```
NEW FILE.
  49  0 M>  NEW FILE.

  50  0 M>

  51  0 M>
* ============================================================.
  52  0 M>  * ============================================================.
* 1. Import student-por.csv.
  53  0 M>  * 1. Import student-por.csv.
* If your clean CSV is comma-separated, change DELIMITERS=";" to DELIMITERS=",
".
  54  0 M>  * If your clean CSV is comma-separated, change DELIMITERS=";" to D
ELIMITERS=",".
* ============================================================.
  55  0 M>  * ============================================================.

  56  0 M>
GET DATA
  57  0 M>  GET DATA
  /TYPE=TXT
  58  0 M>    /TYPE=TXT
  /FILE="D:\low kda score priority basis posts\first post\Greenhouse Geisser C
orrection\student-por.csv"
  59  0 M>    /FILE="D:\low kda score priority basis posts\first post\Greenhou
se Geisser Correction\student-por.csv"
  /ENCODING='UTF8'
  60  0 M>    /ENCODING='UTF8'
  /DELCASE=LINE
  61  0 M>    /DELCASE=LINE
  /DELIMITERS=";"
  62  0 M>    /DELIMITERS=";"
  /QUALIFIER='"'
  63  0 M>    /QUALIFIER='"'
  /ARRANGEMENT=DELIMITED
  64  0 M>    /ARRANGEMENT=DELIMITED
  /FIRSTCASE=2
  65  0 M>    /FIRSTCASE=2
  /DATATYPEMIN PERCENTAGE=95.0
  66  0 M>    /DATATYPEMIN PERCENTAGE=95.0
  /VARIABLES=
  67  0 M>    /VARIABLES=
```

```
  school A12
68  0 M>      school A12
  sex A8
69  0 M>      sex A8
  age F8.0
70  0 M>      age F8.0
  address A8
71  0 M>      address A8
  famsize A8
72  0 M>      famsize A8
  Pstatus A8
73  0 M>      Pstatus A8
  Medu F8.0
74  0 M>      Medu F8.0
  Fedu F8.0
75  0 M>      Fedu F8.0
  Mjob A20
76  0 M>      Mjob A20
  Fjob A20
77  0 M>      Fjob A20
  reason A20
78  0 M>      reason A20
  guardian A20
79  0 M>      guardian A20
  traveltime F8.0
80  0 M>      traveltime F8.0
  studytime F8.0
81  0 M>      studytime F8.0
  failures F8.0
82  0 M>      failures F8.0
  schoolsup A8
83  0 M>      schoolsup A8
  famsup A8
84  0 M>      famsup A8
  paid A8
85  0 M>      paid A8
  activities A8
86  0 M>      activities A8
  nursery A8
87  0 M>      nursery A8
  higher A8
88  0 M>      higher A8
```

```
    internet A8
  89  0 M>      internet A8
    romantic A8
  90  0 M>      romantic A8
    famrel F8.0
  91  0 M>      famrel F8.0
    freetime F8.0
  92  0 M>      freetime F8.0
    goout F8.0
  93  0 M>      goout F8.0
    Dalc F8.0
  94  0 M>      Dalc F8.0
    Walc F8.0
  95  0 M>      Walc F8.0
    health F8.0
  96  0 M>      health F8.0
    absences F8.0
  97  0 M>      absences F8.0
    G1 F8.0
  98  0 M>      G1 F8.0
    G2 F8.0
  99  0 M>      G2 F8.0
    G3 F8.0.
 100  0 M>      G3 F8.0.
CACHE.
 101  0 M>  CACHE.
EXECUTE.
 102  0 M>  EXECUTE.

 103  0 M>
DATASET NAME GreenhouseGeisserWide WINDOW=FRONT.
 104  0 M>  DATASET NAME GreenhouseGeisserWide WINDOW=FRONT.

 105  0 M>
VARIABLE LABELS
 106  0 M>  VARIABLE LABELS
  G1 "First period grade"
 107  0 M>    G1 "First period grade"
  G2 "Second period grade"
 108  0 M>    G2 "Second period grade"
  G3 "Final grade"
 109  0 M>    G3 "Final grade"
```

```
  studytime "Study time group"
 110  0 M>    studytime "Study time group"
  failures "Number of past class failures"
 111  0 M>    failures "Number of past class failures"
  absences "School absences".
 112  0 M>    absences "School absences".

 113  0 M>
FORMATS G1 G2 G3 (F8.2).
 114  0 M>  FORMATS G1 G2 G3 (F8.2).

 115  0 M>

 116  0 M>
* ============================================================.
 117  0 M>  * ============================================================.
* 2. Keep complete repeated-measures cases.
 118  0 M>  * 2. Keep complete repeated-measures cases.
* ============================================================.
 119  0 M>  * ============================================================.

 120  0 M>
COMPUTE case_id = $CASENUM.
 121  0 M>  COMPUTE case_id = $CASENUM.
VARIABLE LABELS case_id "Case ID for repeated-measures analysis".
 122  0 M>  VARIABLE LABELS case_id "Case ID for repeated-measures analysis".
FORMATS case_id (F8.0).
 123  0 M>  FORMATS case_id (F8.0).

 124  0 M>
SELECT IF (NOT MISSING(G1) AND NOT MISSING(G2) AND NOT MISSING(G3)).
 125  0 M>  SELECT IF (NOT MISSING(G1) AND NOT MISSING(G2) AND NOT MISSING(G3)
).
EXECUTE.
 126  0 M>  EXECUTE.

 127  0 M>
SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav"
 128  0 M>  SAVE OUTFILE="D:\low kda score priority basis posts\first post\Gre
enhouse Geisser Correction\SPSS\greenhouse_geisser_cor
               rection_spss_clean_data.sav"
```

```
  /COMPRESSED.
 129  0 M>    /COMPRESSED.

 130  0 M>

 131  0 M>
* ============================================================.
 132  0 M>  * ============================================================.
* 3. Basic sample check and descriptive statistics.
 133  0 M>  * 3. Basic sample check and descriptive statistics.
* ============================================================.
 134  0 M>  * ============================================================.

 135  0 M>
TITLE "Greenhouse Geisser Correction SPSS Analysis: Sample Check".
 136  0 M>  TITLE "Greenhouse Geisser Correction SPSS Analysis: Sample Check".
```

```
 137  0 M>
FREQUENCIES VARIABLES=G1 G2 G3
 138  0 M>  FREQUENCIES VARIABLES=G1 G2 G3
  /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM
 139  0 M>    /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM
  /ORDER=ANALYSIS.
 140  0 M>    /ORDER=ANALYSIS.
```

Frequencies

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=G1 G2 G3 /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

```
[GreenhouseGeisserWide] D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
```

Warnings

No cases were input to this procedure. Either there are none in the working data file or all of them have been filtered out.
Execution of this command stops.

```
 141  0 M>
DESCRIPTIVES VARIABLES=G1 G2 G3
 142  0 M>  DESCRIPTIVES VARIABLES=G1 G2 G3
  /STATISTICS=MEAN STDDEV MIN MAX.
 143  0 M>    /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=G1 G2 G3 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Warnings

No cases were input to this procedure. Either there are none in the working data file or all of them have been filtered out.

Execution of this command stops.

```
 144  0 M>

 145  0 M>
* ============================================================.
 146  0 M>  * ============================================================.
* 4. Pairwise difference variables for sphericity explanation.
 147  0 M>  * 4. Pairwise difference variables for sphericity explanation.
* ============================================================.
 148  0 M>  * ============================================================.

 149  0 M>
COMPUTE diff_G2_G1 = G2 - G1.
 150  0 M>  COMPUTE diff_G2_G1 = G2 - G1.
COMPUTE diff_G3_G1 = G3 - G1.
 151  0 M>  COMPUTE diff_G3_G1 = G3 - G1.
COMPUTE diff_G3_G2 = G3 - G2.
 152  0 M>  COMPUTE diff_G3_G2 = G3 - G2.

 153  0 M>
VARIABLE LABELS
 154  0 M>  VARIABLE LABELS
  diff_G2_G1 "Paired difference: G2 minus G1"
 155  0 M>    diff_G2_G1 "Paired difference: G2 minus G1"
  diff_G3_G1 "Paired difference: G3 minus G1"
 156  0 M>    diff_G3_G1 "Paired difference: G3 minus G1"
  diff_G3_G2 "Paired difference: G3 minus G2".
 157  0 M>    diff_G3_G2 "Paired difference: G3 minus G2".

 158  0 M>
EXECUTE.
 159  0 M>  EXECUTE.

