BL_sesPoor -0.234 -0.026 0.526 0.533
BL_sesPorst -0.211 -0.001 0.541 0.549 0.555
age_child -0.858 -0.123 -0.041 -0.084 -0.113
                                                -0.155
wave
            0.087 -0.006 -0.008 -0.005 -0.001
                                                -0.008
                                                          0.008
>
> model1_mijiref_spell<-</pre>
lmer(spell~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgsnd
s+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: spell ~ male + BL_ses + age_child + wave + lang3_swaref
+ BL_gll1_bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id)
  Data: kenyadata
```

REML criterion at convergence: 34902.8

Scaled residuals:

Min 1Q Median 3Q Max -2.7264 -0.5607 -0.0201 0.5531 2.8991

Random effects:

Groups Name Variance Std.Dev. Corr

child_id (Intercept) 5.1777 2.2755

wave 0.6814 0.8255 -0.29

Residual 7.4072 2.7216

Number of obs: 6513, groups: child_id, 2428

Fixed effects:

	Estimate	Std. Error	đf	t value
Pr(> t)				
(Intercept)	7.42414	0.44473	2432.61222	16.694
< 2e-16 ***				
maleMale	-0.32542	0.12865	2357.23954	-2.530
0.0115 *				
BL_sesLess poor	-0.49794	0.21035	2346.49283	-2.367
0.0180 *	0 04468	0 04405	0060 0000	2 004
BL_sesMedian poor	-0.84167	0.21127	2362.37708	-3.984
6.98e-05 ***	0 07000	0 01107	2275 (1000	4 100
BL_sesPoor 4.13e-05 ***	-0.87029	0.21187	2375.61088	-4.108
	-1.24476	0 20047	2351.66155	5 071
2.72e-09 ***	-1.24470	0.20047	2331.00133	-3.971
age_child	-0.09984	0 03983	2396.54206	-2.507
0.0123 *	0.05501	0.03303	2330.31200	2.307
wave	1.73576	0.04533	2262.95891	38.295
< 2e-16 ***				
lang3_swarefMijikenda	-0.06744	0.18731	2394.46983	-0.360
0.7188				
lang3_swarefKamba	0.23148	0.23932	2360.78041	0.967
0.3335				
BL_gll1_bgsnds	0.44322	0.02810	2336.13281	15.774
< 2e-16 ***				
BL_gl13_rcplang	0.21290	0.01685	2374.39137	12.635
< 2e-16 ***				

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

(Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl wave lng3_M lng3_K BL_g1_

maleMale 0.008

BL_sesLsspr -0.241 -0.016

BL_sesMdnpr -0.268 -0.036 0.529

```
BL_sesPoor -0.236 -0.040 0.532 0.547
BL_sesPorst -0.229 -0.017 0.543 0.563 0.575
age_child -0.505 -0.107 -0.051 -0.091 -0.111
                                                -0.146
wave
            0.089 -0.005 -0.007 -0.005 -0.001
                                                -0.007
                                                          0.008
lng3 swrfMj -0.276 -0.015 -0.073 -0.060 -0.116
                                                -0.137
                                                         -0.124
-0.010
lng3_swrfKm -0.300 -0.023 -0.089 -0.021 -0.037
                                                -0.030
                                                         0.024
-0.012 0.623
BL_gll1_bgs -0.034 0.001 0.020 0.014 0.039
                                                0.045
                                                         -0.148
-0.001 -0.021 -0.017
BL_gll3_rcp -0.595 -0.095 0.073 0.141 0.127
                                                 0.141
                                                         -0.081
-0.003 0.092 0.068 -0.294
> model2 mijiref spell<-
lmer(spell~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_rc
plang) + lang3 swaref* (BL gll1 bgsnds+BL gll3 rcplang) + (1+wave chi
ld_id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: spell ~ male + BL_ses + age_child + wave *
(BL gll1 bgsnds +
   BL_gll3_rcplang) + lang3_swaref * (BL_gll1_bgsnds +
BL_g113_rcplang) +
                     (1 + wave | child_id)
  Data: kenyadata
REML criterion at convergence: 34836.4
Scaled residuals:
    Min
              10 Median
                                3Q
                                        Max
-2.92523 -0.56079 -0.00406 0.55810 2.89969
Random effects:
 Groups
                     Variance Std.Dev. Corr
         Name
 child_id (Intercept) 4.990
                              2.2338
         wave
                     0.469
                              0.6848
                                       -0.48
Residual
                     7.444
                              2.7283
Number of obs: 6513, groups: child_id, 2428
Fixed effects:
                                       Estimate Std. Error
df t value Pr(>|t|)
(Intercept)
                                        7.65605
                                                   0.88502
2561.56915
           8.651 < 2e-16 ***
maleMale
                                       -0.32288
                                                   0.12851
2354.88008 -2.513 0.012053 *
```

```
-0.46249
                                                    0.21047
BL_sesLess poor
2343.27631 -2.197 0.028084 *
                                                    0.21147
BL sesMedian poor
                                        -0.80936
2359.23838 -3.827 0.000133 ***
                                        -0.85617
                                                    0.21163
BL sesPoor
2372.69874 -4.046 5.38e-05 ***
                                        -1.22458
                                                    0.20832
BL sesPoorest
2348.43990 -5.878 4.73e-09 ***
age_child
                                        -0.10191
                                                    0.03988
2392.82211 -2.555 0.010677 *
                                         3.24531
                                                    0.20565
wave
2273.92917 15.781 < 2e-16 ***
BL_gll1_bgsnds
                                         0.26631
                                                    0.07598
2573.47722
            3.505 0.000464 ***
BL gll3 rcplang
                                         0.24798
                                                    0.04566
2628.79734
            5.430 6.13e-08 ***
lang3_swarefMijikenda
                                         1.00069
                                                    0.88691
2408.82236
            1.128 0.259310
lang3_swarefKamba
                                         2.20862
                                                    1.16371
2386.67764
            1.898 0.057827 .
wave:BL_gll1_bgsnds
                                        -0.14024
                                                    0.01941
2242.17180 -7.226 6.77e-13 ***
wave:BL_gl13_rcplang
                                        -0.04243
                                                    0.01153
2272.72242 -3.681 0.000238 ***
BL_gll1_bgsnds:lang3_swarefMijikenda
                                       0.06419
                                                    0.08089
2384.16009
            0.794 0.427506
BL_gll1_bgsnds:lang3_swarefKamba
                                        0.10738
                                                    0.10705
2368.29613 1.003 0.315906
BL gll3 rcplang:lang3 swarefMijikenda
                                       -0.07433
                                                    0.04828
2426.65782 -1.540 0.123799
BL_gll3_rcplang:lang3_swarefKamba
                                       -0.13780
                                                    0.06572
2404.01803 -2.097 0.036123 *
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   vcov(x)
> model3_mijiref_spell<-</pre>
lmer(spell~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bgsn
ds+BL_gll3_rcplang)+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_spell)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
```

Formula: spell ~ male + BL_ses + age_child + wave * lang3_swaref

* (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 + wave |

child_id)

Data: kenyadata

REML criterion at convergence: 34851.3

Scaled residuals:

Min 1Q Median 3Q -2.96984 -0.56017 -0.00636 0.55962 2.90044

Random effects:

Groups Name Variance Std.Dev. Corr

child_id (Intercept) 4.997 2.2355

> wave 0.471 0.6863 -0.48

7.438 2.7274 Residual

Number of obs: 6513, groups: child_id, 2428

		Estimate Sto	d. Error
df t value $Pr(> t)$			
(Intercept)		7.80139	1.00198
2286.48884 7.786 1.04e-14	* * *		
maleMale		-0.32151	0.12852
2354.55386 -2.502 0.012427	*		
BL_sesLess poor		-0.46803	0.21050
2343.15261 -2.223 0.026279	*		
BL_sesMedian poor		-0.81273	0.21149
2359.02636 -3.843 0.000125	* * *	0 05005	0 01165
BL_sesPoor	ato do do	-0.85937	0.21165
2372.61288 -4.060 5.06e-05	* * *	1 00005	0 00005
BL_sesPoorest	***	-1.22805	0.20835
2340.32003 3.034 4.306 03	^ ^ ^	0 10015	0 02000
age_child 2392.45119 -2.561 0.010500	*	-0.10215	0.03989
wave -2.301 0.010300		3.40756	0.57641
2308.24512 5.912 3.89e-09	***	3.40730	0.37041
lang3_swarefMijikenda		0.89135	1.03929
2175.20742 0.858 0.391176		0.07133	1.03727
lang3_swarefKamba		1.86723	1.35041
2134.36699 1.383 0.166898		1.00725	1.33011
BL_gll1_bgsnds		0.25097	0.08693
2179.89047 2.887 0.003927	**		
BL_gl13_rcplang		0.25357	0.05262
2223.61563 4.819 1.54e-06	***		
wave:lang3_swarefMijikenda		-0.12511	0.62439
2303.63273 -0.200 0.841203			

