Mixed MANOVA Report

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Mixed MANOVA structure:
Repeated measures: G1, G2, G3
Between factor: sex

Between-subject MANOVA - Pillai:
    source  Df     Pillai approx F num Df den Df     Pr(>F)
       sex   1 0.01823501 3.993345      3    645 0.00780821
 Residuals 647         NA       NA     NA     NA         NA

Between-subject MANOVA - Wilks:
    source  Df    Wilks approx F num Df den Df     Pr(>F)
       sex   1 0.981765 3.993345      3    645 0.00780821
 Residuals 647       NA       NA     NA     NA         NA

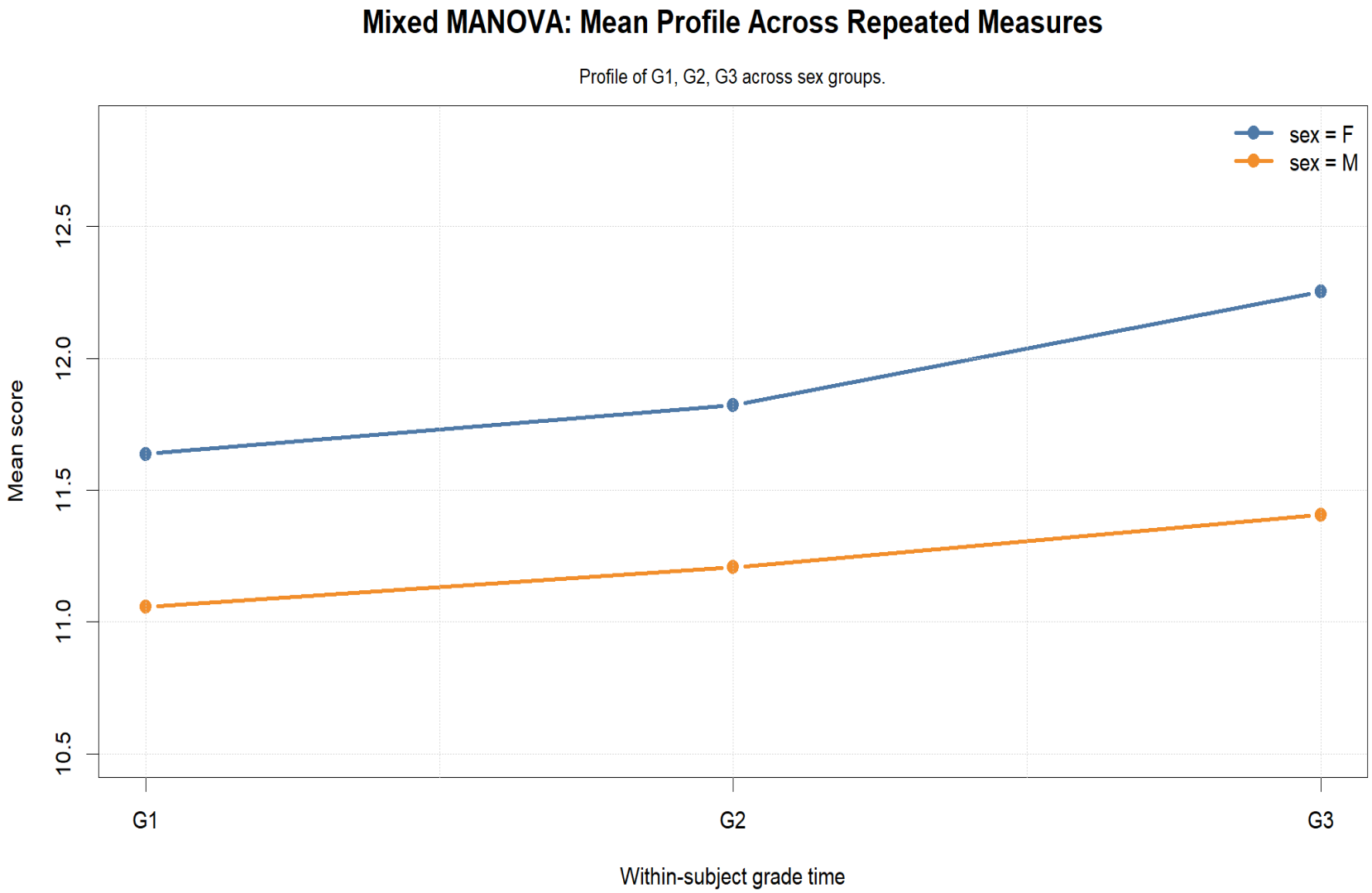
Profile/change-score MANOVA - Pillai:
    source  Df      Pillai approx F num Df den Df     Pr(>F)