 160  0 M>
TITLE "Pairwise Difference Variances for Sphericity Check".
```

```
161  0 M>  TITLE "Pairwise Difference Variances for Sphericity Check".
```

```
 162  0 M>
DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2
 163  0 M>  DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2
  /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
 164  0 M>    /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
```

Descriptives

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2 /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Warnings

No cases were input to this procedure. Either there are none in the working data file or all of them have been filtered out.
Execution of this command stops.

```
 165  0 M>
T-TEST PAIRS=G2 WITH G1 (PAIRED)
 166  0 M>  T-TEST PAIRS=G2 WITH G1 (PAIRED)
             G3 WITH G1 (PAIRED)
 167  0 M>               G3 WITH G1 (PAIRED)
             G3 WITH G2 (PAIRED)
 168  0 M>               G3 WITH G2 (PAIRED)
  /CRITERIA=CI(.9500)
 169  0 M>    /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
 170  0 M>    /MISSING=ANALYSIS.
```

T-Test

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.

Notes

Syntax		T-TEST PAIRS=G2 WITH G1 (PAIRED) G3 WITH G1 (PAIRED) G3 WITH G2 (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.00

Warnings

The Paired Samples Correlations table is not produced.

The Paired Samples Test table is not produced.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Second period grade	.	0[a]	.	.
	First period grade	.	0[a]	.	.
Pair 2	Final grade	.	0[a]	.	.
	First period grade	.	0[a]	.	.
Pair 3	Final grade	.	0[a]	.	.
	Second period grade	.	0[a]	.	.

a. The correlation and t cannot be computed because there are no valid pairs.

```
 171  0 M>

 172  0 M>
* ============================================================.
 173  0 M>  * ============================================================.
* 5. Main repeated-measures ANOVA.
 174  0 M>  * 5. Main repeated-measures ANOVA.
* SPSS will show:
 175  0 M>  * SPSS will show:
* - Mauchly's Test of Sphericity.
```

```
 176  0 M>  * - Mauchly's Test of Sphericity.
* - Sphericity assumed.
 177  0 M>  * - Sphericity assumed.
* - Greenhouse-Geisser correction.
 178  0 M>  * - Greenhouse-Geisser correction.
* - Huynh-Feldt correction.
 179  0 M>  * - Huynh-Feldt correction.
* - Lower-bound correction.
 180  0 M>  * - Lower-bound correction.
* ============================================================.
 181  0 M>  * ============================================================.

 182  0 M>
TITLE "Repeated-Measures ANOVA with Greenhouse Geisser Correction".
 183  0 M>  TITLE "Repeated-Measures ANOVA with Greenhouse Geisser Correction"
.
```

```
 184  0 M>
GLM G1 G2 G3
 185  0 M>  GLM G1 G2 G3
  /WSFACTOR=GradeTime 3 Polynomial
 186  0 M>    /WSFACTOR=GradeTime 3 Polynomial
  /MEASURE=Grade
 187  0 M>    /MEASURE=Grade
  /METHOD=SSTYPE(3)
 188  0 M>    /METHOD=SSTYPE(3)
  /PLOT=PROFILE(GradeTime)
 189  0 M>    /PLOT=PROFILE(GradeTime)
  /EMMEANS=TABLES(GradeTime) COMPARE ADJ(BONFERRONI)
 190  0 M>    /EMMEANS=TABLES(GradeTime) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
 191  0 M>    /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
 192  0 M>    /CRITERIA=ALPHA(.05)
  /WSDESIGN=GradeTime.
 193  0 M>    /WSDESIGN=GradeTime.
```

General Linear Model

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		GLM G1 G2 G3 /WSFACTOR=GradeTime 3 Polynomial /MEASURE=Grade /METHOD=SSTYPE(3) /PLOT=PROFILE (GradeTime) /EMMEANS=TABLES (GradeTime) COMPARE ADJ(BONFERRONI) /PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=GradeTime.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

Warnings

No cases were input to this procedure. Either there are none in the working data file or all of them were filtered out.
Execution of this command stops.

Within-Subjects Factors

Measure: Grade

GradeTime	Dependent Variable
1	G1
2	G2
3	G3

```
 194  0 M>

 195  0 M>
* ============================================================.
 196  0 M>  * ============================================================.
* 6. Boxplots for G1, G2 and G3 distributions.
 197  0 M>  * 6. Boxplots for G1, G2 and G3 distributions.
* ============================================================.
 198  0 M>  * ============================================================.

 199  0 M>
TITLE "G1, G2 and G3 Grade Distributions".
 200  0 M>  TITLE "G1, G2 and G3 Grade Distributions".
```

```
 201  0 M>
EXAMINE VARIABLES=G1 G2 G3
 202  0 M>  EXAMINE VARIABLES=G1 G2 G3
  /PLOT=BOXPLOT
 203  0 M>    /PLOT=BOXPLOT
  /STATISTICS=DESCRIPTIVES
 204  0 M>    /STATISTICS=DESCRIPTIVES
  /CINTERVAL=95
 205  0 M>    /CINTERVAL=95
  /MISSING=LISTWISE
 206  0 M>    /MISSING=LISTWISE
  /NOTOTAL.
 207  0 M>    /NOTOTAL.
```

Explore

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_clean_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.

Notes

Syntax		EXAMINE VARIABLES=G1 G2 G3 /PLOT=BOXPLOT /STATISTICS=DESCRIPTIVES /CINTERVAL=95 /MISSING=LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Warnings

There are no valid cases. Statistics cannot be computed.

```
 208  0 M>

 209  0 M>
* ============================================================.
 210  0 M>  * ============================================================.
* 7. Reshape to long format for repeated-measure graphics.
 211  0 M>  * 7. Reshape to long format for repeated-measure graphics.
* ============================================================.
 212  0 M>  * ============================================================.

 213  0 M>
DATASET COPY GreenhouseGeisserLong.
 214  0 M>  DATASET COPY GreenhouseGeisserLong.
DATASET ACTIVATE GreenhouseGeisserLong.
 215  0 M>  DATASET ACTIVATE GreenhouseGeisserLong.

 216  0 M>
VARSTOCASES
 217  0 M>  VARSTOCASES
  /MAKE Grade FROM G1 G2 G3
 218  0 M>    /MAKE Grade FROM G1 G2 G3
  /INDEX=GradeTime
 219  0 M>    /INDEX=GradeTime
  /KEEP=case_id
```

```
220  0 M>    /KEEP=case_id
 /NULL=KEEP.
221  0 M>    /NULL=KEEP.
```

Variables to Cases

Notes

Output Created		31-MAY-2026 21:12:28
Comments		
Input	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		VARSTOCASES /MAKE Grade FROM G1 G2 G3 /INDEX=GradeTime /KEEP=case_id /NULL=KEEP.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

```
[GreenhouseGeisserLong]
```

Generated Variables

Name	Label
GradeTime	<none>
Grade	First period grade

Processing Statistics

Variables In	37
Variables Out	3

```
 222  0 M>
VALUE LABELS GradeTime
 223  0 M>  VALUE LABELS GradeTime
  1 "G1"
```

```
 224  0 M>    1 "G1"
  2 "G2"
 225  0 M>    2 "G2"
  3 "G3".
 226  0 M>    3 "G3".

 227  0 M>
VARIABLE LABELS
 228  0 M>  VARIABLE LABELS
  Grade "Repeated grade score"
 229  0 M>    Grade "Repeated grade score"
  GradeTime "Repeated grade measure".
 230  0 M>    GradeTime "Repeated grade measure".

 231  0 M>
EXECUTE.
 232  0 M>  EXECUTE.

 233  0 M>
SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\SPSS\greenhouse_geisser_correction_spss_long_data.sav"
 234  0 M>  SAVE OUTFILE="D:\low kda score priority basis posts\first post\Gre
enhouse Geisser Correction\SPSS\greenhouse_geisser_cor
               rection_spss_long_data.sav"
  /COMPRESSED.
 235  0 M>    /COMPRESSED.

 236  0 M>

 237  0 M>
* ============================================================.
 238  0 M>  * ============================================================.
* 8. Mean profile chart in long format.
 239  0 M>  * 8. Mean profile chart in long format.
* ============================================================.
 240  0 M>  * ============================================================.