```
wave:lang3_swarefKamba
                                            -0.40303
                                                       0.81027
2250.29899 -0.497 0.618953
wave:BL_gll1_bgsnds
                                            -0.15678
                                                       0.05241
2309.25115 -2.991 0.002807 **
wave:BL gll3 rcplang
                                                       0.03152
                                            -0.03633
2353.04172 -1.153 0.249203
                                                       0.09463
lang3_swarefMijikenda:BL_gll1_bgsnds
                                            0.09292
2164.38207 0.982 0.326206
lang3_swarefKamba:BL_gll1_bgsnds
                                            0.06080
                                                       0.12485
2161.49759 0.487 0.626306
lang3_swarefMijikenda:BL_gll3_rcplang
                                           -0.08584
                                                        0.05697
2205.62077 -1.507 0.132026
lang3_swarefKamba:BL_gll3_rcplang
                                           -0.12196
                                                       0.07677
2158.58213 -1.589 0.112275
wave:lang3_swarefMijikenda:BL_gll1_bgsnds 0.03293
                                                        0.05710
2294.88606 0.577 0.564164
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                           -0.05762
                                                       0.07557
2289.17789 -0.762 0.445897
wave:lang3_swarefMijikenda:BL_gll3_rcplang -0.01325
                                                       0.03426
2338.60543 -0.387 0.699000
wave:lang3_swarefKamba:BL_gl13_rcplang
                                           0.01929
                                                       0.04610
2282.43309 0.418 0.675708
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
>
anova(model0_mijiref_spell,model1_mijiref_spell,model2_mijiref_s
pell, model3_mijiref_spell)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0 mijiref spell: spell ~ male + BL ses + age child + wave +
(1 + wave | child_id)
model1_mijiref_spell: spell ~ male + BL_ses + age_child + wave +
lang3_swaref + BL_gll1_bgsnds +
model1_mijiref_spell:
                      BL_gll3_rcplang + (1 + wave |
child id)
model2_mijiref_spell: spell ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds +
model2_mijiref_spell: BL_gll3_rcplang) + lang3_swaref *
(BL gll1 bgsnds + BL gll3 rcplang) +
model2_mijiref_spell: (1 + wave | child_id)
```

```
model3_mijiref_spell: spell ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds +
model3_mijiref_spell:
                          BL_gll3_rcplang) + (1 + wave |
child id)
                     Df
                          AIC
                                BIC logLik deviance
                                                       Chisq Chi
Df Pr(>Chisq)
model0_mijiref_spell 12 35396 35477 -17686
                                              35372
model1_mijiref_spell 16 34898 35007 -17433
                                              34866 505.5986
      <2e-16 ***
model2_mijiref_spell 22 34816 34965 -17386
                                              34772
                                                     94.5872
      <2e-16 ***
model3 mijiref spell 28 34820 35010 -17382
                                              34764
                                                      7.4454
      0.2816
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab model(model2 mijiref spell, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
> ranova(model2 mijiref spell)
ANOVA-like table for random-effects: Single term deletions
spell ~ male + BL_ses + age_child + wave + BL_gll1_bgsnds +
BL_gll3_rcplang +
    lang3_swaref + (1 + wave | child_id) + wave:BL_gll1_bgsnds +
    wave:BL_gll3_rcplang + BL_gll1_bgsnds:lang3_swaref +
BL_gll3_rcplang:lang3_swaref
                              npar logLik
                                            AIC
                                                   LRT Df
Pr(>Chisq)
                                22 -17418 34880
<none>
wave in (1 + wave | child_id)
                                20 -17461 34962 85.432 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: English Letter per Minute
> model0_mijiref_leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_eng ~ male + BL_ses + age_child + wave + (1 + wave
child_id)
  Data: kenyadata
```

REML criterion at convergence: 52936.2

Scaled residuals:

Min 10 Median 3 Q Max -3.7780 -0.4827 -0.0685 0.4502 4.2362

Random effects:

Variance Std.Dev. Corr Groups Name

child_id (Intercept) 259.78 16.118

> 29.33 0.67 wave 5.416

Residual 94.18 9.705

Number of obs: 6484, groups: child_id, 2423

Fixed effects:

	Estimate	Std. Error	df	t value	
Pr(> t)					
(Intercept)	31.2300	1.4609	2591.6920	21.377	< 2e-
16 ***					
maleMale	-0.5936	0.5764	2416.4996	-1.030	
0.30323					
BL_sesLess poor	-1.4026	0.9386	2408.2460	-1.494	
0.13523					
BL_sesMedian poor	-0.8471	0.9361	2413.1189	-0.905	
0.36559					
BL_sesPoor	-1.6912	0.9316	2417.4932	-1.815	
0.06959 .					
BL_sesPoorest	-2.9053	0.9129	2410.4807	-3.183	
0.00148 **					
age_child	0.3553	0.1723	2424.3335	2.063	
0.03926 *					
wave	8.2504	0.1925	2147.9469	42.854	< 2e-
16 ***					

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

(Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl

maleMale -0.084

BL sesLsspr -0.294 -0.008

BL_sesMdnpr -0.254 -0.019 0.521

BL_sesPoor -0.228 -0.024 0.524 0.532

BL_sesPorst -0.204 0.002 0.537 0.545 0.553

age_child -0.846 -0.122 -0.042 -0.086 -0.117 -0.1580.188 - 0.004 - 0.002 - 0.002 0.000

wave

> model1_mijiref_leng<-</pre>

lmer(lpm_eng~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs

-0.003

0.003

nds+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_eng ~ male + BL_ses + age_child + wave +
lang3_swaref + BL_gll1_bgsnds + BL_gll3_rcplang + (1 + wave)

| child_id)
Data: kenyadata

REML criterion at convergence: 52688.3

Scaled residuals:

Min 1Q Median 3Q Max -3.8062 -0.4888 -0.0600 0.4459 4.2642

Random effects:

	Estimate	Std. Error	df	t value
Pr(> t)				
(Intercept)	17.35959	1.90698	2524.26994	9.103
< 2e-16 ***				
maleMale	-1.23189	0.55042	2410.30575	-2.238
0.0253 *				
BL_sesLess poor	-0.29313	0.89963	2398.65510	-0.326
0.7446				
BL_sesMedian poor	1.03720	0.90272	2404.98577	1.149
0.2507				
BL_sesPoor	0.56635	0.90413	2408.81842	0.626
0.5311				
BL_sesPoorest	-0.35921	0.89286	2402.06830	-0.402
0.6875	0 00000	0 46080	0.44 5 4.40 5 0	0 505
age_child	-0.09087	0.16972	2417.44079	-0.535
0.5924	0 25006	0 10050	2140 72000	40.060
wave	8.25086	0.19250	2149.73809	42.860
< 2e-16 ***	-1.13621	0 70744	2416.75598	-1.425
lang3_swarefMijikenda 0.1543	-1.13021	0.79744	2410.73398	-1.425
	1.17691	1 02276	2407.00141	1.151
lang3_swarefKamba 0.2500	1.1/091	1.022/0	Z4U/.UU141	1.131

