```
GET DATA
  /TYPE=TXT
  /FILE='D:\dagostino_pearson_test\student_dap_spss_clean.csv'
  /ENCODING='UTF8'
  /DELCASE=LINE
  /DELIMITERS=","
  /QUALIFIER='"'
  /ARRANGEMENT=DELIMITED
  /FIRSTCASE=2
  /IMPORTCASE=ALL
  /VARIABLES=
  studytime F1.0
  G1 F2.0
  G2 F2.0
  G3 F2.0
  absences F3.0.
CACHE.
EXECUTE.

DATASET NAME DAPClean WINDOW=FRONT.

VALUE LABELS studytime
  1 '<2 hours'
  2 '2 to 5 hours'
  3 '5 to 10 hours'
  4 '>10 hours'.

FORMATS studytime G1 G2 G3 absences (F8.0).
EXECUTE.

TITLE 'DAgostino Pearson Test SPSS SAFE Import Check'.
```

```
FREQUENCIES VARIABLES=studytime.
```

Frequencies

```
[DAPClean]
```

Statistics

studytime

N	Valid	649
	Missing	0

studytime

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<2 hours	212	32.7	32.7	32.7
	2 to 5 hours	305	47.0	47.0	79.7
	5 to 10 hours	97	14.9	14.9	94.6
	>10 hours	35	5.4	5.4	100.0
	Total	649	100.0	100.0	

```
DESCRIPTIVES VARIABLES=G3 G1 G2 absences
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
G3	649	0	19	11.91	3.231
G1	649	0	19	11.40	2.745
G2	649	0	19	11.57	2.914
absences	649	0	32	3.66	4.641
Valid N (listwise)	649				

```
* ============================================================.
* A. MAIN G3 DAGOSTINO PEARSON TEST MANUAL CALCULATION.
* ============================================================.

DATASET COPY DAP_G3.
```

```
DATASET ACTIVATE DAP_G3.

SELECT IF NOT MISSING(G3).
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=ADDVARIABLES
  /BREAK=
  /n_total=N(G3)
  /mean_G3=MEAN(G3)
  /sd_G3=SD(G3).

COMPUTE dev_G3 = G3 - mean_G3.
COMPUTE dev2_G3 = dev_G3 ** 2.
COMPUTE dev3_G3 = dev_G3 ** 3.
COMPUTE dev4_G3 = dev_G3 ** 4.
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=ADDVARIABLES
  /BREAK=
  /m2_G3=MEAN(dev2_G3)
  /m3_G3=MEAN(dev3_G3)
  /m4_G3=MEAN(dev4_G3).

COMPUTE skewness_G3 = m3_G3 / (m2_G3 ** 1.5).
COMPUTE pearson_kurtosis_G3 = m4_G3 / (m2_G3 ** 2).
COMPUTE excess_kurtosis_G3 = pearson_kurtosis_G3 - 3.

* Skewness transformation.
COMPUTE y_skew = skewness_G3 * SQRT(((n_total + 1) * (n_total + 3)) / (6 * (n_
total - 2))).
COMPUTE beta2_skew = (3 * (n_total ** 2 + 27 * n_total - 70) * (n_total + 1) *
 (n_total + 3)) / ((n_total - 2) * (n_total + 5) * (n_total + 7) * (n_total +
9)).
COMPUTE W2_skew = -1 + SQRT(2 * (beta2_skew - 1)).
COMPUTE delta_skew = 1 / SQRT(LN(SQRT(W2_skew))).
COMPUTE alpha_skew = SQRT(2 / (W2_skew - 1)).
```

```
COMPUTE z_skewness_G3 = delta_skew * LN((y_skew / alpha_skew) + SQRT((y_skew /
 alpha_skew) ** 2 + 1)).