 241  0 M>
TITLE "Mean Grade Trajectory Across G1, G2 and G3".
```

```
242  0 M>  TITLE "Mean Grade Trajectory Across G1, G2 and G3".
```

```
 243  0 M>
GGRAPH
 244  0 M>  GGRAPH
  /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade
 245  0 M>    /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade
  /GRAPHSPEC SOURCE=INLINE.
 246  0 M>    /GRAPHSPEC SOURCE=INLINE.
BEGIN GPL
  SOURCE: s=userSource(id("meanprofile"))
  DATA: GradeTime=col(source(s), name("GradeTime"), unit.category())
  DATA: Grade=col(source(s), name("Grade"))
  GUIDE: axis(dim(1), label("Repeated grade measure"))
  GUIDE: axis(dim(2), label("Mean grade"))
  GUIDE: text.title(label("Mean G1, G2 and G3 Grades"))
  ELEMENT: line(position(GradeTime*summary.mean(Grade)))
  ELEMENT: point(position(GradeTime*summary.mean(Grade)))
END GPL.
```

GGraph

Notes

Output Created		31-MAY-2026 21:12:29
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_long_data.sav
	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	3

Notes

Syntax		GGRAPH /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade /GRAPHSPEC SOURCE=INLINE. BEGIN GPL SOURCE: s=userSource (id("meanprofile")) DATA: GradeTime=col (source(s), name ("GradeTime"), unit. category()) DATA: Grade=col(source (s), name("Grade")) GUIDE: axis(dim(1), label ("Repeated grade measure")) GUIDE: axis(dim(2), label ("Mean grade")) GUIDE: text.title(label ("Mean G1, G2 and G3 Grades")) ELEMENT: line(position (GradeTime*summary. mean(Grade))) ELEMENT: point(position (GradeTime*summary. mean(Grade))) END GPL.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

[GreenhouseGeisserLong] D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_long_data.sav

Warnings

No data to graph because all values of filter field have been excluded.
Execution of this command stops.
There are no valid cases. Statistics cannot be computed.

247 0 M>

```
 248  0 M>
* ============================================================.
 249  0 M>  * ============================================================.
* 9. Long-format boxplot.
 250  0 M>  * 9. Long-format boxplot.
* ============================================================.
 251  0 M>  * ============================================================.

 252  0 M>
TITLE "Repeated Grade Distribution by Time Point".
 253  0 M>  TITLE "Repeated Grade Distribution by Time Point".
```

```
 254  0 M>
GGRAPH
 255  0 M>  GGRAPH
  /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade
 256  0 M>    /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade
  /GRAPHSPEC SOURCE=INLINE.
 257  0 M>    /GRAPHSPEC SOURCE=INLINE.
BEGIN GPL
  SOURCE: s=userSource(id("boxdata"))
  DATA: GradeTime=col(source(s), name("GradeTime"), unit.category())
  DATA: Grade=col(source(s), name("Grade"))
  GUIDE: axis(dim(1), label("Repeated grade measure"))
  GUIDE: axis(dim(2), label("Grade"))
  GUIDE: text.title(label("G1, G2 and G3 Grade Distributions"))
  ELEMENT: schema(position(bin.quantile.letter(GradeTime*Grade)))
END GPL.
```

GGraph

Notes

Output Created		31-MAY-2026 21:12:29
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_long_data.sav
	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	3

Repeated Grade Distribution by Time Point

Notes

Syntax		GGRAPH /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade /GRAPHSPEC SOURCE=INLINE. BEGIN GPL SOURCE: s=userSource (id("boxdata")) DATA: GradeTime=col (source(s), name ("GradeTime"), unit. category()) DATA: Grade=col(source (s), name("Grade")) GUIDE: axis(dim(1), label ("Repeated grade measure")) GUIDE: axis(dim(2), label ("Grade")) GUIDE: text.title(label ("G1, G2 and G3 Grade Distributions")) ELEMENT: schema (position(bin.quantile.letter (GradeTime*Grade))) END GPL.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

Warnings

No data to graph because all values of filter field have been excluded.
Execution of this command stops.
There are no valid cases. Statistics cannot be computed.

```
 258  0 M>

 259  0 M>
* ============================================================.
 260  0 M>  * ============================================================.
* 10. Return to wide dataset for final save and export.
```

```
 261  0 M>  * 10. Return to wide dataset for final save and export.
* ============================================================.
 262  0 M>  * ============================================================.

 263  0 M>
DATASET ACTIVATE GreenhouseGeisserWide.
 264  0 M>  DATASET ACTIVATE GreenhouseGeisserWide.

 265  0 M>
TITLE "Final Greenhouse Geisser Correction SPSS Output".
 266  0 M>  TITLE "Final Greenhouse Geisser Correction SPSS Output".
```

```
 267  0 M>
SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\SPSS\greenhouse_geisser_correction_spss_final_wide_data.sav"
 268  0 M>  SAVE OUTFILE="D:\low kda score priority basis posts\first post\Gre
enhouse Geisser Correction\SPSS\greenhouse_geisser_cor
              rection_spss_final_wide_data.sav"
  /COMPRESSED.
 269  0 M>    /COMPRESSED.

 270  0 M>

 271  0 M>
* ============================================================.
 272  0 M>  * ============================================================.
* 11. Export complete SPSS output to PDF and SPV.
 273  0 M>  * 11. Export complete SPSS output to PDF and SPV.
* ============================================================.
 274  0 M>  * ============================================================.

 275  0 M>
OUTPUT SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhou
se Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.spv".
 276  0 M>  OUTPUT SAVE OUTFILE="D:\low kda score priority basis posts\first p
ost\Greenhouse Geisser Correction\SPSS\Greenhouse-Geis
              ser-Correction-SPSS-output.spv".

 277  0 M>
OUTPUT EXPORT
 278  0 M>  OUTPUT EXPORT
  /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
 279  0 M>    /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
  /PDF DOCUMENTFILE="D:\low kda score priority basis posts\first post\Greenhou
se Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.pdf"
 280  0 M>    /PDF DOCUMENTFILE="D:\low kda score priority basis posts\first p
ost\Greenhouse Geisser Correction\SPSS\Greenhouse-Geis
              ser-Correction-SPSS-output.pdf"
  EMBEDBOOKMARKS=YES
 281  0 M>    EMBEDBOOKMARKS=YES
  EMBEDFONTS=YES.
```

```
282  0 M>    EMBEDFONTS=YES.
```

Output Export

Notes

Output Created		31-MAY-2026 21:12:29
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_spss_final_wide_data.sav
	Active Dataset	GreenhouseGeisserWide
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	0
Syntax		OUTPUT EXPORT /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING /PDF DOCUMENTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.pdf" EMBEDBOOKMARKS=YES...
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:04.86

Notes

Files Saved	Viewer	Document2
	Document File	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.pdf
	Image File Count	0

Export Summary

Viewer	Document2
Document File	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.pdf

```
 283  0 M>
EXECUTE.
 284  0 M>  EXECUTE.

 285  0 M>
* ============================================================.
 286  0 M>  * ============================================================.
* End of SPSS transcript.
 287  0 M>  * End of SPSS transcript.
* ============================================================.
 288  0 M>  * ============================================================.
* ============================================================.
 291  0 M>  * ============================================================.
* Greenhouse-Geisser Correction SPSS syntax using clean CSV.
 292  0 M>  * Greenhouse-Geisser Correction SPSS syntax using clean CSV.
* First run Greenhouse_Geisser_Clean_Data_and_SPSS.py.
 293  0 M>  * First run Greenhouse_Geisser_Clean_Data_and_SPSS.py.
* It creates this clean CSV:
 294  0 M>  * It creates this clean CSV:
* D:\low kda score priority basis posts\first post\Greenhouse Geisser Correcti
on\student_por_greenhouse_geisser_clean.csv
```

```
 295  0 M>  * D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\student_por_greenhouse_geisser_clean.cs
              v
* ============================================================.
 296  0 M>  * ============================================================.

