

t.p.é*

Une collection d'outils pour
(s')initier à la publication
en éducation et valoriser la
transformation pédagogique

* transformer et publier en sciences de l'éducation



Ces outils sont organisés en trois volets :

- accompagner / structurer pour les accompagnant-es
- rédiger pour les équipes enseignantes débutant en recherche-action
- s'enrichir / ressources une série de références et de guides

Ils ont été développés par la Chaire recherche-action sur l'innovation pédagogique de l'Université Paris Saclay et l'institut Villebon - *Georges Charpak*, en collaboration avec l'UQAM, et sont le fruit du travail de Marine Moyon, Frédéric Bouquet, Jeanne Parmentier, et Martin Riopel, et d'Emmanuel Ahr pour l'outil EVA.

L'exploration, la conception de la charte graphique et la mise en forme des outils ont été réalisées par Dalva Rospape et Marie Jouble.

Retrouvez tous les outils sur :

<https://cep.villebon-charpak.fr/tpe>

→ s'enrichir / ressources

stat 101

Ce document est un guide pour mener des analyses statistiques sous JASP (niveau débutant).

Découverte du logiciel JASP

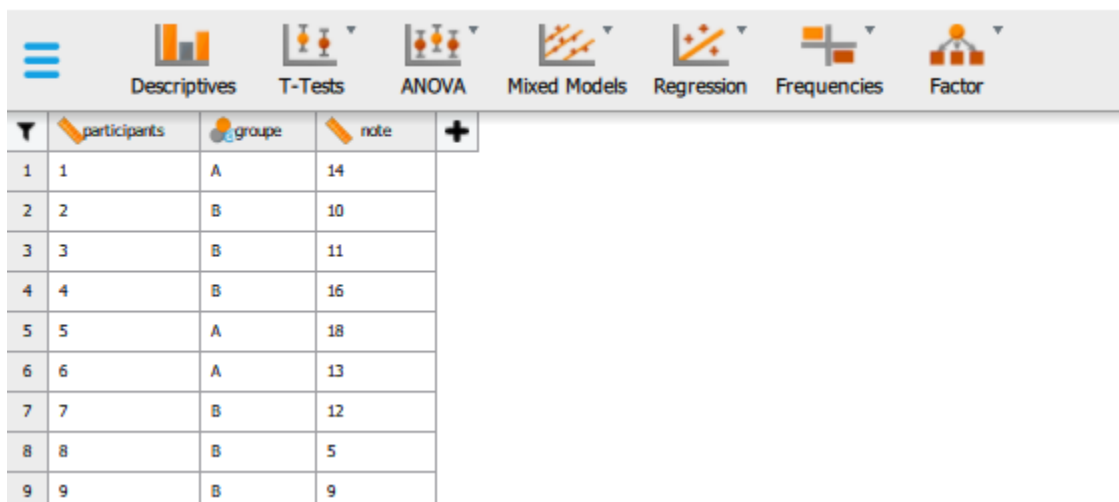
JASP est un logiciel de type tableur, libre, adapté au traitement statistique de données.

Pour l'installation, voir le site du logiciel <https://jasp-stats.org/> .

Ce document a été utilisé comme support lors d'ateliers de présentation de méthodes d'analyses statistiques. Ce n'est pas un cours, et il n'a pas l'ambition d'être complet. Il permet de parcourir quelques possibilités du logiciel avec des exemples pratiques.