       sex   1 0.008517143  2.77467      2    646 0.06311356
 Residuals 647          NA       NA     NA     NA         NA

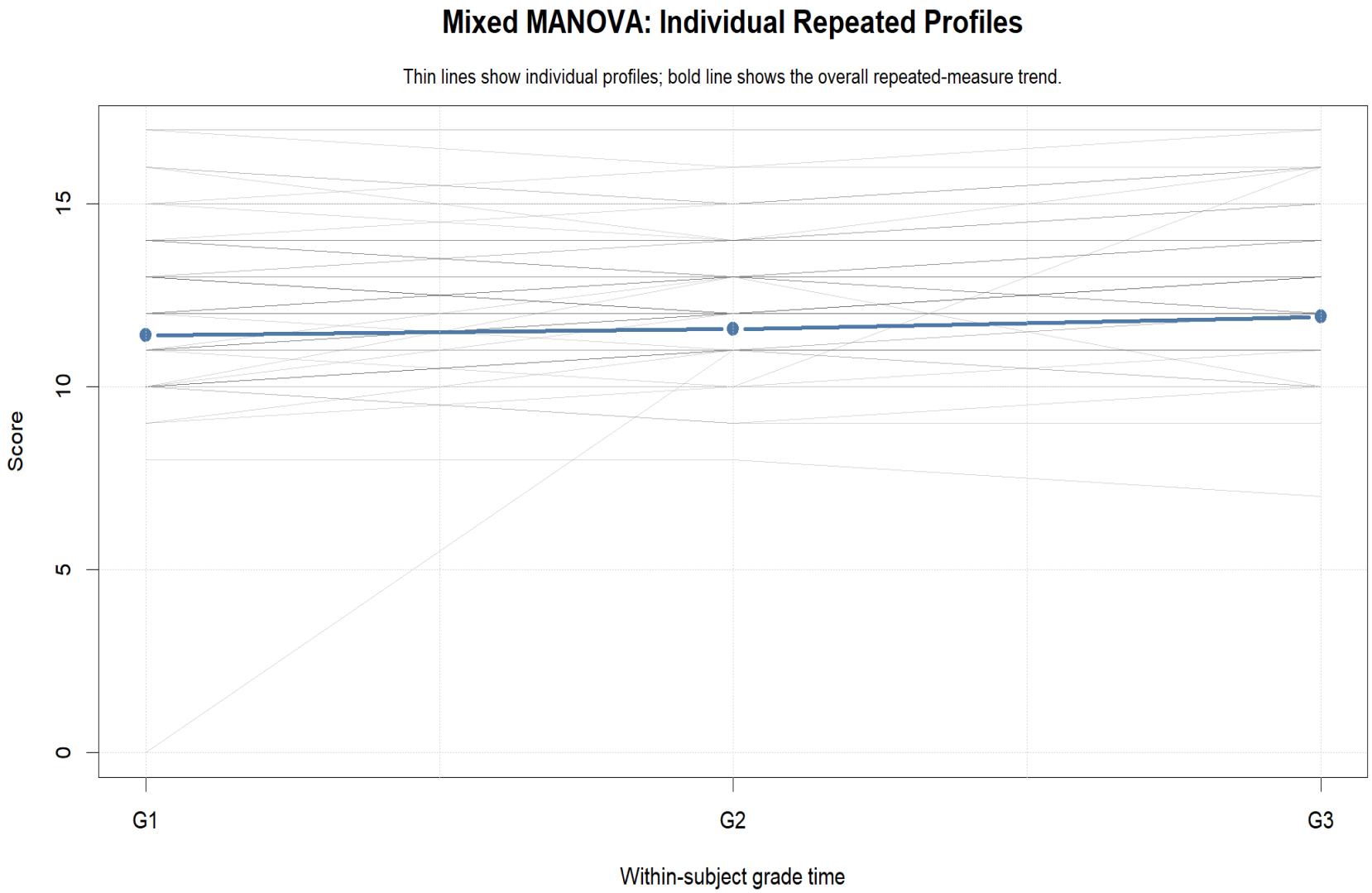
Repeated long-format follow-up:

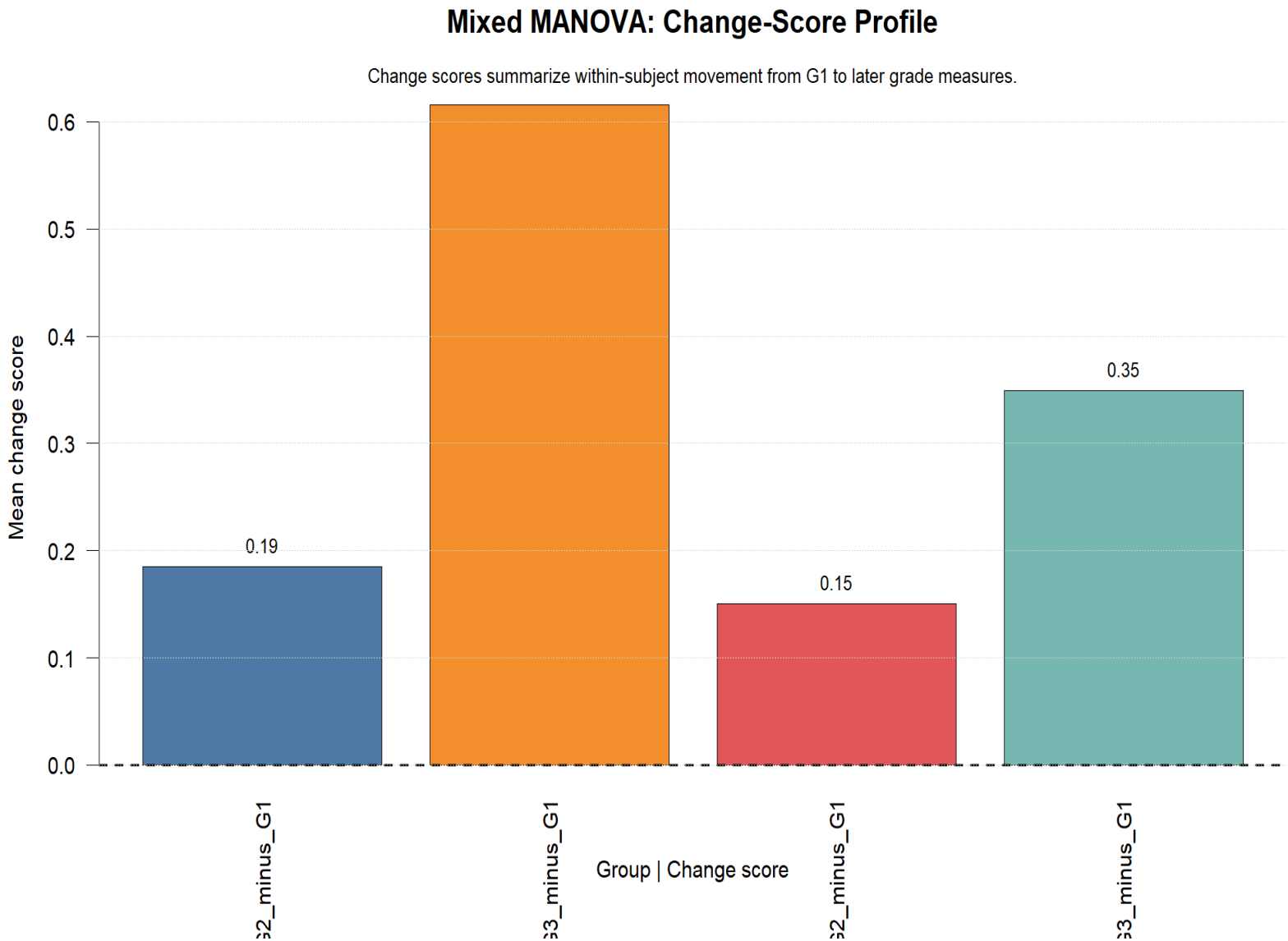
Error: subject_id
              Df Sum Sq Mean Sq F value  Pr(>F)
between_group   1    219  218.53   9.188 0.00253 **