 297  0 M>
GET DATA
 298  0 M>  GET DATA
 /TYPE=TXT
 299  0 M>   /TYPE=TXT
 /FILE="D:\low kda score priority basis posts\first post\Greenhouse Geisser Co
rrection\student_por_greenhouse_geisser_clean.csv"
 300  0 M>   /FILE="D:\low kda score priority basis posts\first post\Greenhous
e Geisser Correction\student_por_greenhouse_geisser_cl
              ean.csv"
 /ENCODING='UTF8'
 301  0 M>   /ENCODING='UTF8'
 /DELCASE=LINE
 302  0 M>   /DELCASE=LINE
 /DELIMITERS=","
 303  0 M>   /DELIMITERS=","
 /QUALIFIER='"'
 304  0 M>   /QUALIFIER='"'
 /ARRANGEMENT=DELIMITED
 305  0 M>   /ARRANGEMENT=DELIMITED
 /FIRSTCASE=2
 306  0 M>   /FIRSTCASE=2
 /DATATYPEMIN PERCENTAGE=95.0
 307  0 M>   /DATATYPEMIN PERCENTAGE=95.0
 /VARIABLES=
 308  0 M>   /VARIABLES=
 case_id F8.0
 309  0 M>   case_id F8.0
 school A12
 310  0 M>   school A12
 sex A8
 311  0 M>   sex A8
 age F8.0
```

```
312  0 M>   age F8.0
address A8
313  0 M>   address A8
famsize A8
314  0 M>   famsize A8
Pstatus A8
315  0 M>   Pstatus A8
Medu F8.0
316  0 M>   Medu F8.0
Fedu F8.0
317  0 M>   Fedu F8.0
Mjob A20
318  0 M>   Mjob A20
Fjob A20
319  0 M>   Fjob A20
reason A20
320  0 M>   reason A20
guardian A20
321  0 M>   guardian A20
traveltime F8.0
322  0 M>   traveltime F8.0
studytime F8.0
323  0 M>   studytime F8.0
failures F8.0
324  0 M>   failures F8.0
schoolsup A8
325  0 M>   schoolsup A8
famsup A8
326  0 M>   famsup A8
paid A8
327  0 M>   paid A8
activities A8
328  0 M>   activities A8
nursery A8
329  0 M>   nursery A8
higher A8
330  0 M>   higher A8
internet A8
331  0 M>   internet A8
```

```
 romantic A8
 332  0 M>   romantic A8
 famrel F8.0
 333  0 M>   famrel F8.0
 freetime F8.0
 334  0 M>   freetime F8.0
 goout F8.0
 335  0 M>   goout F8.0
 Dalc F8.0
 336  0 M>   Dalc F8.0
 Walc F8.0
 337  0 M>   Walc F8.0
 health F8.0
 338  0 M>   health F8.0
 absences F8.0
 339  0 M>   absences F8.0
 G1 F8.0
 340  0 M>   G1 F8.0
 G2 F8.0
 341  0 M>   G2 F8.0
 G3 F8.0.
 342  0 M>   G3 F8.0.
CACHE.
 343  0 M>  CACHE.
EXECUTE.
 344  0 M>  EXECUTE.

 345  0 M>
DATASET NAME GreenhouseGeisserClean WINDOW=FRONT.
 346  0 M>  DATASET NAME GreenhouseGeisserClean WINDOW=FRONT.

 347  0 M>
VARIABLE LABELS
 348  0 M>  VARIABLE LABELS
 case_id "Case ID for repeated-measures analysis"
 349  0 M>   case_id "Case ID for repeated-measures analysis"
 G1 "First period grade"
 350  0 M>   G1 "First period grade"
 G2 "Second period grade"
```

```
 351  0 M>   G2 "Second period grade"
 G3 "Final grade"
 352  0 M>   G3 "Final grade"
 studytime "Study time group"
 353  0 M>   studytime "Study time group"
 failures "Number of past class failures"
 354  0 M>   failures "Number of past class failures"
 absences "School absences".
 355  0 M>   absences "School absences".

 356  0 M>
FORMATS case_id age Medu Fedu traveltime studytime failures famrel freetime go
out Dalc Walc health absences (F8.0).
 357  0 M>  FORMATS case_id age Medu Fedu traveltime studytime failures famrel
 freetime goout Dalc Walc health absences (F8.0).
FORMATS G1 G2 G3 (F8.2).
 358  0 M>  FORMATS G1 G2 G3 (F8.2).
EXECUTE.
 359  0 M>  EXECUTE.

 360  0 M>
TITLE "Greenhouse Geisser Correction SPSS Analysis: Clean Data Sample Check".
 361  0 M>  TITLE "Greenhouse Geisser Correction SPSS Analysis: Clean Data Sam
ple Check".

>Warning # 2003.  Command name: TITLE
>The title given exceeds 60 characters in length.  The first 60 characters wil
l
>be used.
```

```
FREQUENCIES VARIABLES=G1 G2 G3
 362  0 M>  FREQUENCIES VARIABLES=G1 G2 G3
 /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM
 363  0 M>   /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM
 /ORDER=ANALYSIS.
 364  0 M>   /ORDER=ANALYSIS.
```

Frequencies

Notes

Output Created		31-MAY-2026 21:20:12
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=G1 G2 G3 /STATISTICS=MEAN MEDIAN STDDEV MINIMUM MAXIMUM /ORDER=ANALYSIS.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

```
[GreenhouseGeisserClean]
```

Statistics

		First period grade	Second period grade	Final grade
N	Valid	649	649	649
	Missing	0	0	0
Mean		11.3991	11.5701	11.9060
Median		11.0000	11.0000	12.0000
Std. Deviation		2.74527	2.91364	3.23066
Minimum		.00	.00	.00
Maximum		19.00	19.00	19.00

Frequency Table

First period grade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	.2	.2	.2
	4.00	2	.3	.3	.5
	5.00	5	.8	.8	1.2
	6.00	9	1.4	1.4	2.6
	7.00	33	5.1	5.1	7.7
	8.00	42	6.5	6.5	14.2
	9.00	65	10.0	10.0	24.2
	10.00	95	14.6	14.6	38.8
	11.00	91	14.0	14.0	52.9
	12.00	82	12.6	12.6	65.5
	13.00	72	11.1	11.1	76.6
	14.00	71	10.9	10.9	87.5
	15.00	35	5.4	5.4	92.9
	16.00	22	3.4	3.4	96.3
	17.00	16	2.5	2.5	98.8
	18.00	7	1.1	1.1	99.8
	19.00	1	.2	.2	100.0
	Total	649	100.0	100.0	

Second period grade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	1.1	1.1	1.1
	5.00	3	.5	.5	1.5
	6.00	7	1.1	1.1	2.6
	7.00	16	2.5	2.5	5.1
	8.00	40	6.2	6.2	11.2
	9.00	72	11.1	11.1	22.3
	10.00	83	12.8	12.8	35.1
	11.00	103	15.9	15.9	51.0
	12.00	86	13.3	13.3	64.3
	13.00	80	12.3	12.3	76.6
	14.00	54	8.3	8.3	84.9
	15.00	38	5.9	5.9	90.8
	16.00	25	3.9	3.9	94.6
	17.00	20	3.1	3.1	97.7
	18.00	14	2.2	2.2	99.8
	19.00	1	.2	.2	100.0
	Total	649	100.0	100.0	

Final grade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	15	2.3	2.3	2.3
	1.00	1	.2	.2	2.5
	5.00	1	.2	.2	2.6
	6.00	3	.5	.5	3.1
	7.00	10	1.5	1.5	4.6
	8.00	35	5.4	5.4	10.0
	9.00	35	5.4	5.4	15.4
	10.00	97	14.9	14.9	30.4
	11.00	104	16.0	16.0	46.4
	12.00	72	11.1	11.1	57.5
	13.00	82	12.6	12.6	70.1
	14.00	63	9.7	9.7	79.8
	15.00	49	7.6	7.6	87.4
	16.00	36	5.5	5.5	92.9
	17.00	29	4.5	4.5	97.4
	18.00	15	2.3	2.3	99.7
	19.00	2	.3	.3	100.0
	Total	649	100.0	100.0	

```
 365  0 M>
DESCRIPTIVES VARIABLES=G1 G2 G3
 366  0 M>  DESCRIPTIVES VARIABLES=G1 G2 G3
 /STATISTICS=MEAN STDDEV MIN MAX.
 367  0 M>   /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Notes

Output Created		31-MAY-2026 21:20:12
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=G1 G2 G3 /STATISTICS=MEAN STDDEV MIN MAX.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
First period grade	649	.00	19.00	11.3991	2.74527
Second period grade	649	.00	19.00	11.5701	2.91364
Final grade	649	.00	19.00	11.9060	3.23066
Valid N (listwise)	649				

```
 368  0 M>
COMPUTE diff_G2_G1 = G2 - G1.
 369  0 M>  COMPUTE diff_G2_G1 = G2 - G1.
COMPUTE diff_G3_G1 = G3 - G1.
 370  0 M>  COMPUTE diff_G3_G1 = G3 - G1.
```

```
COMPUTE diff_G3_G2 = G3 - G2.
 371  0 M>  COMPUTE diff_G3_G2 = G3 - G2.
VARIABLE LABELS
 372  0 M>  VARIABLE LABELS
 diff_G2_G1 "Paired difference: G2 minus G1"
 373  0 M>   diff_G2_G1 "Paired difference: G2 minus G1"
 diff_G3_G1 "Paired difference: G3 minus G1"
 374  0 M>   diff_G3_G1 "Paired difference: G3 minus G1"
 diff_G3_G2 "Paired difference: G3 minus G2".
 375  0 M>   diff_G3_G2 "Paired difference: G3 minus G2".
EXECUTE.
 376  0 M>  EXECUTE.

 377  0 M>
TITLE "Pairwise Difference Variances for Sphericity Check".
 378  0 M>  TITLE "Pairwise Difference Variances for Sphericity Check".
```

```
DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2
 379  0 M>  DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2
 /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
 380  0 M>   /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
```