Les données

Après l'import des données depuis un fichier enregistré au format .csv, la première chose à faire est de préciser la nature de chacune des variables. Pour cela, il suffit de cliquer sur le logo à gauche du nom de la variable et d'en renseigner la nature (Scale = variable quantitative ; Ordinal = variable qualitative ordinale ; Nominal = variable qualitative nominale).



| | participants | groupe | note | |
|---|--------------|--------|------|--|
| 1 | 1 | A | 14 | |
| 2 | 2 | B | 10 | |
| 3 | 3 | B | 11 | |
| 4 | 4 | B | 16 | |
| 5 | 5 | A | 18 | |
| 6 | 6 | A | 13 | |
| 7 | 7 | B | 12 | |
| 8 | 8 | B | 5 | |
| 9 | 9 | B | 9 | |

Analyse descriptive



| | participant | note_examen_biologie | discipline_de_specialite |
|----|-------------|----------------------|--------------------------|
| 1 | 1 | 34 | chimie |
| 2 | 2 | 15 | maths |
| 3 | 3 | 32 | maths |
| 4 | 4 | 24 | physique |
| 5 | 5 | 45 | maths |
| 6 | 6 | 27 | physique |
| 7 | 7 | 45 | chimie |
| 8 | 8 | 32 | physique |
| 9 | 9 | 48 | chimie |
| 10 | 10 | 51 | maths |
| 11 | 11 | 43 | maths |
| 12 | 12 | 29 | physique |
| 13 | 13 | 31 | maths |
| 14 | 14 | 59 | maths |
| 15 | 15 | 50 | chimie |
| 16 | 16 | 36 | physique |
| 17 | 17 | 51 | maths |
| 18 | 18 | 34 | maths |
| 19 | 19 | 33 | maths |
| 20 | 20 | 65 | physique |
| 21 | 21 | 45 | chimie |



▼ Plots

Customizable plots

Color palette

- Boxplots
 - Boxplot element Use color palette
 - Violin element Label outliers
 - Jitter element

Scatter Plots

Graph above scatter plot

- Density
- Histogram
- None

Graph right of scatter plot

- Density
- Histogram
- None
- Add regression line
 - Smooth
 - Linear
- Show confidence interval %
- Show legend

Basic plots

- Distribution plots
 - Display density
- Correlation plots
- Q-Q plots
- Pie charts

▼ Statistics

Percentile Values

- Quartiles
- Cut points for: equal groups
- Percentiles:

Central Tendency

- Mean
- Median
- Mode
- Sum

Dispersion

- S. E. mean Std. deviation
- MAD MAD Robust
- IQR Variance
- Range Minimum
- Maximum

Distribution

- Skewness
- Kurtosis
- Shapiro-Wilk test

Results

Descriptive Statistics

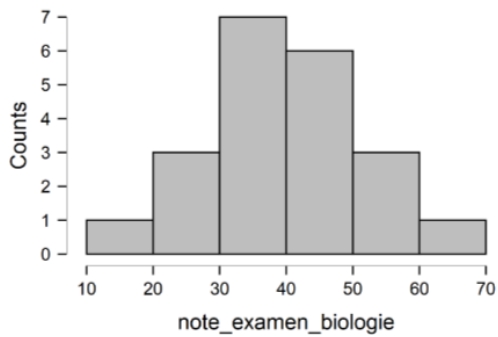
Descriptive Statistics

| | note_examen_biologie | discipline_de_specialite |
|-------------------------|----------------------|--------------------------|
| Valid | 21 | 21 |
| Missing | 0 | 0 |
| Mean | 39.476 | |
| Median | 36.000 | |
| Std. Deviation | 12.221 | |
| MAD | 9.000 | |
| Variance | 149.362 | |
| Shapiro-Wilk | 0.975 | |
| P-value of Shapiro-Wilk | 0.830 | |
| Minimum | 15.000 | |
| Maximum | 65.000 | |

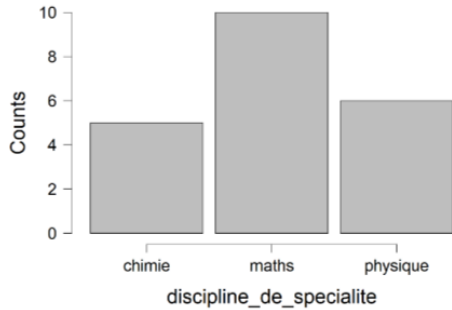
Note. Not all values are available for Nominal Text variables