Residuals     647  15388   23.78
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

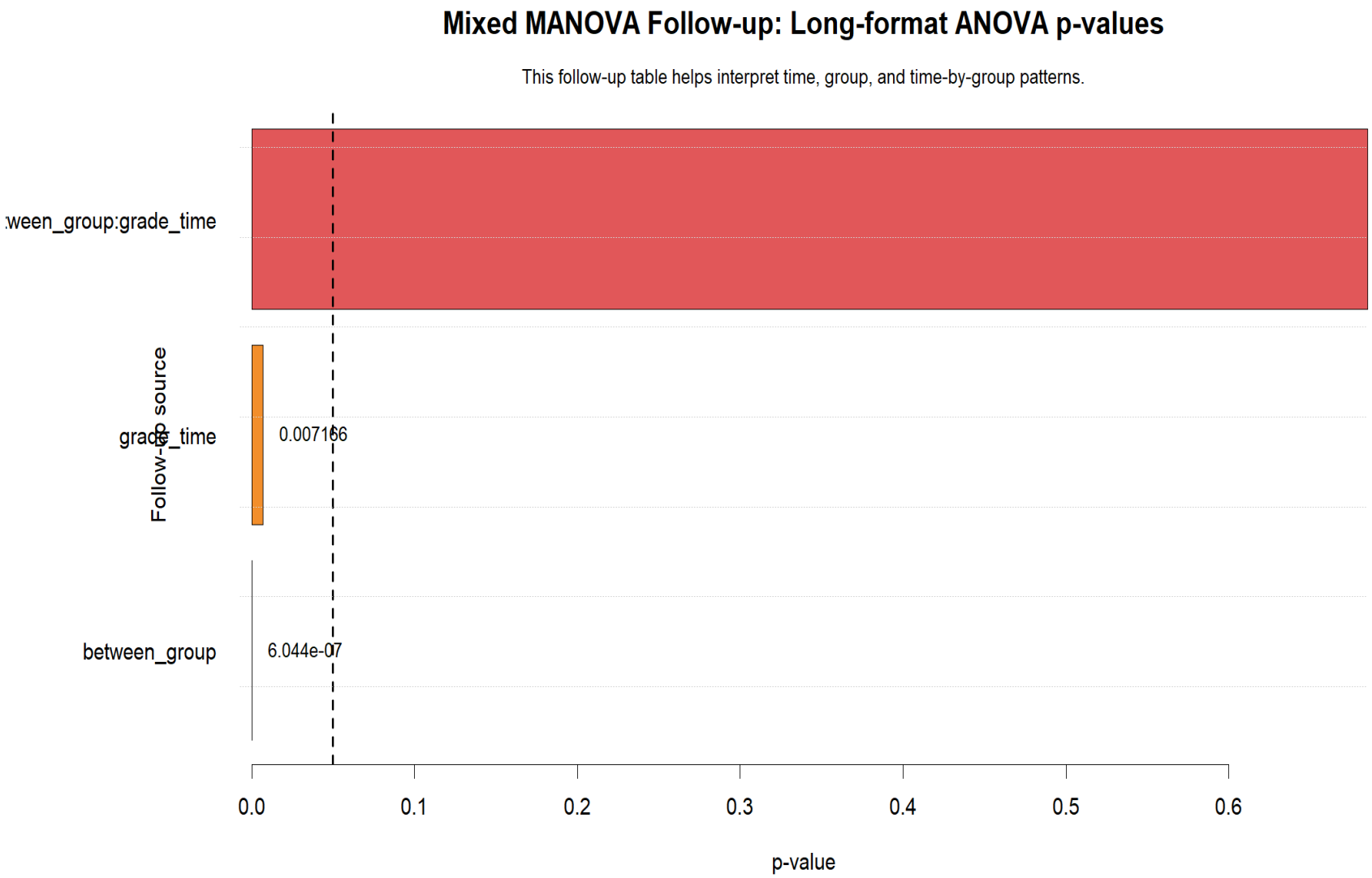
Error: subject_id:grade_time
                           Df Sum Sq Mean Sq F value   Pr(>F)
grade_time                  2   86.3   43.17  36.386 4.23e-16 ***
between_group:grade_time    2    6.6    3.29   2.777   0.0626 .