```
1.37997 0.12041 2394.43272 11.461
BL_gll1_bgsnds
< 2e-16 ***
BL gll3 rcplang
                       0.51975 0.07208 2425.13979 7.210
7.43e-13 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
      lng3_M lng3_K BL_g1_
wave
maleMale
            0.007
BL sesLsspr -0.240 -0.015
BL_sesMdnpr -0.265 -0.034 0.527
BL sesPoor -0.234 -0.038 0.530 0.546
BL_sesPorst -0.224 -0.015 0.540 0.560 0.574
age child -0.498 -0.105 -0.053 -0.093 -0.115
                                                -0.150
wave
           0.145 -0.004 -0.002 -0.002 0.000
                                                -0.003
                                                          0.003
lng3_swrfMj -0.272 -0.014 -0.075 -0.063 -0.118
                                                -0.141 \quad -0.126
-0.004
lng3 swrfKm -0.293 -0.022 -0.092 -0.023 -0.038
                                                -0.033
                                                         0.020
-0.005 0.618
BL_gll1_bgs -0.035 0.001 0.022 0.015 0.043 0.048
                                                         -0.151
-0.001 -0.023 -0.018
BL_gll3_rcp -0.593 -0.098 0.076 0.142 0.127 0.141
                                                         -0.084
0.000 \quad 0.094 \quad 0.069 \quad -0.293
> model2_mijiref_leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_
rcplang) + lang3 swaref* (BL gll1 bgsnds+BL gll3 rcplang) + (1+wave|c
hild_id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_eng ~ male + BL_ses + age_child + wave *
(BL all1 basnds +
   BL_gl13_rcplang) + lang3_swaref * (BL_gl11_bgsnds +
BL gll3 rcplang) +
                     (1 + wave | child id)
  Data: kenyadata
REML criterion at convergence: 52695.6
Scaled residuals:
            10 Median
                            3Q
                                   Max
-3.8063 - 0.4864 - 0.0611 0.4466
                               4.2591
Random effects:
                     Variance Std.Dev. Corr
         Name
Groups
```

child_id (Intercept) 238.93 15.457

wave 29.42 5.424 0.69

Residual 94.14 9.702

Number of obs: 6484, groups: child_id, 2423

Fixed effects:

Tixed Clicets.	Estimate St	d. Error
df t value $Pr(> t)$		
(Intercept)	16.62469	3.92442
2921.98136 4.236 2.34e-05 ***		
maleMale	-1.22347	0.55079
2406.09917 -2.221 0.026423 *		
BL_sesLess poor	-0.26274	0.90180
2394.30227 -0.291 0.770806		
BL_sesMedian poor	1.03048	0.90520
2400.02334 1.138 0.255067		
BL_sesPoor	0.56745	0.90473
2404.51996 0.627 0.530585	0.30713	0.50175
BL_sesPoorest	-0.34719	0.89388
2397.85218 -0.388 0.697751	0.54715	0.05500
age_child	-0.09789	0.17027
2412.74816 -0.575 0.565384	-0.09769	0.17027
	7.37017	0 00400
wave 2176 29752 8 242 2 89e-16 ***	7.3/01/	0.89420
2170.23732 0.212 2.036 10	0 00001	0 22556
BL_gll1_bgsnds	0.98981	0.33776
2962.15834 2.931 0.003410 **	0 65 45 4	0.0001
BL_gll3_rcplang	0.67471	0.20284
3004.48546 3.326 0.000891 ***		
lang3_swarefMijikenda	-1.57377	3.81072
2467.46552 -0.413 0.679654		
lang3_swarefKamba	-0.05912	4.99645
2454.54223 -0.012 0.990560		
wave:BL_gl11_bgsnds	-0.08123	0.08410
2146.98999 -0.966 0.334193		
wave:BL_gl13_rcplang	0.07265	0.05004
2175.87334 1.452 0.146667		
BL_gll1_bgsnds:lang3_swarefMijikenda	0.30278	0.34492
2398.06619 0.878 0.380127		
BL_gll1_bgsnds:lang3_swarefKamba	0.42231	0.45751
2394.35306 0.923 0.356070		
BL_gl13_rcplang:lang3_swarefMijikenda	-0.06198	0.20613
2444.22326 -0.301 0.763677	0.00190	0.20013
	-0.05257	0 28076
2437.94959 -0.187 0.851496	0.05257	0.20070

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   vcov(x)
> model3 mijiref leng<-</pre>
lmer(lpm_eng~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bg
snds+BL gll3 rcplang)+(1+wave|child id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_leng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_eng ~ male + BL_ses + age_child + wave *
lang3 swaref * (BL gll1 bgsnds + BL gll3 rcplang) + (1 +
wave | child id)
  Data: kenyadata
REML criterion at convergence: 52696.1
Scaled residuals:
   Min
            10 Median
                           3Q
                                   Max
-3.8061 -0.4855 -0.0596 0.4477 4.2954
Random effects:
 Groups
         Name
                     Variance Std.Dev. Corr
 child_id (Intercept) 239.00 15.460
                      29.52
                               5.433
                                       0.69
         wave
                      94.13
                               9.702
Residual
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                                            Estimate Std. Error
df t value Pr(>|t|)
(Intercept)
                                            16.58398
                                                        5.16170
2433.65812
            3.213 0.00133 **
maleMale
                                            -1.22371
                                                        0.55076
2405.94523 -2.222
                  0.02639 *
                                            -0.25818
                                                        0.90179
BL_sesLess poor
2394.32823 -0.286
                   0.77468
BL_sesMedian poor
                                             1.02569
                                                        0.90516
2399.94012
            1.133
                  0.25727
                                             0.56730
                                                        0.90468
BL_sesPoor
2404.41028
           0.627 0.53067
BL_sesPoorest
                                            -0.34962
                                                        0.89384
2397.78790 -0.391 0.69573
age child
                                            -0.09782
                                                        0.17027
2412.64964 -0.575
                  0.56568
```

```
7.31065
                                                        2.54772
wave
            2.869
2241.10680
                   0.00415 **
lang3 swarefMijikenda
                                            -1.93592
                                                        5.42929
2288.65361
          -0.357
                   0.72145
                                             3.48435
                                                        7.08112
lang3 swarefKamba
2236.80438
            0.492
                  0.62272
                                             1.34217
                                                        0.45409
BL_gll1_bgsnds
2301.67260
            2.956 0.00315 **
BL_gll3_rcplang
                                             0.60570
                                                        0.27370
2349.70650
            2.213 0.02699 *
wave:lang3_swarefMijikenda
                                            -0.22618
                                                        2.75261
2231.62704 -0.082
                  0.93452
wave:lang3_swarefKamba
                                             2.51112
                                                        3.55104
2158.93165
            0.707 0.47955
wave:BL gll1 bgsnds
                                             0.16504
                                                        0.22773
            0.725 0.46870
2212.34342
wave:BL_gl13_rcplang
                                             0.02603
                                                        0.13852
2273.64102
            0.188
                  0.85098
lang3_swarefMijikenda:BL_gll1_bgsnds
                                            -0.12965
                                                        0.49498
2284.95237 -0.262
                  0.79340
lang3_swarefKamba:BL_gll1_bgsnds
                                            0.22809
                                                        0.65299
2281.14842
            0.349
                  0.72690
lang3_swarefMijikenda:BL_gll3_rcplang
                                            0.04146
                                                        0.29688
2325.52984
            0.140
                  0.88894
lang3_swarefKamba:BL_gll3_rcplang
                                            -0.19434
                                                        0.40167
2266.52845 -0.484 0.62855
wave:lang3_swarefMijikenda:BL_gll1_bgsnds
                                                        0.24802
                                            -0.30288
2197.54021 -1.221 0.22215
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                           -0.13622
                                                        0.32772
2201.70069 -0.416
                  0.67769
wave:lang3_swarefMijikenda:BL_gll3_rcplang
                                            0.07105
                                                        0.15025
2256.63141
            0.473
                  0.63632
wave:lang3_swarefKamba:BL_gl13_rcplang
                                           -0.10044
                                                        0.20123
2179.27185 -0.499 0.61775
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
>
anova(model0_mijiref_leng,model1_mijiref_leng,model2_mijiref_len
g,model3_mijiref_leng)
refitting model(s) with ML (instead of REML)
Data: kenyadata
```

```
Models:
model0_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
+ (1 + wave | child_id)
model1_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
+ lang3 swaref + BL gll1 bgsnds +
model1_mijiref_leng:
                       BL_gll3_rcplang + (1 + wave | child_id)
model2_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
* (BL_gll1_bgsnds +
model2_mijiref_leng:
                        BL_gl13_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
model2_mijiref_leng:
                       (1 + wave | child_id)
model3_mijiref_leng: lpm_eng ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3_mijiref_leng: BL_gll3_rcplang) + (1 + wave |
child id)
                   Df
                               BIC logLik deviance
                                                      Chisq Chi