Descriptives

Notes

Output Created		31-MAY-2026 21:20:12
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=diff_G2_G1 diff_G3_G1 diff_G3_G2 /STATISTICS=MEAN STDDEV VARIANCE MIN MAX.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Paired difference: G2 minus G1	649	-9.00	11.00	.1710	1.47929	2.188
Paired difference: G3 minus G1	649	-11.00	11.00	.5069	1.82076	3.315
Paired difference: G3 minus G2	649	-9.00	6.00	.3359	1.27824	1.634
Valid N (listwise)	649					

```
 381  0 M>
T-TEST PAIRS=G2 WITH G1 (PAIRED)
 382  0 M>  T-TEST PAIRS=G2 WITH G1 (PAIRED)
 G3 WITH G1 (PAIRED)
 383  0 M>   G3 WITH G1 (PAIRED)
 G3 WITH G2 (PAIRED)
 384  0 M>   G3 WITH G2 (PAIRED)
 /CRITERIA=CI(.9500)
 385  0 M>   /CRITERIA=CI(.9500)
 /MISSING=ANALYSIS.
 386  0 M>   /MISSING=ANALYSIS.
```

T-Test

Notes

Output Created		31-MAY-2026 21:20:12
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST PAIRS=G2 WITH G1 (PAIRED) G3 WITH G1 (PAIRED) G3 WITH G2 (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

Pairwise Difference Variances for Sphericity Check

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Second period grade	11.5701	649	2.91364	.11437
	First period grade	11.3991	649	2.74527	.10776
Pair 2	Final grade	11.9060	649	3.23066	.12681
	First period grade	11.3991	649	2.74527	.10776
Pair 3	Final grade	11.9060	649	3.23066	.12681
	Second period grade	11.5701	649	2.91364	.11437

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Second period grade & First period grade	649	.865	.000
Pair 2	Final grade & First period grade	649	.826	.000
Pair 3	Final grade & Second period grade	649	.919	.000

Paired Samples Test

		Paired Differences			
					95% Confidence ...
		Mean	Std. Deviation	Std. Error Mean	Lower
Pair 1	Second period grade - First period grade	.17103	1.47929	.05807	.05701
Pair 2	Final grade - First period grade	.50693	1.82076	.07147	.36659
Pair 3	Final grade - Second period grade	.33590	1.27824	.05018	.23738

Pairwise Difference Variances for Sphericity Check

Paired Samples Test

		Paired ... 95% Confidence Interval of the ... Upper	t	df	Sig. (2-tailed)
Pair 1	Second period grade - First period grade	.28505	2.945	648	.003
Pair 2	Final grade - First period grade	.64728	7.093	648	.000
Pair 3	Final grade - Second period grade	.43443	6.695	648	.000

```
 387  0 M>
TITLE "Repeated-Measures ANOVA with Greenhouse Geisser Correction".
 388  0 M>  TITLE "Repeated-Measures ANOVA with Greenhouse Geisser Correction"
.
```

```
GLM G1 G2 G3
 389  0 M>  GLM G1 G2 G3
 /WSFACTOR=GradeTime 3 Polynomial
 390  0 M>   /WSFACTOR=GradeTime 3 Polynomial
 /MEASURE=Grade
 391  0 M>   /MEASURE=Grade
 /METHOD=SSTYPE(3)
 392  0 M>   /METHOD=SSTYPE(3)
 /PLOT=PROFILE(GradeTime)
 393  0 M>   /PLOT=PROFILE(GradeTime)
 /EMMEANS=TABLES(GradeTime) COMPARE ADJ(BONFERRONI)
 394  0 M>   /EMMEANS=TABLES(GradeTime) COMPARE ADJ(BONFERRONI)
 /PRINT=DESCRIPTIVE ETASQ OPOWER
 395  0 M>   /PRINT=DESCRIPTIVE ETASQ OPOWER
 /CRITERIA=ALPHA(.05)
 396  0 M>   /CRITERIA=ALPHA(.05)
 /WSDESIGN=GradeTime.
 397  0 M>   /WSDESIGN=GradeTime.
```

General Linear Model

Notes

Output Created		31-MAY-2026 21:20:12
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		GLM G1 G2 G3 /WSFACTOR=GradeTime 3 Polynomial /MEASURE=Grade /METHOD=SSTYPE(3) /PLOT=PROFILE (GradeTime) /EMMEANS=TABLES (GradeTime) COMPARE ADJ(BONFERRONI) /PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=GradeTime.
Resources	Processor Time	00:00:03.81
	Elapsed Time	00:00:01.90

Within-Subjects Factors

Measure: Grade

GradeTime	Dependent Variable
1	G1
2	G2
3	G3

Descriptive Statistics

	Mean	Std. Deviation	N
First period grade	11.3991	2.74527	649
Second period grade	11.5701	2.91364	649
Final grade	11.9060	3.23066	649

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
GradeTime	Pillai's Trace	.085	29.882[b]	2.000	647.000	.000
	Wilks' Lambda	.915	29.882[b]	2.000	647.000	.000
	Hotelling's Trace	.092	29.882[b]	2.000	647.000	.000
	Roy's Largest Root	.092	29.882[b]	2.000	647.000	.000

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[c]
GradeTime	Pillai's Trace	.085	59.763	1.000
	Wilks' Lambda	.085	59.763	1.000
	Hotelling's Trace	.085	59.763	1.000
	Roy's Largest Root	.085	59.763	1.000

a. Design: Intercept
Within Subjects Design: GradeTime

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: Grade

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
GradeTime	.827	122.814	2	.000	.853

Mauchly's Test of Sphericity[a]

Measure: Grade

Within Subjects Effect	Epsilon[b] Huynh-Feldt	Lower-bound
GradeTime	.855	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: GradeTime

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: Grade

Source		Type III Sum of Squares	df	Mean Square	F
GradeTime	Sphericity Assumed	86.331	2	43.165	36.287
	Greenhouse-Geisser	86.331	1.705	50.628	36.287
	Huynh-Feldt	86.331	1.709	50.509	36.287
	Lower-bound	86.331	1.000	86.331	36.287
Error(GradeTime)	Sphericity Assumed	1541.669	1296	1.190	
	Greenhouse-Geisser	1541.669	1104.961	1.395	
	Huynh-Feldt	1541.669	1107.581	1.392	
	Lower-bound	1541.669	648.000	2.379	

Tests of Within-Subjects Effects

Measure: Grade

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
GradeTime	Sphericity Assumed	.000	.053	72.574	1.000
	Greenhouse-Geisser	.000	.053	61.876	1.000
	Huynh-Feldt	.000	.053	62.023	1.000
	Lower-bound	.000	.053	36.287	1.000
Error(GradeTime)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: Grade

Source	GradeTime	Type III Sum of Squares	df	Mean Square	F	Sig.
GradeTime	Linear	83.391	1	83.391	50.309	.000
	Quadratic	2.940	1	2.940	4.075	.044
Error(GradeTime)	Linear	1074.109	648	1.658		
	Quadratic	467.560	648	.722		

Tests of Within-Subjects Contrasts

Measure: Grade

Source	GradeTime	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
GradeTime	Linear	.072	50.309	1.000
	Quadratic	.006	4.075	.522
Error(GradeTime)	Linear			
	Quadratic			

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: Grade

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	263121.703	1	263121.703	10925.261	.000	.944
Error	15606.297	648	24.084			

Tests of Between-Subjects Effects

Measure: Grade

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	10925.261	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

GradeTime

Estimates

Measure: Grade

GradeTime	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	11.399	.108	11.187	11.611
2	11.570	.114	11.346	11.795
3	11.906	.127	11.657	12.155

Pairwise Comparisons

Measure: Grade

(I) GradeTime	(J) GradeTime	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.171*	.058	.010	-.310	-.032
	3	-.507*	.071	.000	-.678	-.335
2	1	.171*	.058	.010	.032	.310
	3	-.336*	.050	.000	-.456	-.215
3	1	.507*	.071	.000	.335	.678
	2	.336*	.050	.000	.215	.456

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.085	29.882[a]	2.000	647.000	.000	.085
Wilks' lambda	.915	29.882[a]	2.000	647.000	.000	.085
Hotelling's trace	.092	29.882[a]	2.000	647.000	.000	.085
Roy's largest root	.092	29.882[a]	2.000	647.000	.000	.085