Residuals                1294 1535.1    1.19
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

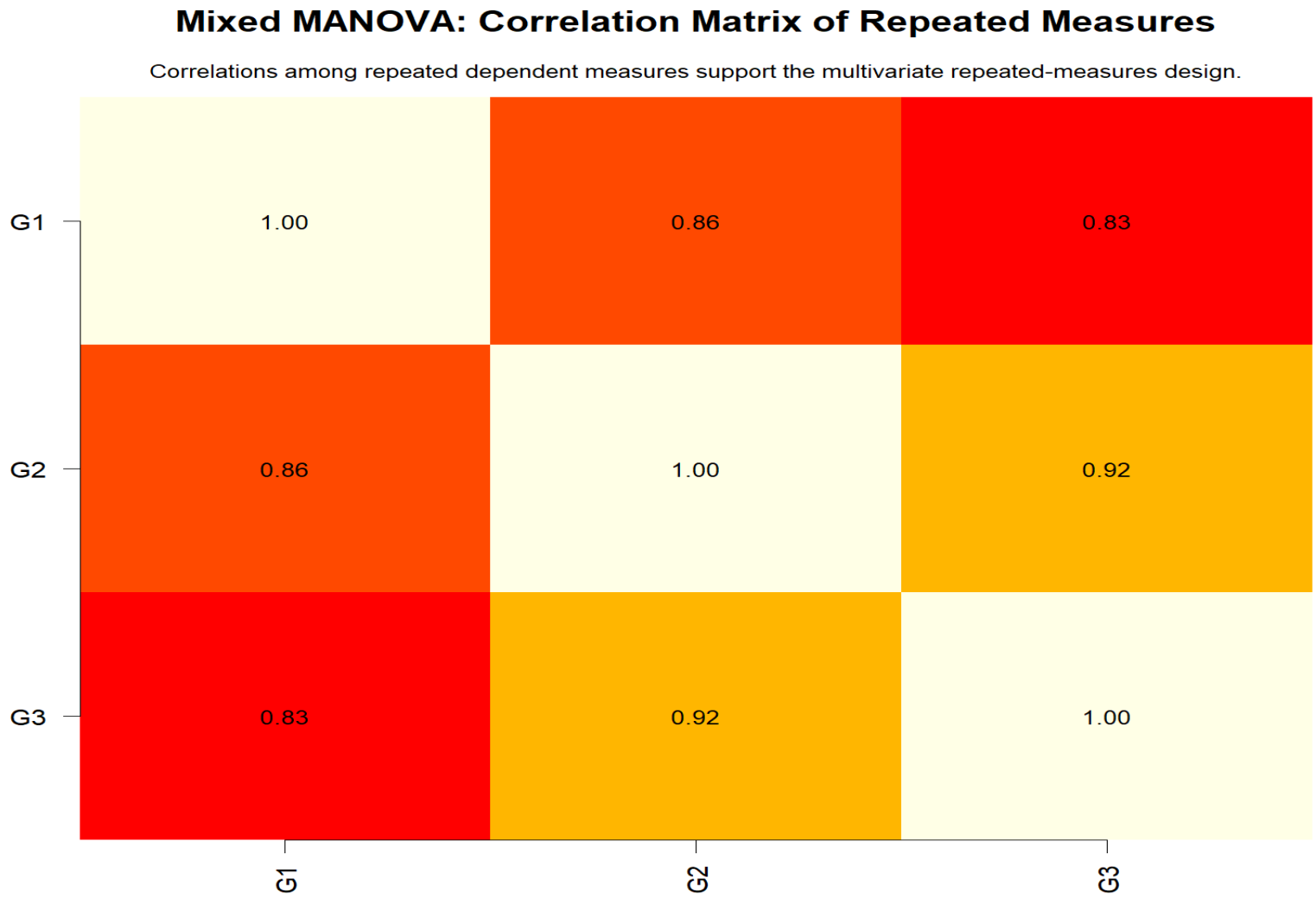
Group/time summary:
 group grade_time   n     mean median standard_deviation minimum maximum
     F         G1 383 11.63708     12           2.794232       0      19
     M         G1 266 11.05639     11           2.640865       4      18
     F         G2 383 11.82245     12           2.967506       0      19
     M         G2 266 11.20677     11           2.800019       0      18
     F         G3 383 12.25326     12           3.124147       0      19
     M         G3 266 11.40602     11           3.320690       0      19
```

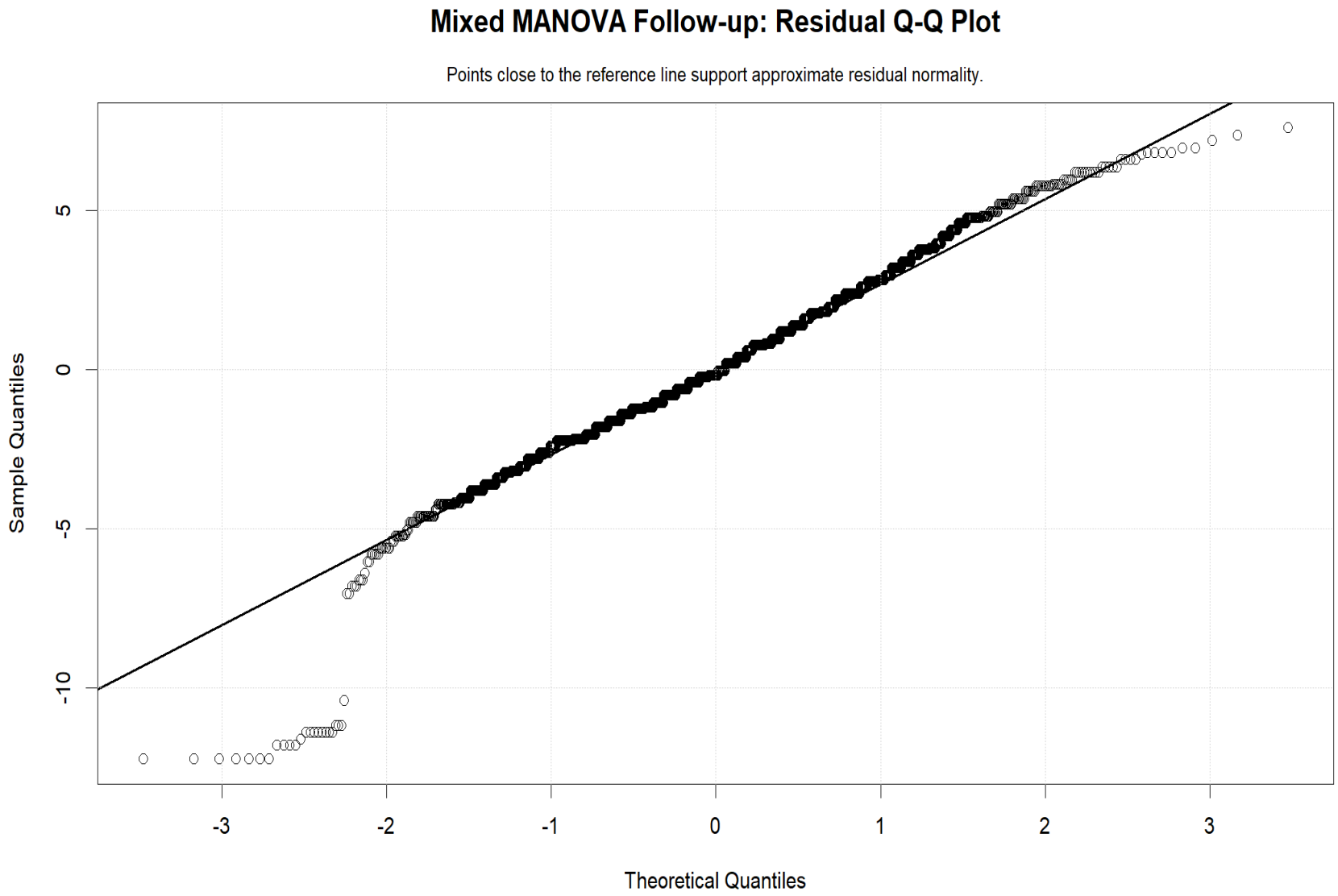

Mixed MANOVA: Mean Profile Across Repeated Measures
Profile of G1, G2, G3 across sex groups.
sex = F
sex = M
Mean score
12.5
12.0
11.5
11.0
10.5
G1
G2
G3
Within-subject grade time


Mixed MANOVA: Individual Repeated Profiles
Thin lines show individual profiles; bold line shows the overall repeated-measure trend.
Score
0
5
10
15
G1
G2
G3
Within-subject grade time


Mixed MANOVA: Change-Score Profile
Change scores summarize within-subject movement from G1 to later grade measures.
Mean change score
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.19
0.35
0.15
Group | Change score


Mixed MANOVA Follow-up: Long-format ANOVA p-values
This follow-up table helps interpret time, group, and time-by-group patterns.
:ween_group:grade_time
grade_time
between_group
Follow-up source
0.007166
6.044e-07
0.0
0.1
0.2
0.3
0.4
0.5
0.6
p-value


Mixed MANOVA: Correlation Matrix of Repeated Measures
Correlations among repeated dependent measures support the multivariate repeated-measures design.
G1
G2
G3
1.00
0.86
0.83
0.86
1.00
0.92
0.83
0.92
1.00
G1
G2
G3


Mixed MANOVA Follow-up: Residual Q-Q Plot
Points close to the reference line support approximate residual normality.
Sample Quantiles
5
0
-5
-10
-3
-2
-1
0
1
2
3
Theoretical Quantiles