                         AIC
Df Pr(>Chisq)
model0_mijiref_leng 12 52963 53044 -26469
                                             52939
model1_mijiref_leng 16 52719 52827 -26343
                                             52687 251.7613
     <2e-16 ***
model2_mijiref_leng 22 52727 52876 -26342
                                             52683
                                                     3.4143
      0.7553
model3_mijiref_leng 28 52735 52925 -26340
                                             52679
                                                     4.1408
     0.6576
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model1_mijiref_leng, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
> ranova(model1_mijiref_leng)
ANOVA-like table for random-effects: Single term deletions
Model:
lpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id)
                              npar logLik
                                            AIC
                                                  LRT Df
Pr(>Chisq)
                                16 -26344 52720
<none>
wave in (1 + wave | child_id)
                               14 -26457 52942 225.8 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: English Word per Minute
```

```
> model0 mijiref weng2<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+(1+wave|child_id),
data=kenyadata, na.action=na.omit)
singular fit
> summary(model0 mijiref weng) #singular fit
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 46471.4
Scaled residuals:
   Min
            10 Median
                            3 Q
                                    Max
-2.3348 -0.5116 -0.1201 0.3633
                                9.6175
Random effects:
 Groups
        Name
                     Variance Std.Dev.
 child id (Intercept) 31.67
                               5.628
 Residual
                      53.43
                              7.310
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                    Estimate Std. Error
                                               df t value
Pr(>|t|)
                   14.97094
                                0.75155 2653.93771 19.920 <
(Intercept)
2e-16 ***
maleMale
                                0.29702 2499.76288 0.073
                    0.02178
0.9416
                   -1.03677
BL_sesLess poor
                               0.48364\ 2490.97970\ -2.144
0.0322 *
                                0.48260 2502.80923 -4.805
BL_sesMedian poor
                   -2.31885
1.64e-06 ***
                    -2.98209
                                0.48090\ 2515.94130\ -6.201
BL sesPoor
6.53e-10 ***
BL sesPoorest
                                0.47019\ 2495.04220\ -7.500
                   -3.52661
8.79e-14 ***
                   -0.12643
                                0.08901\ 2529.55927\ -1.420
age child
0.1556
                     5.70024
                                0.11331 4443.08104 50.306 <
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
```

```
maleMale -0.083
BL_sesLsspr -0.297 -0.008
BL_sesMdnpr -0.257 -0.020 0.522
BL sesPoor -0.231 -0.025 0.525 0.532
BL sesPorst -0.208 0.001 0.539 0.547 0.553
age child -0.850 -0.123 -0.041 -0.085 -0.114
                                                -0.155
            0.163 -0.006 -0.007 -0.005 -0.002
wave
                                                -0.008
                                                          0.007
> model0_mijiref_weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+(1|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0 mijiref weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave + (1 |
child id)
   Data: kenyadata
REML criterion at convergence: 46471.4
Scaled residuals:
   Min
            10 Median
                            3 Q
                                   Max
-2.3348 -0.5116 -0.1201 0.3633
Random effects:
 Groups Name
                     Variance Std.Dev.
 child_id (Intercept) 31.67
                               5.628
 Residual
                      53.43
                              7.310
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                   Estimate Std. Error
                                               df t value
Pr(>|t|)
(Intercept)
                   14.97094
                               0.75155 2653.93771 19.920 <
2e-16 ***
maleMale
                    0.02178
                               0.29702 2499.76288
                                                   0.073
0.9416
                   -1.03677
                               0.48364\ 2490.97970\ -2.144
BL_sesLess poor
0.0322 *
                               0.48260\ 2502.80923\ -4.805
BL_sesMedian poor
                   -2.31885
1.64e-06 ***
                               0.48090\ 2515.94130\ -6.201
BL sesPoor
                   -2.98209
6.53e-10 ***
BL_sesPoorest
                   -3.52661
                               0.47019\ 2495.04220\ -7.500
8.79e-14 ***
age child
                   -0.12643
                               0.08901\ 2529.55927\ -1.420
0.1556
```

```
5.70024 0.11331 4443.08104 50.306 <
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
           -0.083
BL_sesLsspr -0.297 -0.008
                         0.522
BL_sesMdnpr -0.257 -0.020
BL_sesPoor -0.231 -0.025 0.525 0.532
BL sesPorst -0.208 0.001 0.539 0.547 0.553
age_child -0.850 -0.123 -0.041 -0.085 -0.114
                                                -0.155
            0.163 -0.006 -0.007 -0.005 -0.002
                                                -0.008
                                                          0.007
wave
> model1 mijiref weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs
nds+BL_gll3_rcplang+(1|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1 mijiref weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_eng ~ male + BL_ses + age_child + wave +
lang3_swaref + BL_gll1_bgsnds + BL_gll3_rcplang + (1 |
child_id)
  Data: kenyadata
REML criterion at convergence: 46169.2
Scaled residuals:
            10 Median
    Min
                            30
                                   Max
-2.1870 -0.5295 -0.1211 0.3572 9.7663
Random effects:
 Groups
        Name
                     Variance Std.Dev.
 child_id (Intercept) 25.44
                              5.044
 Residual
                      53.42
                              7.309
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                       Estimate Std. Error
                                                   df t value
Pr(>|t|)
                                   0.97128 2601.43438
(Intercept)
                        7.82447
                                                        8.056
1.19e-15 ***
                       -0.30207 0.28002 2488.14305 -1.079
maleMale
0.280807
```

```
BL_sesLess poor
                       -0.48633
                                   0.45745\ 2472.67118\ -1.063
0.287826
                                   0.45937 2487.36514
BL_sesMedian poor
                       -1.32602
                                                       -2.887
0.003928 **
                                   0.46069 2500.44615
BL sesPoor
                       -1.73892
                                                       -3.775
0.000164 ***
                                   0.45378 2476.09594
                       -2.11164
                                                       -4.653
BL sesPoorest
3.44e-06 ***
age_child
                       -0.35292
                                   0.08659 2519.45027
                                                       -4.076
4.72e-05 ***
                        5.70230
                                   0.11309 4463.29785
                                                       50.423
wave
< 2e-16 ***
lang3_swarefMijikenda
                       -0.96734
                                   0.40695 2517.50994
                                                       -2.377
0.017527 *
lang3 swarefKamba
                       0.89491
                                   0.52052 2491.53840
                                                        1.719
0.085692 .
BL_gll1_bgsnds
                        0.83193
                                   0.06115 2465.68193
                                                       13.606
< 2e-16 ***
                                   0.03671 2510.77755
BL_gll3_rcplang
                       0.24119
                                                        6.571
6.07e-11 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
      lng3_M lng3_K BL_g1_
wave
            0.008
maleMale
BL_sesLsspr -0.240 -0.015
BL_sesMdnpr -0.267 -0.035 0.528
BL_sesPoor -0.235 -0.039 0.531 0.546
BL_sesPorst -0.228 -0.015 0.542 0.561 0.574
age_child -0.500 -0.106 -0.051 -0.091 -0.112
                                                -0.147
            0.129 -0.006 -0.007 -0.005 -0.001
wave
                                                -0.007
                                                          0.007
lng3_swrfMj -0.275 -0.015 -0.074 -0.061 -0.117
                                                -0.138
                                                         -0.125
-0.008
lng3_swrfKm -0.297 -0.023 -0.090 -0.022 -0.037
                                                -0.031
                                                          0.022
-0.010 0.621
BL_gll1_bgs -0.035 0.001 0.020 0.014 0.040
                                                0.046
                                                         -0.150
-0.001 -0.021 -0.017
BL_gll3_rcp -0.594 -0.097 0.074 0.142 0.127
                                                 0.141
                                                         -0.082
0.000 0.093 0.069 -0.292
> model2_mijiref_weng<-</pre>
lmer(wpm_eng~male+BL_ses+age_child+wave*(BL_gl11_bgsnds+BL_gl13_
rcplang) + lang3_swaref + (BL_gll1_bgsnds+BL_gll3_rcplang) + (1 | child_
id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_weng)
```