* Kurtosis transformation.
COMPUTE expected_kurtosis = 3 * (n_total - 1) / (n_total + 1).
COMPUTE var_kurtosis = (24 * n_total * (n_total - 2) * (n_total - 3)) / (((n_t
otal + 1) ** 2) * (n_total + 3) * (n_total + 5)).
COMPUTE x_kurt = (pearson_kurtosis_G3 - expected_kurtosis) / SQRT(var_kurtosis
).
COMPUTE sqrt_beta1_kurt = (6 * (n_total ** 2 - 5 * n_total + 2) / ((n_total +
7) * (n_total + 9))) * SQRT(6 * (n_total + 3) * (n_total + 5) / (n_total * (n_
total - 2) * (n_total - 3))).
COMPUTE A_kurt = 6 + (8 / sqrt_beta1_kurt) * (2 / sqrt_beta1_kurt + SQRT(1 + 4
 / (sqrt_beta1_kurt ** 2))).
COMPUTE term1_kurt = 1 - 2 / (9 * A_kurt).
COMPUTE denom_kurt = 1 + x_kurt * SQRT(2 / (A_kurt - 4)).
COMPUTE term2_kurt = ((1 - 2 / A_kurt) / ABS(denom_kurt)) ** (1 / 3).
IF (denom_kurt < 0) term2_kurt = -1 * term2_kurt.
COMPUTE z_kurtosis_G3 = (term1_kurt - term2_kurt) / SQRT(2 / (9 * A_kurt)).

COMPUTE K2_G3 = (z_skewness_G3 ** 2) + (z_kurtosis_G3 ** 2).
COMPUTE p_value_G3 = EXP(-K2_G3 / 2).
STRING decision_0_05_G3 (A30).
IF (p_value_G3 < .05) decision_0_05_G3 = 'Reject normality'.
IF (p_value_G3 >= .05) decision_0_05_G3 = 'Do not reject normality'.
EXECUTE.

FORMATS mean_G3 sd_G3 skewness_G3 excess_kurtosis_G3 z_skewness_G3 z_kurtosis_
G3 K2_G3 p_value_G3 (E16.8).
EXECUTE.

TITLE 'Main G3 DAgostino Pearson Test Manual Result'.
```

```
LIST VARIABLES=n_total mean_G3 sd_G3 skewness_G3 excess_kurtosis_G3 z_skewness
_G3 z_kurtosis_G3 K2_G3 p_value_G3 decision_0_05_G3
  /CASES=FROM 1 TO 1.
```

List

[DAP_G3]

The variables are listed in the following order:

LINE   1: n_total mean_G3 sd_G3 skewness_G3 excess_kurtosis_G3 z_skewness_G3 z
_kurtosis_G3

LINE   2: K2_G3 p_value_G3 decision_0_05_G3

```
     n_total:     649  1.19060092E+001  3.23065624E+000 -9.10798039E-001  2.68
212332E+000 -8.28165125E+000  6.75418447E+000
       K2_G3:  1.14204755E+002  1.58764160E-025 Reject normality


Number of cases read:  1    Number of cases listed:  1

SAVE TRANSLATE
  /TYPE=CSV
  /OUTFILE='D:\dagostino_pearson_test\dagostino_pearson_spss_g3_result.csv'
  /REPLACE
  /FIELDNAMES
  /CELLS=VALUES.



* ============================================================.
* B. VARIABLE COMPARISON: G1, G2, G3, ABSENCES.
* ============================================================.

DATASET ACTIVATE DAPClean.
DATASET COPY DAP_Vars.
DATASET ACTIVATE DAP_Vars.

VARSTOCASES
  /MAKE value FROM G1 G2 G3 absences
  /INDEX=variable_index.
```

Variables to Cases

```
[DAP_Vars]
```

Generated Variables

Name	Label
variable_index	<none>
value	<none>

Processing Statistics

Variables In	5
Variables Out	3

```
EXECUTE.

VALUE LABELS variable_index
  1 'G1'
  2 'G2'
  3 'G3'
  4 'absences'.

SELECT IF NOT MISSING(value).
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=ADDVARIABLES
  /BREAK=variable_index
  /n_variable=N(value)
  /mean_variable=MEAN(value)
  /sd_variable=SD(value).