Multivariate Tests

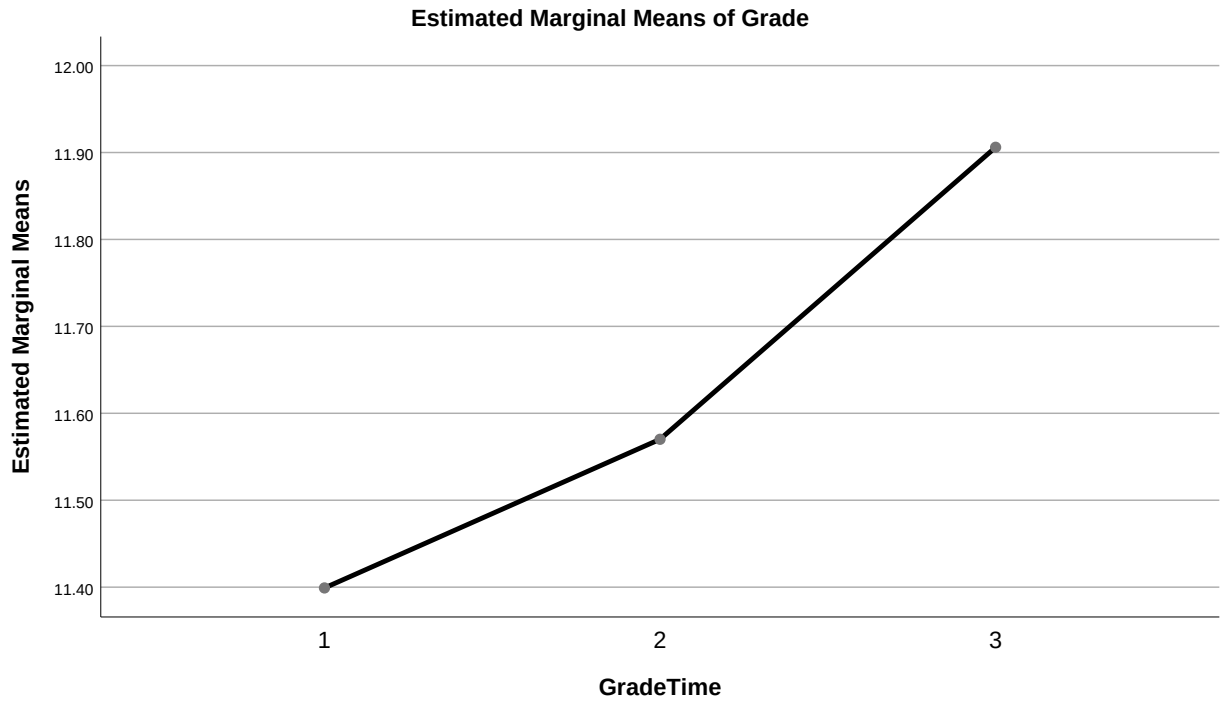
	Noncent. Parameter	Observed Power[b]
Pillai's trace	59.763	1.000
Wilks' lambda	59.763	1.000
Hotelling's trace	59.763	1.000
Roy's largest root	59.763	1.000

Each F tests the multivariate effect of GradeTime. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

Profile Plots




```
 398  0 M>
TITLE "G1, G2 and G3 Grade Distributions".
 399  0 M>  TITLE "G1, G2 and G3 Grade Distributions".
```

```
EXAMINE VARIABLES=G1 G2 G3
 400  0 M>  EXAMINE VARIABLES=G1 G2 G3
 /PLOT=BOXPLOT
 401  0 M>   /PLOT=BOXPLOT
 /STATISTICS=DESCRIPTIVES
 402  0 M>   /STATISTICS=DESCRIPTIVES
 /CINTERVAL=95
 403  0 M>   /CINTERVAL=95
 /MISSING=LISTWISE
 404  0 M>   /MISSING=LISTWISE
 /NOTOTAL.
 405  0 M>   /NOTOTAL.
```

Explore

Notes

Output Created		31-MAY-2026 21:20:14
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	649
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.

G1, G2 and G3 Grade Distributions

Notes

Syntax		EXAMINE VARIABLES=G1 G2 G3 /PLOT=BOXPLOT /STATISTICS=DESCRIPTIVES /CINTERVAL=95 /MISSING=LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:00.72
	Elapsed Time	00:00:00.61

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
First period grade	649	100.0%	0	0.0%	649	100.0%
Second period grade	649	100.0%	0	0.0%	649	100.0%
Final grade	649	100.0%	0	0.0%	649	100.0%

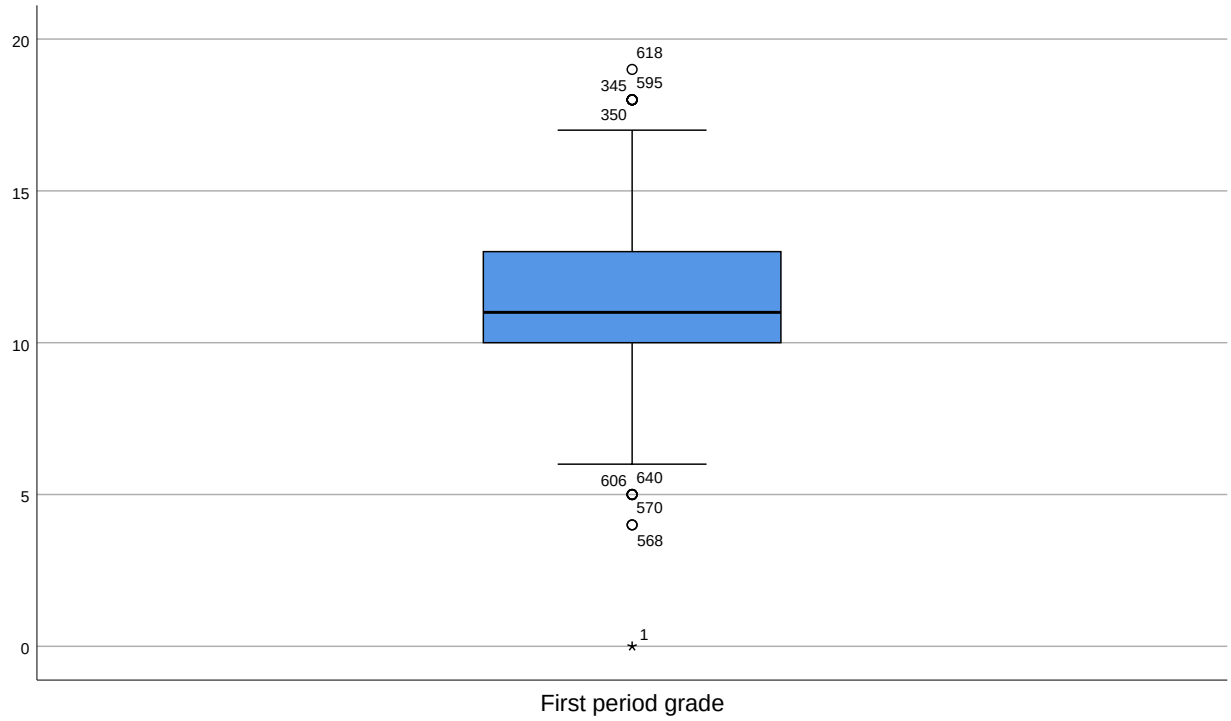
Descriptives

			Statistic	Std. Error
First period grade	Mean		11.3991	.10776
	95% Confidence Interval for Mean	Lower Bound	11.1875	
		Upper Bound	11.6107	
	5% Trimmed Mean		11.3861	
	Median		11.0000	
	Variance		7.536	
	Std. Deviation		2.74527	
	Minimum		.00	
	Maximum		19.00	
	Range		19.00	
	Interquartile Range		3.00	
	Skewness		-.003	.096
	Kurtosis		.037	.192
Second period grade	Mean		11.5701	.11437
	95% Confidence Interval for Mean	Lower Bound	11.3455	
		Upper Bound	11.7947	
	5% Trimmed Mean		11.6011	
	Median		11.0000	
	Variance		8.489	
	Std. Deviation		2.91364	
	Minimum		.00	
	Maximum		19.00	
	Range		19.00	
	Interquartile Range		3.00	
	Skewness		-.360	.096
	Kurtosis		1.662	.192
Final grade	Mean		11.9060	.12681
	95% Confidence Interval for Mean	Lower Bound	11.6570	
		Upper Bound	12.1550	
	5% Trimmed Mean		12.0574	
	Median		12.0000	
	Variance		10.437	
	Std. Deviation		3.23066	