Linear mixed model fit by REML. t-tests use Satterthwaite's method ['lmerModLmerTest']

Formula: wpm_eng ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds +

BL_gll3_rcplang) + lang3_swaref + (BL_gll1_bgsnds +

BL_gll3_rcplang) + (1 | child_id)

Data: kenyadata

REML criterion at convergence: 45914.1

Scaled residuals:

Min 1Q Median 3Q Max -2.1332 -0.4997 -0.1013 0.3230 9.6077

Random effects:

Groups Name Variance Std.Dev. child_id (Intercept) 26.43 5.141 Residual 50.24 7.088

Number of obs: 6484, groups: child_id, 2423

	Estimate	Std. Error	df	t value
Pr(> t)				
(Intercept)	0.14675	1.11160	3996.01912	0.132
0.894980				
maleMale	-0.29393	0.27938	2487.09154	-1.052
0.292866				
BL_sesLess poor	-0.54746	0.45647	2472.20430	-1.199
0.230513				
BL_sesMedian poor	-1.34877	0.45833	2486.10138	-2.943
0.003283 **				
BL_sesPoor	-1.77407	0.45962	2498.79274	-3.860
0.000116 ***				
BL_sesPoorest	-2.13627	0.45278	2475.10991	-4.718
2.51e-06 ***				
age_child	-0.34539	0.08637	2517.14301	-3.999
6.55e-05 ***				
wave	-1.30988	0.51014	4483.91762	-2.568
0.010270 *				
BL_gll1_bgsnds	1.41109	0.08036	5260.69449	17.560
< 2e-16 ***				
BL_gll3_rcplang	0.49412	0.04817	5267.69822	10.258
< 2e-16 ***				
lang3_swarefMijikenda	-0.97025	0.40596	2515.65519	-2.390
0.016921 *				
lang3_swarefKamba	0.90671	0.51932	2490.08518	1.746
0.080943 .				

```
0.53301 0.04800 4432.10390 11.105
wave:BL_gll1_bgsnds
< 2e-16 ***
wave:BL_gl13_rcplang 0.23136
                                   0.02857 4473.99162
                                                        8.099
7.06e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 14 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
> model3_mijiref_weng<-</pre>
lmer(wpm eng~male+BL ses+age child+wave*lang3 swaref*(BL gll1 bg
snds+BL_gl13_rcplang) + (1 | child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_weng)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm eng ~ male + BL ses + age child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 45866.4
Scaled residuals:
            10 Median
   Min
                            3Q
                                   Max
-2.1975 -0.5016 -0.0969 0.3211 9.3889
Random effects:
Groups
                     Variance Std.Dev.
        Name
 child_id (Intercept) 26.58
                              5.156
 Residual
                     49.59
                              7.042
Number of obs: 6484, groups: child_id, 2423
Fixed effects:
                                            Estimate Std. Error
df t value Pr(>|t|)
(Intercept)
                                            -1.25876
                                                        2.46454
5212.55536 -0.511 0.609549
maleMale
                                            -0.29432
                                                        0.27914
2484.06944 -1.054 0.291810
BL_sesLess poor
                                            -0.53979
                                                        0.45684
2468.66231 -1.182 0.237485
BL sesMedian poor
                                            -1.33897
                                                        0.45887
2482.36799 -2.918 0.003555 **
```

```
BL sesPoor
                                           -1.78412
                                                       0.45920
2495.69193 -3.885 0.000105 ***
                                                       0.45257
BL sesPoorest
                                           -2.15992
2471.69245 -4.773 1.93e-06 ***
                                           -0.34742
                                                       0.08651
age child
2512.97356 -4.016 6.09e-05 ***
                                           -0.82843
                                                       1.44375
wave
4571.21457 -0.574 0.566127
lang3_swarefMijikenda
                                            1.17485
                                                       2.58090
5411.19278
            0.455 0.648976
lang3_swarefKamba
                                            0.98566
                                                       3.35007
            0.294 0.768602
5316.27986
BL_gll1_bgsnds
                                            1.48688
                                                       0.21580
5428.23580 6.890 6.21e-12 ***
BL gll3 rcplang
                                           0.62550
                                                       0.13072
5496.25043 4.785 1.75e-06 ***
wave:lang3_swarefMijikenda
                                           -0.34790
                                                       1.55991
4557.07624 -0.223 0.823524
wave:lang3_swarefKamba
                                           -0.43053
                                                       2.00893
4497.68487 -0.214 0.830318
wave:BL_gll1_bgsnds
                                           0.50248
                                                       0.12894
4478.73277
            3.897 9.88e-05 ***
wave:BL_gl13_rcplang
                                           0.28391
                                                       0.07849
4564.06869 3.617 0.000301 ***
lang3_swarefMijikenda:BL_gll1_bgsnds
                                           -0.06425
                                                       0.23493
5401.19053 -0.273 0.784487
lang3_swarefKamba:BL_gll1_bgsnds
                                           -0.18691
                                                       0.30977
5378.87236 -0.603 0.546273
lang3_swarefMijikenda:BL_gll3_rcplang -0.20786
                                                       0.14159
5483.58199 -1.468 0.142130
lang3_swarefKamba:BL_gll3_rcplang
                                           0.05963
                                                       0.19061
5384.24873
            0.313 0.754426
wave:lang3_swarefMijikenda:BL_gll1_bgsnds 0.04976
                                                       0.14046
4467.86604 0.354 0.723166
wave:lang3 swarefKamba:BL gll1 bgsnds
                                           0.01930
                                                       0.18585
4456.85866
           0.104 0.917291
wave:lang3_swarefMijikenda:BL_gll3_rcplang -0.09591
                                                       0.08515
4547.49578 -1.126 0.260118
wave:lang3 swarefKamba:BL gll3 rcplang
                                                       0.11385
                                          0.02619
4497.08076 0.230 0.818090
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   VCOV(X)
```

```
>
anova (model0_mijiref_weng, model1_mijiref_weng, model2_mijiref_wen
g, model3 mijiref weng)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
+ (1 | child id)
model1_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1 mijiref weng:
                        BL_gll3_rcplang + (1 | child_id)
model2_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
* (BL gll1 bgsnds +
model2 mijiref weng:
                        BL_gl13_rcplang) + lang3_swaref +
(BL gll1 bgsnds + BL gll3 rcplang) +
model2_mijiref_weng:
                        (1 | child_id)
model3_mijiref_weng: wpm_eng ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3 mijiref weng:
                         BL gll3 rcplang) + (1 | child id)
                    Df
                               BIC logLik deviance
                         AIC
Df Pr(>Chisq)
model0_mijiref_weng 10 46483 46551 -23232
                                             46463
model1_mijiref_weng 14 46180 46275 -23076
                                             46152 311.682
 < 2.2e-16 ***
model2_mijiref_weng 16 45919 46027 -22943
                                             45887 264.866
 < 2.2e-16 ***
model3_mijiref_weng 26 45871 46047 -22909
                                             45819 67.962
10 1.096e-10 ***
___
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model3_mijiref_weng, show.se=TRUE, show.std=TRUE)
> ranova(model3_mijiref_weng)
ANOVA-like table for random-effects: Single term deletions
Model:
wpm_eng ~ male + BL_ses + age_child + wave + lang3_swaref +
BL_gll1_bgsnds +
    BL_gll3_rcplang + (1 | child_id) + wave:lang3_swaref +
wave:BL_gll1_bgsnds +
    wave:BL_gll3_rcplang + lang3_swaref:BL_gll1_bgsnds +
lang3_swaref:BL_gll3_rcplang +
    wave:lang3_swaref:BL_gll1_bgsnds +
wave:lang3_swaref:BL_gl13_rcplang
              npar logLik
                             AIC
                                    LRT Df Pr(>Chisq)
                 26 -22933 45918
<none>
                 25 -23289 46627 710.97 1 < 2.2e-16 ***
(1 | child_id)
```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> #DV: Swahili Letter per Minute

> model0_mijiref_lswa<-</pre>

lmer(lpm_swa~male+BL_ses+age_child+wave+(1+wave|child_id),

data=kenyadata, na.action=na.omit)

> summary(model0_mijiref_lswa)

Linear mixed model fit by REML. t-tests use Satterthwaite's method ['lmerModLmerTest']

Formula: lpm_swa ~ male + BL_ses + age_child + wave + (1 + wave | child_id)

Data: kenyadata

REML criterion at convergence: 49579.2

Scaled residuals:

Min 1Q Median 3Q Max -2.9652 -0.4213 -0.2499 0.2226 6.3475

Random effects:

Fixed effects:

	Estimate	Std. Error	df	t value	
Pr(> t)					
(Intercept)	13.91909	0.92541	2771.07303	15.041	<
2e-16 ***					
maleMale	-0.02515	0.35859	2429.21592	-0.070	
0.944088					
BL_sesLess poor	-2.19983	0.58363	2419.35143	-3.769	
0.000168 ***					
BL_sesMedian poor	-3.96666	0.58229	2426.52458	-6.812	
1.21e-11 ***					
BL_sesPoor	-4.01717	0.57979	2433.62222	-6.929	
5.42e-12 ***					
BL_sesPoorest	-4.71109	0.56755	2421.86802	-8.301	<
2e-16 ***					
age_child	-0.25650	0.10729	2444.33452	-2.391	
0.016887 *					
wave	1.23780	0.17120	2233.44388	7.230	
6.59e-13 ***					

```
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
           (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
           -0.083
maleMale
BL_sesLsspr -0.289 -0.007
BL_sesMdnpr -0.250 -0.019
                         0.521
BL sesPoor -0.224 -0.024 0.524 0.531
BL_sesPorst -0.201 0.001 0.537 0.545 0.553
age_child -0.832 -0.122 -0.042 -0.086 -0.116
                                                -0.157
            0.260 -0.004 -0.003 -0.003 -0.001
                                                -0.005
                                                         0.004
wave
> model1_mijiref_lswa<-</pre>
lmer(lpm swa~male+BL ses+age child+wave+lang3 swaref+BL gll1 bgs
nds+BL_gll3_rcplang+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: 1pm swa ~ male + BL ses + age child + wave +
lang3_swaref + BL_gll1_bgsnds +
   BL gll3 rcplang + (1 + wave | child id)
  Data: kenyadata
REML criterion at convergence: 49362.8
Scaled residuals:
            10 Median
   Min
                            3Q
                                   Max
-2.9911 -0.4460 -0.2184 0.2378 6.3235
Random effects:
 Groups
                     Variance Std.Dev. Corr
         Name
 child_id (Intercept) 108.25 10.404
                      21.03
                              4.586
                                       0.86
         wave
                      78.82
 Residual
                               8.878
Number of obs: 6454, groups: child_id, 2423
Fixed effects:
                       Estimate Std. Error
                                                   df t value
Pr(>|t|)
                                   1.20625 2631.80835
(Intercept)
                        5.57724
                                                       4.624
3.95e-06 ***
maleMale
                       -0.43307 0.34441 2422.77401 -1.257
0.20872
                      -1.45492 0.56249 2408.18575 -2.587
BL_sesLess poor
0.00975 **
```

```
-2.86877 0.56472 2417.68948 -5.080
BL sesMedian poor
4.06e-07 ***
                                   0.56588 2423.87810
BL sesPoor
                       -2.75643
                                                       -4.871
1.18e-06 ***
                                   0.55827 2412.78690
BL sesPoorest
                       -3.33438
                                                       -5.973
2.68e-09 ***
                                   0.10631 2437.22432
age child
                       -0.56904
                                                      -5.353
9.47e-08 ***
                        1.24669
                                   0.17099 2240.65712
                                                        7.291
4.24e-13 ***
lang3_swarefMijikenda
                       -0.47763
                                   0.49944 2433.57693
                                                       -0.956
0.33900
lang3_swarefKamba
                       -0.63267
                                   0.63982 2419.19480
                                                       -0.989
0.32285
BL_gll1_bgsnds
                       0.76136
                                   0.07523 2401.00616
                                                       10.120
< 2e-16 ***
BL_gl13_rcplang
                        0.35793
                                   0.04516 2441.11813 7.926
3.42e-15 ***
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
      lng3_M lng3_K BL_g1_
wave
maleMale
            0.008
BL_sesLsspr -0.237 -0.015
BL_sesMdnpr -0.262 -0.034 0.527
BL_sesPoor -0.231 -0.039 0.530 0.546
BL_sesPorst -0.223 -0.015 0.540 0.560 0.574
age_child -0.493 -0.105 -0.052 -0.093 -0.114
                                                -0.149
           0.198 -0.004 -0.003 -0.003 -0.001
                                                -0.005
                                                          0.004
wave
lng3_swrfMj -0.271 -0.015 -0.075 -0.063 -0.118
                                                -0.140
                                                         -0.126
-0.005
lng3_swrfKm -0.292 -0.022 -0.092 -0.024 -0.038
                                                -0.032
                                                          0.020
-0.007 0.619
BL_gll1_bgs -0.035 0.002 0.021 0.015 0.041
                                                 0.047
                                                         -0.151
0.000 - 0.022 - 0.018
BL_gll3_rcp -0.588 -0.099 0.074 0.142 0.127 0.141
                                                         -0.084
0.000 \quad 0.095 \quad 0.069 \quad -0.291
> model2_mijiref_lswa<-</pre>
lmer(lpm_swa~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_
rcplang) + lang3_swaref*(BL_gll1_bgsnds+BL_gll3_rcplang) + (1+wave|c
hild_id), data=kenyadata, na.action=na.omit)
> summary(model2_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
```

REML criterion at convergence: 49362.2

Scaled residuals:

Min 1Q Median 3Q Max -2.9907 -0.4458 -0.2188 0.2328 6.3108

Random effects:

222000		Estimate	Std. Error
df t value Pr(> t)			
(Intercept)		1.426e+00	2.577e+00
3.279e+03 0.554 0.579945			
maleMale		-4.288e-01	3.446e-01
2.418e+03 -1.245 0.213432			
BL_sesLess poor		-1.465e+00	5.637e-01
2.403e+03 -2.599 0.009403	* *		
BL_sesMedian poor		-2.886e+00	5.661e-01
2.412e+03 -5.098 3.69e-07	* * *		
BL_sesPoor		-2.768e+00	5.661e-01
2.419e+03 -4.889 1.08e-06	* * *		
BL_sesPoorest		-3.344e+00	5.588e-01
2.408e+03 -5.984 2.51e-09	***	5 555 04	4 066 04
age_child	* * *	-5.755e-01	1.066e-01
2.431e+03 -5.398 7.39e-08	* * *	1 ((7 004 - 01
wave	*	-1.665e+00	7.894e-01
2.260e+03 -2.110 0.035010	^	0 220- 01	2 225 2 01
BL_gll1_bgsnds 3.385e+03 3.727 0.000197	***	8.3290-01	2.235e-01
BL_gl13_rcplang		5.691e-01	1.344e-01
3.423e+03 4.235 2.35e-05	***	J.091e-01	1.3446-01
lang3_swarefMijikenda		1 7130-02	2.395e+00
2.483e+03 0.007 0.994297		1.7150 02	2.3330100
lang3_swarefKamba		-2.036e+00	3.139e+00
2.478e+03 -0.649 0.516652			

```
wave:BL_gll1_bgsnds
                                     6.837e-02 7.458e-02
2.234e+03
         0.917 0.359369
wave:BL_gl13_rcplang
                                     1.411e-01 4.425e-02
2.262e+03
          3.188 0.001450 **
BL qll1 bqsnds:lanq3 swarefMijikenda -1.022e-03 2.158e-01
2.415e+03 -0.005 0.996223
2.407e+03 0.609 0.542565
BL_gll3_rcplang:lang3_swarefMijikenda -2.630e-02 1.294e-01
2.464e+03 -0.203 0.838956
BL_gll3_rcplang:lang3_swarefKamba 2.791e-02 1.762e-01
2.463e+03 0.158 0.874136
____
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
                  if you need it
   vcov(x)
> model3_mijiref_lswa<-</pre>
lmer(lpm swa~male+BL ses+age child+wave*lang3 swaref*(BL gll1 bg
snds+BL_gl13_rcplang)+(1+wave|child_id), data=kenyadata,
na.action=na.omit)
> summary(model3_mijiref_lswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: lpm_swa ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 +
wave | child_id)
  Data: kenyadata
REML criterion at convergence: 49351.3
Scaled residuals:
            10 Median
   Min
                           3Q
                                  Max
-2.9890 -0.4470 -0.2163 0.2347 6.3087
Random effects:
Groups Name
                    Variance Std.Dev. Corr
child_id (Intercept) 106.91
                             10.340
                     20.28
                              4.503
         wave
                                      0.86
                     78.86
                              8.880
Residual
Number of obs: 6454, groups: child_id, 2423
Fixed effects:
```