COMPUTE dev_value = value - mean_variable.
COMPUTE dev2_value = dev_value ** 2.
COMPUTE dev3_value = dev_value ** 3.
COMPUTE dev4_value = dev_value ** 4.
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=REPLACE
```

```
  /BREAK=variable_index
  /n_variable=FIRST(n_variable)
  /mean_variable=FIRST(mean_variable)
  /sd_variable=FIRST(sd_variable)
  /m2_variable=MEAN(dev2_value)
  /m3_variable=MEAN(dev3_value)
  /m4_variable=MEAN(dev4_value).

COMPUTE skewness = m3_variable / (m2_variable ** 1.5).
COMPUTE pearson_kurtosis = m4_variable / (m2_variable ** 2).
COMPUTE excess_kurtosis = pearson_kurtosis - 3.

COMPUTE y_skew = skewness * SQRT(((n_variable + 1) * (n_variable + 3)) / (6 *
(n_variable - 2))).
COMPUTE beta2_skew = (3 * (n_variable ** 2 + 27 * n_variable - 70) * (n_variab
le + 1) * (n_variable + 3)) / ((n_variable - 2) * (n_variable + 5) * (n_variab
le + 7) * (n_variable + 9)).
COMPUTE W2_skew = -1 + SQRT(2 * (beta2_skew - 1)).
COMPUTE delta_skew = 1 / SQRT(LN(SQRT(W2_skew))).
COMPUTE alpha_skew = SQRT(2 / (W2_skew - 1)).
COMPUTE z_skewness = delta_skew * LN((y_skew / alpha_skew) + SQRT((y_skew / al
pha_skew) ** 2 + 1)).

COMPUTE expected_kurtosis = 3 * (n_variable - 1) / (n_variable + 1).
COMPUTE var_kurtosis = (24 * n_variable * (n_variable - 2) * (n_variable - 3))
 / (((n_variable + 1) ** 2) * (n_variable + 3) * (n_variable + 5)).
COMPUTE x_kurt = (pearson_kurtosis - expected_kurtosis) / SQRT(var_kurtosis).
COMPUTE sqrt_beta1_kurt = (6 * (n_variable ** 2 - 5 * n_variable + 2) / ((n_va
riable + 7) * (n_variable + 9))) * SQRT(6 * (n_variable + 3) * (n_variable + 5
) / (n_variable * (n_variable - 2) * (n_variable - 3))).
COMPUTE A_kurt = 6 + (8 / sqrt_beta1_kurt) * (2 / sqrt_beta1_kurt + SQRT(1 + 4
 / (sqrt_beta1_kurt ** 2))).
COMPUTE term1_kurt = 1 - 2 / (9 * A_kurt).
COMPUTE denom_kurt = 1 + x_kurt * SQRT(2 / (A_kurt - 4)).
COMPUTE term2_kurt = ((1 - 2 / A_kurt) / ABS(denom_kurt)) ** (1 / 3).
IF (denom_kurt < 0) term2_kurt = -1 * term2_kurt.
COMPUTE z_kurtosis = (term1_kurt - term2_kurt) / SQRT(2 / (9 * A_kurt)).

COMPUTE K2_statistic = (z_skewness ** 2) + (z_kurtosis ** 2).
```

```
COMPUTE p_value = EXP(-K2_statistic / 2).
STRING decision_0_05 (A30).
IF (p_value < .05) decision_0_05 = 'Reject normality'.
IF (p_value >= .05) decision_0_05 = 'Do not reject normality'.
EXECUTE.

FORMATS mean_variable sd_variable skewness excess_kurtosis z_skewness z_kurtos
is K2_statistic p_value (E16.8).
EXECUTE.