Descriptives

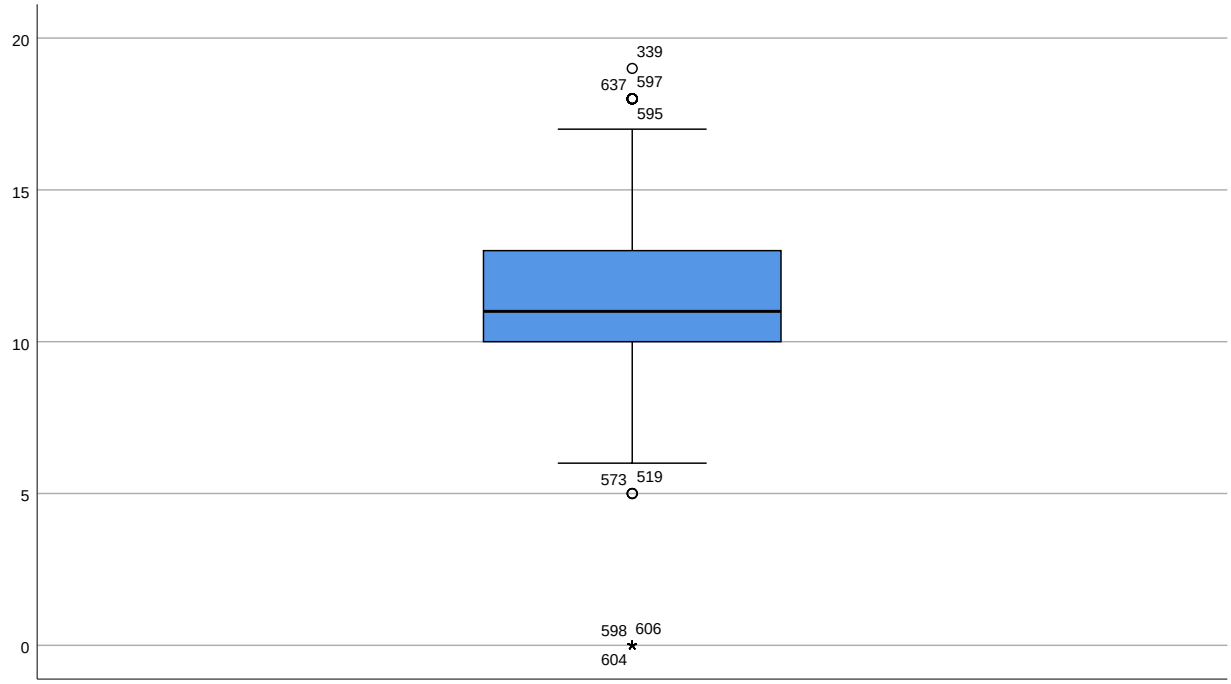
		Statistic	Std. Error
	Minimum	.00	
	Maximum	19.00	
	Range	19.00	
	Interquartile Range	4.00	
	Skewness	-.913	.096
	Kurtosis	2.712	.192

First period grade

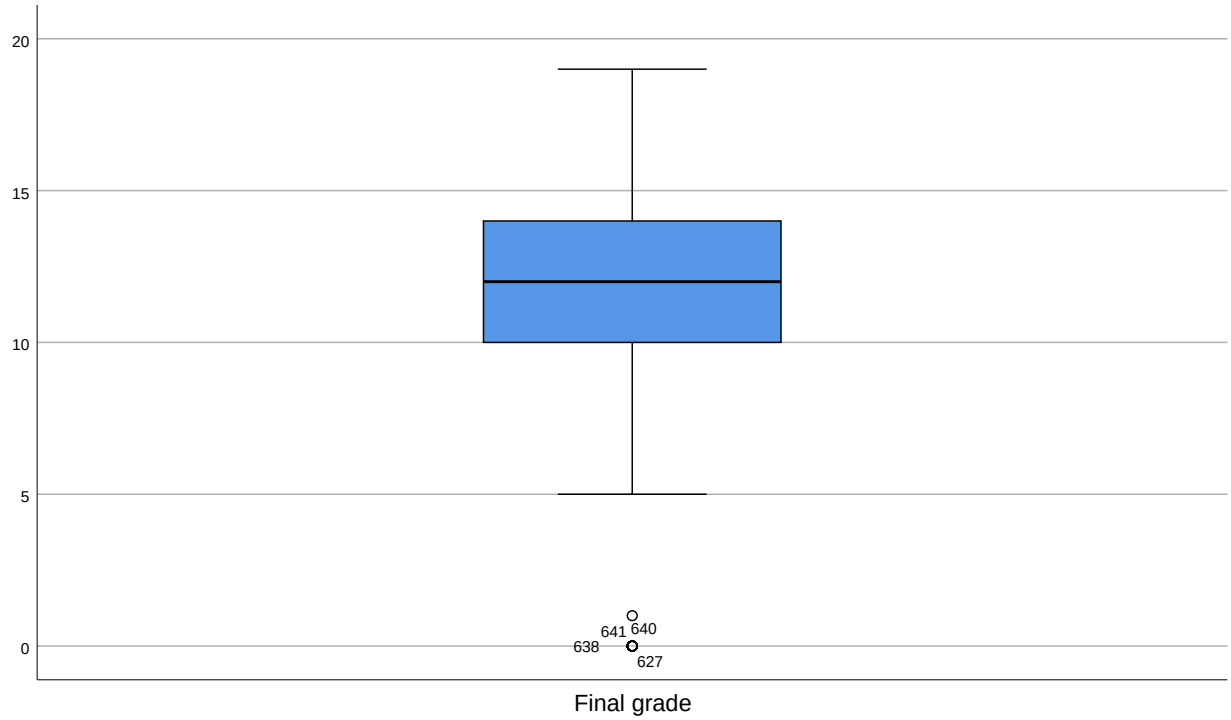


Second period grade

G1, G2 and G3 Grade Distributions



Final grade



```
 406  0 M>
DATASET COPY GreenhouseGeisserLong.
 407  0 M>  DATASET COPY GreenhouseGeisserLong.
```

Dataset Copy

Notes

Output Created		31-MAY-2026 21:20:15
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\student_por_greenhouse_geisser_clean.csv
	Active Dataset	GreenhouseGeisserClean
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		DATASET COPY GreenhouseGeisserLong.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

Warnings

Replacing existing dataset named GreenhouseGeisserLong.

```
DATASET ACTIVATE GreenhouseGeisserLong.
 408  0 M>  DATASET ACTIVATE GreenhouseGeisserLong.
VARSTOCASES
 409  0 M>  VARSTOCASES
 /MAKE Grade FROM G1 G2 G3
 410  0 M>   /MAKE Grade FROM G1 G2 G3
 /INDEX=GradeTime
 411  0 M>   /INDEX=GradeTime
 /KEEP=case_id
 412  0 M>   /KEEP=case_id
 /NULL=KEEP.
```

```
413  0 M>   /NULL=KEEP.
```

Variables to Cases

Notes

Output Created		31-MAY-2026 21:20:15
Comments		
Input	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
Syntax		VARSTOCASES /MAKE Grade FROM G1 G2 G3 /INDEX=GradeTime /KEEP=case_id /NULL=KEEP.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

```
[GreenhouseGeisserLong]
```

Generated Variables

Name	Label
GradeTime	<none>
Grade	First period grade

Processing Statistics

Variables In	37
Variables Out	3

```
VALUE LABELS GradeTime 1 "G1" 2 "G2" 3 "G3".
 414  0 M>  VALUE LABELS GradeTime 1 "G1" 2 "G2" 3 "G3".
VARIABLE LABELS Grade "Repeated grade score" GradeTime "Repeated grade measure
".
 415  0 M>  VARIABLE LABELS Grade "Repeated grade score" GradeTime "Repeated g
rade measure".
```

```
EXECUTE.
 416  0 M>  EXECUTE.

 417  0 M>
SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\SPSS\greenhouse_geisser_correction_long_data.sav"
 418  0 M>  SAVE OUTFILE="D:\low kda score priority basis posts\first post\Gre
enhouse Geisser Correction\SPSS\greenhouse_geisser_cor
               rection_long_data.sav"
 /COMPRESSED.
 419  0 M>   /COMPRESSED.

 420  0 M>
TITLE "Mean Grade Trajectory Across G1, G2 and G3".
 421  0 M>  TITLE "Mean Grade Trajectory Across G1, G2 and G3".
```

```
GGRAPH
 422  0 M>  GGRAPH
 /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade
 423  0 M>   /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade
 /GRAPHSPEC SOURCE=INLINE.
 424  0 M>   /GRAPHSPEC SOURCE=INLINE.
BEGIN GPL
 SOURCE: s=userSource(id("meanprofile"))
 DATA: GradeTime=col(source(s), name("GradeTime"), unit.category())
 DATA: Grade=col(source(s), name("Grade"))
 GUIDE: axis(dim(1), label("Repeated grade measure"))
 GUIDE: axis(dim(2), label("Mean grade"))
 GUIDE: text.title(label("Mean G1, G2 and G3 Grades"))
 ELEMENT: line(position(GradeTime*summary.mean(Grade)))
 ELEMENT: point(position(GradeTime*summary.mean(Grade)))
END GPL.
```