	Estimate S	Std. Error
df t value $Pr(> t)$		
(Intercept)	1.49457	3.86768
2354.76127 0.386 0.69922		0.04460
maleMale	-0.42890	0.34468
2417.28450 -1.244 0.21349	1 47500	0 56201
BL_sesLess poor 2402.24954 -2.616 0.00896 **	-1.47503	0.56391
BL_sesMedian poor	-2.89600	0.56629
2411.27074 -5.114 3.40e-07 ***	-2.09000	0.30029
BL_sesPoor	-2.76440	0.56631
2418.20740 -4.881 1.12e-06 ***	2.70110	0.30031
BL_sesPoorest	-3.35051	0.55896
2407.02745 -5.994 2.35e-09 ***		
age_child	-0.57589	0.10666
2430.37706 -5.400 7.33e-08 ***		
wave	-1.68793	2.23351
2328.92051 -0.756 0.44989		
lang3_swarefMijikenda	0.72153	4.10259
2229.10077 0.176 0.86041		
lang3_swarefKamba	-4.22678	5.33583
2179.30193 -0.792 0.42836		
BL_gll1_bgsnds	1.52569	0.34508
2267.42717 4.421 1.03e-05 ***	0 45050	0.00010
BL_gll3_rcplang	0.45858	0.20848
2306.76102 2.200 0.02793 *	0 57227	0 41422
<pre>wave:lang3_swarefMijikenda 2317.89663 0.237 0.81230</pre>	0.57337	2.41433
wave:lang3_swarefKamba	-1.49384	3.12079
2247.89127 -0.479 0.63222	-1.49304	3.12079
wave:BL_gll1_bgsnds	0.56439	0.20156
2310.23689 2.800 0.00515 **	0.30133	0.20130
wave:BL_gl13_rcplang	0.06528	0.12227
2379.98787 0.534 0.59344		• • • • • • • • • • • • • • • • • • • •
lang3_swarefMijikenda:BL_gll1_bgsnds	-0.75361	0.37563
2249.05435 -2.006 0.04495 *		
lang3_swarefKamba:BL_gll1_bgsnds	-0.87847	0.49429
2243.74926 -1.777 0.07566 .		
	0.04395	0.22588
2283.55662 0.195 0.84576		
<u> </u>	0.34751	0.30400
2216.75441 1.143 0.25311	0 50000	0.04046
wave:lang3_swarefMijikenda:BL_gll1_bgsnds	-0.53893	0.21946
2293.12989 -2.456 0.01414 *	0 75570	0 20065
wave:lang3_swarefKamba:BL_gll1_bgsnds	-0.75578	0.28965
2287.63734 -2.609 0.00913 **		

```
wave:lang3_swarefMijikenda:BL_gll3_rcplang 0.04676
                                                         0.13258
2358.72317
            0.353 0.72433
wave:lang3_swarefKamba:BL_gl13_rcplang
                                             0.22546
                                                         0.17741
2276.35739
            1.271
                   0.20392
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE)
                              or
   vcov(x)
                   if you need it
>
>
anova (model 0 mijiref lswa, model 1 mijiref lswa, model 2 mijiref lsw
a, model3 mijiref lswa)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
+ (1 + wave | child id)
model1_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1 mijiref lswa:
                       BL_gl13_rcplang + (1 + wave | child_id)
model2_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
* (BL_gll1_bgsnds +
model2_mijiref_lswa:
                        BL_gl13_rcplang) + lang3_swaref *
(BL_gll1_bgsnds + BL_gll3_rcplang) +
model2_mijiref_lswa: (1 + wave | child_id)
model3_mijiref_lswa: lpm_swa ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3 mijiref 1swa:
                        BL_g113_rcplang) + (1 + wave)
child_id)
                   Df
                         AIC
                              BIC logLik deviance
                                                    Chisa Chi
Df Pr(>Chisq)
model0_mijiref_lswa 12 49599 49680 -24787
                                             49575
model1_mijiref_lswa 16 49383 49491 -24675
                                             49351 223.947
  < 2.2e-16 ***
model2_mijiref_1swa 22 49379 49528 -24668
                                             49335
                                                   15.495
    0.016740 *
model3_mijiref_1swa 28 49374 49564 -24659
                                             49318 17.072
   0.009024 **
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model3_mijiref_lswa, show.se=TRUE, show.std=TRUE)
Caution! ICC for random-slope-intercept models usually not
meaningful. Use `adjusted = TRUE` to use the mean random effect
variance to calculate the ICC. See 'Note' in `?icc`.
```

```
> ranova(model3_mijiref_lswa)
ANOVA-like table for random-effects: Single term deletions
Model:
lpm_swa ~ male + BL_ses + age_child + wave + lang3_swaref +
BL gll1 bgsnds +
   BL_gll3_rcplang + (1 + wave | child_id) + wave:lang3_swaref
   wave:BL_gll1_bgsnds + wave:BL_gll3_rcplang +
lang3_swaref:BL_gll1_bgsnds +
    lang3_swaref:BL_gll3_rcplang +
wave:lang3_swaref:BL_gll1_bgsnds +
   wave:lang3_swaref:BL_gl13_rcplang
                                                   LRT Df
                              npar logLik
                                            AIC
Pr(>Chisq)
                                28 -24676 49407
<none>
wave in (1 + wave | child_id) 26 -24816 49683 279.87 2 <
2.2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #DV: Swahili Word per Minute
> model0_mijiref_wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave+(1|child_id),
data=kenyadata, na.action=na.omit)
> summary(model0_mijiref_wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 49567.8
Scaled residuals:
             10 Median
                             3Q
                                    Max
-1.8890 -0.5755 -0.0990 0.4686
Random effects:
 Groups Name
                     Variance Std.Dev.
 child_id (Intercept) 46.03
                              6.785
 Residual
                      92.38
                               9.612
Number of obs: 6457, groups: child_id, 2423
Fixed effects:
                   Estimate Std. Error df t value
Pr(>|t|)
```

```
(Intercept)
2e-16 ***
maleMale
                   -0.56981
                              0.37136 2506.86077 -1.534
0.12506
                              0.60445\ 2495.27817\ -1.923
BL sesLess poor
                   -1.16223
0.05462 .
                              0.60300 2504.23258 -3.565
                   -2.14986
BL_sesMedian poor
0.00037 ***
                              0.60113 2520.67199 -5.232
BL_sesPoor
                   -3.14537
1.81e-07 ***
BL_sesPoorest
                   -3.61251 0.58800 2504.75430 -6.144
9.35e-10 ***
age_child
                   -0.00779
                              0.11132\ 2538.55023\ -0.070
0.94422
                    8.62175
                              0.14940 4453.56611 57.708 <
wave
2e-16 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '1
Correlation of Fixed Effects:
           (Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl
maleMale
           -0.083
BL_sesLsspr -0.296 -0.009
BL_sesMdnpr -0.256 -0.020 0.522
BL_sesPoor -0.230 -0.025 0.525 0.532
BL_sesPorst -0.207 0.001 0.538 0.547 0.553
age_child -0.849 -0.123 -0.040 -0.084 -0.114
                                               -0.155
                                               -0.006
            0.171 - 0.006 - 0.006 - 0.006 - 0.001
                                                         0.008
wave
> model1_mijiref_wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave+lang3_swaref+BL_gll1_bgs
nds+BL_gll3_rcplang+(1|child_id), data=kenyadata,
na.action=na.omit)
> summary(model1_mijiref_wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave +
lang3_swaref + BL_gll1_bgsnds +
                                  BL_g113_rcplang + (1 |
child id)
  Data: kenyadata
REML criterion at convergence: 49246.6
Scaled residuals:
            10 Median
   Min
                            3Q
                                  Max
-1.8942 -0.5782 -0.1130 0.4562 5.4436
```

Random effects:

Groups Name Variance Std.Dev. child_id (Intercept) 35.78 5.982 Residual 92.36 9.610

Number of obs: 6457, groups: child_id, 2423

Fixed effects:

	Estimate	Std. Error	df	t value
Pr(> t)				
(Intercept)	10.89499	1.21111	2613.14454	8.996
< 2e-16 ***				
maleMale	-0.98682	0.34875	2491.35259	-2.830
0.00470 **				
BL_sesLess poor	-0.44190	0.56939	2471.88746	-0.776
0.43777				
BL_sesMedian poor	-0.86432	0.57172	2484.57547	-1.512
0.13071				
BL_sesPoor	-1.54647	0.57367	2501.81061	-2.696
0.00707 **				
BL_sesPoorest	-1.79558	0.56525	2481.58503	-3.177
0.00151 **				
age_child	-0.30260	0.10788	2525.69931	-2.805
0.00507 **				
wave	8.62257	0.14907	4474.94122	57.842
< 2e-16 ***				
lang3_swarefMijikenda	-1.26423	0.50720	2525.62990	-2.493
0.01275 *				
lang3_swarefKamba	1.01687	0.64849	2497.83855	1.568
0.11700				
BL_gll1_bgsnds	1.06294	0.07617	2471.98933	13.955
< 2e-16 ***				
BL_gl13_rcplang	0.31611	0.04571	2511.92443	6.915
5.9e-12 ***				
Signif. codes: 0 ***'	0.001 *	*′ 0.01 `*′	0.05 \.' 0.	.1 \ ' 1

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

(Intr) maleMl BL_sLp BL_sMp BL_sesPr BL_ssPrs ag_chl lng3_M lng3_K BL_g1_ wave

0.008 maleMale

BL_sesLsspr -0.240 -0.016

BL_sesMdnpr -0.267 -0.035 0.528

BL_sesPoor -0.234 -0.039 0.531 0.546

BL_sesPorst -0.227 -0.016 0.541 0.561 0.574

age_child -0.499 -0.106 -0.050 -0.091 -0.112 -0.147

wave 0.137 -0.006 -0.005 -0.006 0.000 -0.005 0.009

```
lng3_swrfMj -0.276 -0.016 -0.073 -0.061 -0.117
                                                -0.137
                                                         -0.125
-0.011
lng3_swrfKm -0.298 -0.023 -0.089 -0.022 -0.037
                                                -0.031
                                                          0.021
-0.011 0.622
BL gll1 bgs -0.035 0.001 0.020 0.014 0.040
                                                0.045
                                                         -0.150
-0.002 -0.020 -0.016
BL_gll3_rcp -0.593 -0.097 0.073 0.142 0.127
                                                 0.141
                                                         -0.083
-0.001 0.094 0.069 -0.292
> model2_mijiref_wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave*(BL_gll1_bgsnds+BL_gll3_
rcplang)+lang3_swaref*(BL_gll1_bgsnds+BL_gll3_rcplang)+(1|child_
id), data=kenyadata, na.action=na.omit)
> summary(model2 mijiref wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave *
(BL_gll1_bgsnds +
    BL_gll3_rcplang) + lang3_swaref * (BL_gll1_bgsnds +
                       (1 | child id)
BL gll3 rcplang) +
  Data: kenyadata
REML criterion at convergence: 49044
Scaled residuals:
            10 Median
   Min
                            3Q
                                   Max
-2.2826 -0.5662 -0.0946 0.4227
                               5.5813
Random effects:
Groups
        Name
                     Variance Std.Dev.
 child_id (Intercept) 37.12
                              6.093
 Residual
                     87.91
                              9.376
Number of obs: 6457, groups: child_id, 2423
Fixed effects:
                                       Estimate Std. Error
df t value Pr(>|t|)
(Intercept)
                                       -1.37248
                                                   2.47606
3027.91612 -0.554
                  0.57941
maleMale
                                       -0.96866
                                                   0.34800
2487.90720 -2.784
                   0.00542 **
BL_sesLess poor
                                       -0.45711
                                                   0.56914
2468.03205
           -0.803
                   0.42196
```