TITLE 'DAgostino Pearson K2 Variable Comparison in SPSS'.
```

```
LIST VARIABLES=variable_index n_variable mean_variable sd_variable skewness ex
cess_kurtosis z_skewness z_kurtosis K2_statistic p_value decision_0_05
  /CASES=FROM 1 TO 4.
```

List

```
The variables are listed in the following order:

LINE   1: variable_index n_variable mean_variable sd_variable skewness excess_
kurtosis z_skewness z_kurtosis

LINE   2: K2_statistic p_value decision_0_05
```

```
variable_ind:    1     649  1.13990755E+001  2.74526513E+000 -2.76722221E-003
 2.71258027E-002 -2.91036654E-002  2.81692556E-001
K2_statistic:  8.01977196E-002  9.60694460E-001 Do not reject normality

variable_ind:    2     649  1.15701079E+001  2.91363866E+000 -3.59449409E-001
 1.64045368E+000 -3.67139860E+000  5.16796481E+000
K2_statistic:  4.01870280E+001  1.87714470E-009 Reject normality

variable_ind:    3     649  1.19060092E+001  3.23065624E+000 -9.10798039E-001
 2.68212332E+000 -8.28165125E+000  6.75418447E+000
K2_statistic:  1.14204755E+002  1.58764160E-025 Reject normality

variable_ind:    4     649  3.65947612E+000  4.64075881E+000  2.01602038E+000
 5.72740449E+000  1.41504121E+001  9.35477468E+000
K2_statistic:  2.87745971E+002  3.28667174E-063 Reject normality


Number of cases read:  4    Number of cases listed:  4

SAVE TRANSLATE
  /TYPE=CSV
  /OUTFILE='D:\dagostino_pearson_test\dagostino_pearson_spss_variable_results.
csv'
  /REPLACE
  /FIELDNAMES
  /CELLS=VALUES.



* ============================================================.
* C. STUDYTIME GROUP-WISE G3 CHECK.
* ============================================================.

DATASET ACTIVATE DAPClean.
DATASET COPY DAP_Studytime.
DATASET ACTIVATE DAP_Studytime.
```

```
SELECT IF NOT MISSING(G3) AND NOT MISSING(studytime).
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=ADDVARIABLES
  /BREAK=studytime
  /n_group=N(G3)
  /mean_group=MEAN(G3)
  /sd_group=SD(G3).

COMPUTE dev_group = G3 - mean_group.
COMPUTE dev2_group = dev_group ** 2.
COMPUTE dev3_group = dev_group ** 3.
COMPUTE dev4_group = dev_group ** 4.
EXECUTE.

AGGREGATE
  /OUTFILE=* MODE=REPLACE
  /BREAK=studytime
  /n_group=FIRST(n_group)
  /mean_group=FIRST(mean_group)
  /sd_group=FIRST(sd_group)
  /m2_group=MEAN(dev2_group)
  /m3_group=MEAN(dev3_group)
  /m4_group=MEAN(dev4_group).

COMPUTE skewness = m3_group / (m2_group ** 1.5).
COMPUTE pearson_kurtosis = m4_group / (m2_group ** 2).
COMPUTE excess_kurtosis = pearson_kurtosis - 3.

COMPUTE y_skew = skewness * SQRT(((n_group + 1) * (n_group + 3)) / (6 * (n_gro
up - 2))).
COMPUTE beta2_skew = (3 * (n_group ** 2 + 27 * n_group - 70) * (n_group + 1) *
 (n_group + 3)) / ((n_group - 2) * (n_group + 5) * (n_group + 7) * (n_group +
9)).
COMPUTE W2_skew = -1 + SQRT(2 * (beta2_skew - 1)).
COMPUTE delta_skew = 1 / SQRT(LN(SQRT(W2_skew))).
COMPUTE alpha_skew = SQRT(2 / (W2_skew - 1)).
```

```
COMPUTE z_skewness = delta_skew * LN((y_skew / alpha_skew) + SQRT((y_skew / al
pha_skew) ** 2 + 1)).