GGraph

Notes

Output Created		31-MAY-2026 21:20:15
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_long_data.sav
	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	1947

Mean Grade Trajectory Across G1, G2 and G3

Notes

Syntax		GGRAPH /GRAPHDATASET NAME="meanprofile" VARIABLES=GradeTime Grade /GRAPHSPEC SOURCE=INLINE. BEGIN GPL SOURCE: s=userSource (id("meanprofile")) DATA: GradeTime=col (source(s), name ("GradeTime"), unit. category()) DATA: Grade=col(source (s), name("Grade")) GUIDE: axis(dim(1), label ("Repeated grade measure")) GUIDE: axis(dim(2), label ("Mean grade")) GUIDE: text.title(label ("Mean G1, G2 and G3 Grades")) ELEMENT: line(position (GradeTime*summary. mean(Grade))) ELEMENT: point(position (GradeTime*summary. mean(Grade))) END GPL.
Resources	Processor Time	00:00:00.30
	Elapsed Time	00:00:00.19

[GreenhouseGeisserLong] D:\low kda score priority basis posts\first post\Green house Geisser Correction\SPSS\greenhouse_geisser_correction_long_data.sav

Warnings

GPL error: algebra(GradeTime*summary.mean(Grade))

Expecting (or + or * or /: GradeTime*summary.mean(Grade)

GPL:
SOURCE: s=userSource(id("meanprofile"))
DATA: GradeTime=col(source(s), name("GradeTime"), unit.
category())
DATA: Grade=col(source(s), name("Grade"))
GUIDE: axis(dim(1), label("Repeated grade measure"))
GUIDE: axis(dim(2), label("Mean grade"))
GUIDE: text.title(label("Mean G1, G2 and G3 Grades"))
ELEMENT: line(position(GradeTime*summary.mean(Grade)))
ELEMENT: point(position(GradeTime*summary.mean(Grade)))

```
 425  0 M>
TITLE "Repeated Grade Distribution by Time Point".
 426  0 M>  TITLE "Repeated Grade Distribution by Time Point".
```

```
GGRAPH
 427  0 M>  GGRAPH
 /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade
 428  0 M>   /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade
 /GRAPHSPEC SOURCE=INLINE.
 429  0 M>   /GRAPHSPEC SOURCE=INLINE.
BEGIN GPL
 SOURCE: s=userSource(id("boxdata"))
 DATA: GradeTime=col(source(s), name("GradeTime"), unit.category())
 DATA: Grade=col(source(s), name("Grade"))
 GUIDE: axis(dim(1), label("Repeated grade measure"))
 GUIDE: axis(dim(2), label("Grade"))
 GUIDE: text.title(label("G1, G2 and G3 Grade Distributions"))
 ELEMENT: schema(position(bin.quantile.letter(GradeTime*Grade)))
END GPL.
```

GGraph

Notes

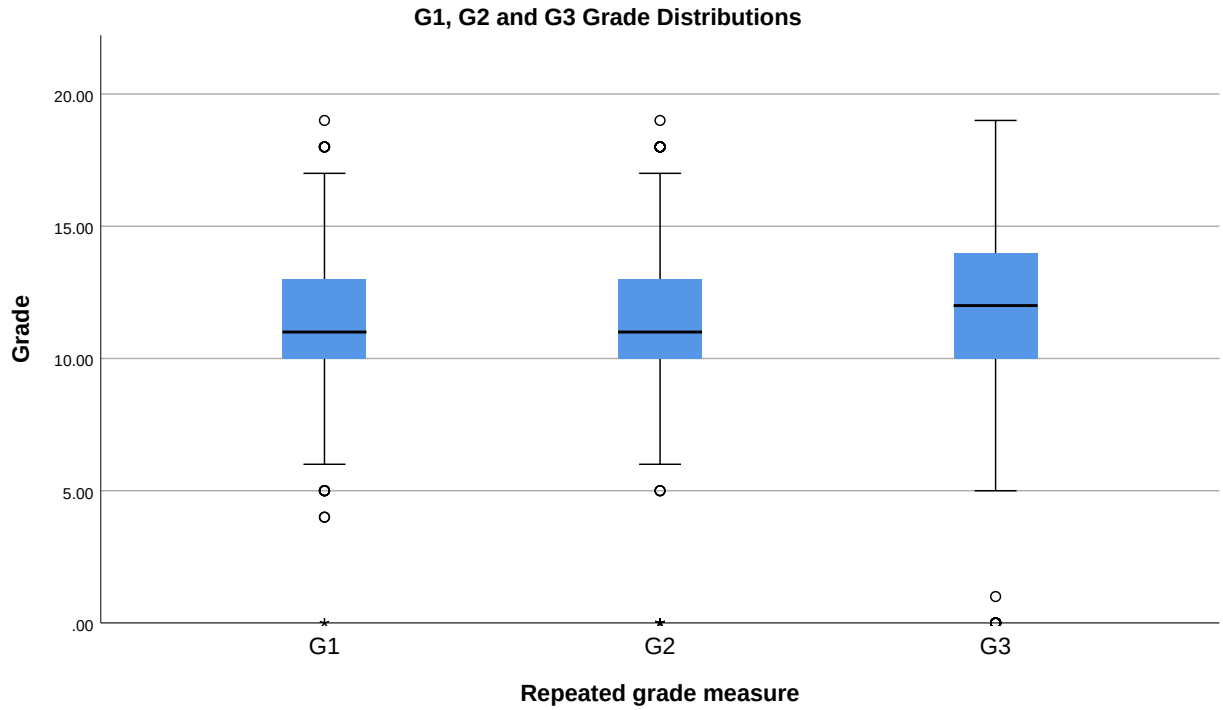
Output Created		31-MAY-2026 21:20:15
Comments		
Input	Data	D:\low kda score priority basis posts\first post\Greenhouse Geisser Correction\SPSS\greenhouse_geisser_correction_long_data.sav
	Active Dataset	GreenhouseGeisserLong
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	1947

Repeated Grade Distribution by Time Point

Notes

Syntax		GGRAPH /GRAPHDATASET NAME="boxdata" VARIABLES=GradeTime Grade /GRAPHSPEC SOURCE=INLINE. BEGIN GPL SOURCE: s=userSource (id("boxdata")) DATA: GradeTime=col (source(s), name ("GradeTime"), unit. category()) DATA: Grade=col(source (s), name("Grade")) GUIDE: axis(dim(1), label ("Repeated grade measure")) GUIDE: axis(dim(2), label ("Grade")) GUIDE: text.title(label ("G1, G2 and G3 Grade Distributions")) ELEMENT: schema (position(bin.quantile.letter (GradeTime*Grade))) END GPL.
Resources	Processor Time	00:00:00.39
	Elapsed Time	00:00:00.33

Repeated Grade Distribution by Time Point




```
 430  0 M>
DATASET ACTIVATE GreenhouseGeisserClean.
 431  0 M>  DATASET ACTIVATE GreenhouseGeisserClean.
SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhouse Geis
ser Correction\SPSS\greenhouse_geisser_correction_clean_data.sav"
 432  0 M>  SAVE OUTFILE="D:\low kda score priority basis posts\first post\Gre
enhouse Geisser Correction\SPSS\greenhouse_geisser_cor
              rection_clean_data.sav"
 /COMPRESSED.
 433  0 M>   /COMPRESSED.

 434  0 M>
OUTPUT SAVE OUTFILE="D:\low kda score priority basis posts\first post\Greenhou
se Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.spv".
 435  0 M>  OUTPUT SAVE OUTFILE="D:\low kda score priority basis posts\first p
ost\Greenhouse Geisser Correction\SPSS\Greenhouse-Geis
              ser-Correction-SPSS-output.spv".
OUTPUT EXPORT
 436  0 M>  OUTPUT EXPORT
 /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
```

```
 437  0 M>   /CONTENTS EXPORT=ALL LAYERS=PRINTSETTING MODELVIEWS=PRINTSETTING
 /PDF DOCUMENTFILE="D:\low kda score priority basis posts\first post\Greenhous
e Geisser Correction\SPSS\Greenhouse-Geisser-Correction-SPSS-output.pdf"
 438  0 M>   /PDF DOCUMENTFILE="D:\low kda score priority basis posts\first po
st\Greenhouse Geisser Correction\SPSS\Greenhouse-Geiss
               er-Correction-SPSS-output.pdf"
```