-0.82089

-1.58671

0.57165

0.57238

BL_sesMedian poor

2497.73811 -2.772

BL sesPoor

2480.29942 -1.436 0.15113

0.00561 **

```
BL sesPoorest
                                       -1.81220
                                                   0.56426
2477.28771 -3.212 0.00134 **
                                                   0.10790
age child
                                       -0.29587
2520.27435 -2.742 0.00615 **
                                        0.28469
                                                   0.67610
wave
4499.73379 0.421 0.67372
                                        1.64660
                                                   0.21255
BL_gll1_bgsnds
            7.747 1.27e-14 ***
3088.61075
BL_gll3_rcplang
                                        0.80875
                                                   0.12819
            6.309 3.20e-10 ***
3151.06086
lang3_swarefMijikenda
                                        2.13945
                                                   2.41984
2582.26973
            0.884
                  0.37671
lang3_swarefKamba
                                        5.32833
                                                   3.16767
2553.41422
            1.682 0.09267 .
wave:BL_gll1_bgsnds
                                        0.63775
                                                   0.06377
4450.49313 10.001 < 2e-16 ***
wave:BL_gl13_rcplang
                                        0.27343
                                                   0.03781
            7.232 5.59e-13 ***
4485.05348
BL_gll1_bgsnds:lang3_swarefMijikenda
                                        0.14958
                                                   0.21853
2506.54881 0.684 0.49373
BL_gll1_bgsnds:lang3_swarefKamba
                                        0.03293
                                                   0.28959
2503.44808
          0.114 0.90949
BL_gll3_rcplang:lang3_swarefMijikenda
                                       -0.22174
                                                   0.13108
2574.71581 -1.692 0.09082 .
BL_gll3_rcplang:lang3_swarefKamba
                                       -0.23696
                                                   0.17830
2552.33540 -1.329 0.18395
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 18 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
> model3 mijiref wswa<-</pre>
lmer(wpm_swa~male+BL_ses+age_child+wave*lang3_swaref*(BL_gll1_bg
snds+BL gll3 rcplang)+(1|child id), data=kenyadata,
na.action=na.omit)
> summary(model3 mijiref wswa)
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: wpm_swa ~ male + BL_ses + age_child + wave *
lang3_swaref * (BL_gll1_bgsnds + BL_gll3_rcplang) + (1 |
child_id)
  Data: kenyadata
```

REML criterion at convergence: 49008.4

Scaled residuals:

Min 1Q Median 3Q Max -2.3244 -0.5612 -0.0878 0.4106 5.3970

Random effects:

Groups Name Variance Std.Dev. child_id (Intercept) 37.30 6.107
Residual 87.18 9.337

Number of obs: 6457, groups: child_id, 2423

		Estimate St	d. Error
df t value Pr(> t)			
(Intercept)		-0.3451	3.1823
5454.2469 -0.108 0.913635			
maleMale		-0.9659	0.3478
2488.1618 -2.778 0.005517	* *		
BL_sesLess poor		-0.4480	0.5688
2468.7057 -0.788 0.430964			
BL_sesMedian poor		-0.8245	0.5713
2480.7216 -1.443 0.149062			
BL_sesPoor		-1.5992	0.5720
2498.3123 -2.796 0.005217	* *		
BL_sesPoorest		-1.8316	0.5639
2477.8432 -3.248 0.001177	* *		
age_child		-0.2963	0.1078
2520.3338 -2.748 0.006039	* *		
wave		1.2600	1.9308
4609.7218 0.653 0.514052			
lang3_swarefMijikenda		0.5307	3.3373
5638.8538 0.159 0.873671			
lang3_swarefKamba		7.5703	4.3141
5536.4611 1.755 0.079352	•		
BL_gll1_bgsnds		1.2439	0.2781
5637.9371 4.472 7.88e-06	* * *		
BL_gl13_rcplang		0.9449	0.1690
5706.6909 5.591 2.36e-08	* * *		
<pre>wave:lang3_swarefMijikenda</pre>		-1.5114	2.0838
4592.4436 -0.725 0.468300			
<pre>wave:lang3_swarefKamba</pre>		2.0739	2.6768
4521.8992 0.775 0.438510			
wave:BL_gll1_bgsnds		0.2878	0.1718
4504.7309 1.675 0.093944	•		
wave:BL_gll3_rcplang		0.3880	0.1048
4598.5453 3.703 0.000215	* * *		

```
0.6314
lang3 swarefMijikenda:BL gll1 bgsnds
                                                        0.3026
           2.086 0.036987 *
5613.1353
lang3 swarefKamba:BL gll1 bgsnds
                                                        0.4003
                                             0.5094
5616.2678
          1.273 0.203225
lang3 swarefMijikenda:BL gll3 rcplang
                                                         0.1828
                                            -0.3825
5690.4596 -2.093 0.036406 *
lang3_swarefKamba:BL_gl13_rcplang
                                            -0.4848
                                                        0.2454
5592.6209 -1.975 0.048294 *
wave:lang3_swarefMijikenda:BL_gll1_bgsnds
                                            0.4227
                                                         0.1871
          2.259 0.023903 *
4492.1418
wave:lang3_swarefKamba:BL_gll1_bgsnds
                                            0.4122
                                                         0.2484
           1.660 0.097070 .
4490.1875
wave:lang3_swarefMijikenda:BL_gll3_rcplang
                                            -0.1375
                                                        0.1135
4578.3283 -1.211 0.225966
wave:lang3_swarefKamba:BL_gl13_rcplang
                                                         0.1516
                                            -0.2173
4520.1212 -1.434 0.151769
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation matrix not shown by default, as p = 24 > 12.
Use print(x, correlation=TRUE) or
   vcov(x)
                  if you need it
>
>
anova(model0_mijiref_wswa, model1_mijiref_wswa, model2_mijiref_wsw
a, model3_mijiref_wswa)
refitting model(s) with ML (instead of REML)
Data: kenyadata
Models:
model0_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
+ (1 | child_id)
model1_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
+ lang3_swaref + BL_gll1_bgsnds +
model1 mijiref wswa:
                       BL_gll3_rcplang + (1 | child_id)
model2_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
* (BL gll1 bgsnds +
model2 mijiref wswa:
                        BL_gl13_rcplang) + lang3_swaref *
(BL gll1 bgsnds + BL gll3 rcplang) +
model2 mijiref wswa:
                        (1 \mid child_id)
model3_mijiref_wswa: wpm_swa ~ male + BL_ses + age_child + wave
* lang3_swaref * (BL_gll1_bgsnds +
model3_mijiref_wswa:
                        BL_gll3_rcplang) + (1 | child_id)
                   Df
                        AIC BIC logLik deviance
                                                    Chisa Chi
Df Pr(>Chisq)
model0_mijiref_wswa 10 49583 49651 -24782
                                           49563
```

```
model1_mijiref_wswa 14 49262 49357 -24617 49234 329.023
4 < 2.2e-16 ***
model2_mijiref_wswa 20 49056 49192 -24508
                                           49016 218.077
6 < 2.2e-16 ***
model3 mijiref wswa 26 49025 49201 -24486
                                            48973 43.751
6 8.281e-08 ***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> tab_model(model3_mijiref_wswa, show.se=TRUE, show.std=TRUE)
> ranova(model3_mijiref_wswa)
ANOVA-like table for random-effects: Single term deletions
Model:
wpm_swa ~ male + BL_ses + age_child + wave + lang3_swaref +
BL gll1 bgsnds +
    BL_gll3_rcplang + (1 | child_id) + wave:lang3_swaref +
wave:BL_gll1_bgsnds +
   wave:BL_gll3_rcplang + lang3_swaref:BL_gll1_bgsnds +
lang3_swaref:BL_gll3_rcplang +
   wave:lang3 swaref:BL gll1 bgsnds +
wave:lang3_swaref:BL_gll3_rcplang
              npar logLik AIC
                                  LRT Df Pr(>Chisq)
                26 -24504 49060
<none>
(1 | child_id) 25 -24765 49580 522.01 1 < 2.2e-16 ***
___
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```