COMPUTE expected_kurtosis = 3 * (n_group - 1) / (n_group + 1).
COMPUTE var_kurtosis = (24 * n_group * (n_group - 2) * (n_group - 3)) / (((n_g
roup + 1) ** 2) * (n_group + 3) * (n_group + 5)).
COMPUTE x_kurt = (pearson_kurtosis - expected_kurtosis) / SQRT(var_kurtosis).
COMPUTE sqrt_beta1_kurt = (6 * (n_group ** 2 - 5 * n_group + 2) / ((n_group +
7) * (n_group + 9))) * SQRT(6 * (n_group + 3) * (n_group + 5) / (n_group * (n_
group - 2) * (n_group - 3))).
COMPUTE A_kurt = 6 + (8 / sqrt_beta1_kurt) * (2 / sqrt_beta1_kurt + SQRT(1 + 4
 / (sqrt_beta1_kurt ** 2))).
COMPUTE term1_kurt = 1 - 2 / (9 * A_kurt).
COMPUTE denom_kurt = 1 + x_kurt * SQRT(2 / (A_kurt - 4)).
COMPUTE term2_kurt = ((1 - 2 / A_kurt) / ABS(denom_kurt)) ** (1 / 3).
IF (denom_kurt < 0) term2_kurt = -1 * term2_kurt.
COMPUTE z_kurtosis = (term1_kurt - term2_kurt) / SQRT(2 / (9 * A_kurt)).

COMPUTE K2_statistic = (z_skewness ** 2) + (z_kurtosis ** 2).
COMPUTE p_value = EXP(-K2_statistic / 2).
STRING decision_0_05 (A30).
IF (p_value < .05) decision_0_05 = 'Reject normality'.
IF (p_value >= .05) decision_0_05 = 'Do not reject normality'.
EXECUTE.

FORMATS mean_group sd_group skewness excess_kurtosis z_skewness z_kurtosis K2_
statistic p_value (E16.8).
EXECUTE.

TITLE 'DAgostino Pearson K2 for G3 by Studytime Group in SPSS'.
```

```
LIST VARIABLES=studytime n_group mean_group sd_group skewness excess_kurtosis
z_skewness z_kurtosis K2_statistic p_value decision_0_05
  /CASES=FROM 1 TO 4.
```

List

```
The variables are listed in the following order:

LINE   1: studytime n_group mean_group sd_group skewness excess_kurtosis z_ske
wness z_kurtosis

LINE   2: K2_statistic p_value decision_0_05
```

```
   studytime:        1     212  1.08443396E+001  3.21862413E+000 -1.07046504E+
000  3.01617526E+000 -5.51209498E+000  4.49026867E+000
K2_statistic:  5.05457038E+001  1.05715795E-011 Reject normality

   studytime:        2     305  1.20918033E+001  3.24312507E+000 -1.02300755E+
000  2.97506747E+000 -6.30773923E+000  5.14030274E+000
K2_statistic:  6.62102864E+001  4.19390883E-015 Reject normality

   studytime:        3      97  1.32268041E+001  2.50210393E+000 -1.87207912E-
001 -5.37406296E-001 -7.96931871E-001 -1.19562062E+000
K2_statistic:  2.06460908E+000  3.56185170E-001 Do not reject normality

   studytime:        4      35  1.30571429E+001  3.03840958E+000  2.00198363E-
001 -4.59008352E-001  5.53909825E-001 -3.01045330E-001
K2_statistic:  3.97444386E-001  8.19777602E-001 Do not reject normality


Number of cases read:  4    Number of cases listed:  4

SAVE TRANSLATE
  /TYPE=CSV
  /OUTFILE='D:\dagostino_pearson_test\dagostino_pearson_spss_studytime_group_r
esults.csv'
  /REPLACE
  /FIELDNAMES
  /CELLS=VALUES.



* ============================================================.
* D. EXPORT SPSS OUTPUT PDF.
* ============================================================.

OUTPUT EXPORT
  /CONTENTS EXPORT=VISIBLE
  /PDF DOCUMENTFILE='D:\dagostino_pearson_test\DAgostino-Pearson-Test-SPSS-out
put-SAFE.pdf'.
```

Output Export

Export Summary

Viewer	Document2
Document File	D:\dagostino_pearson_test\DAgostino-Pearson-Test-SPSS-output-SAFE.pdf