Distribution Plots

note_examen_biologie

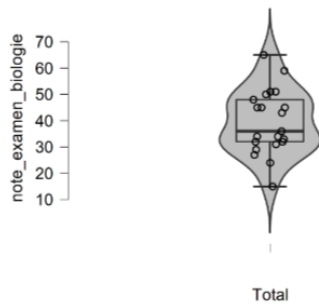


discipline_de_specialite



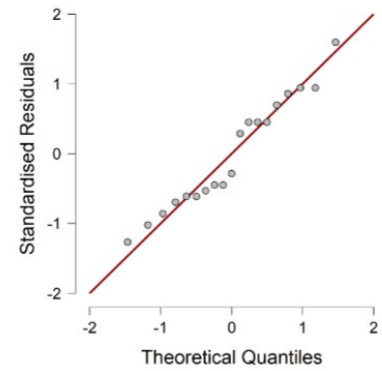
Boxplots

note_examen_biologie

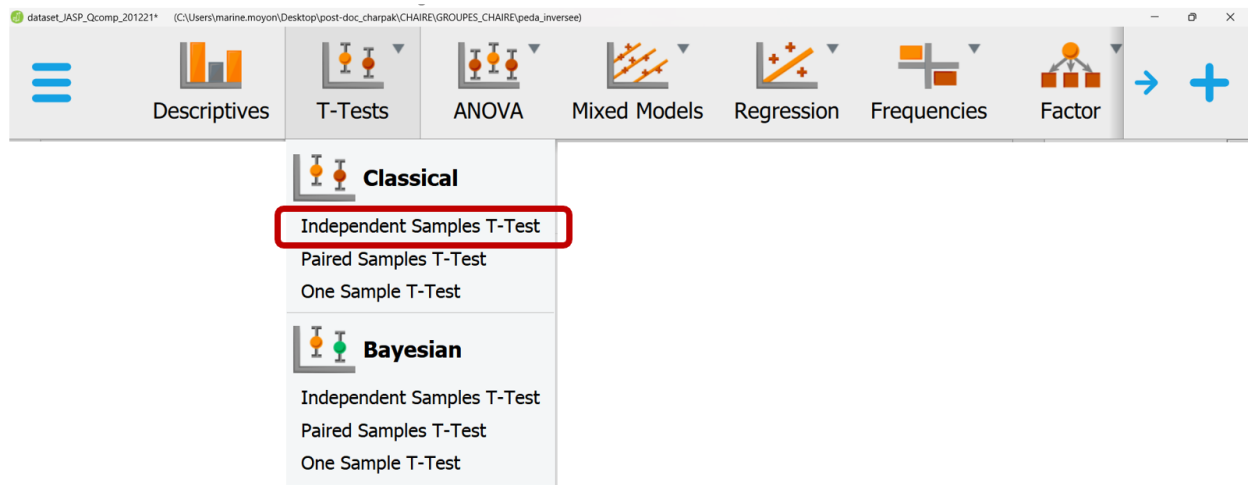


Q-Q Plots

note_examen_biologie



Test de Student pour échantillons indépendants



Description de l'expérience

Design expérimental ; VI = groupe

- 2 échantillons indépendants
- n = 47 étudiants divisés en 2 groupes (de façon aléatoire)

Groupe A (n=23)
qui suit une
pédagogie inversée



Groupe B (n=24)
qui suit une
pédagogie classique



Mesure de la VD

Note examen final



Organisation des données pour JASP

| Participant | groupe | note |
|-------------|--------|------|
| 1 | A | 14 |
| 2 | B | 10 |
| 3 | B | 11 |
| ... | | |
| 33 | A | 14 |
| 34 | A | 14 |
| 35 | B | 15 |
| 36 | B | 15 |
| ... | | |
| 47 | A | 16 |

Données JASP

| | participants | groupe | note | + |
|----|--------------|--------|------|---|
| 1 | 1 | A | 14 | |
| 2 | 2 | B | 10 | |
| 3 | 3 | B | 11 | |
| 4 | 4 | B | 16 | |
| 5 | 5 | A | 18 | |
| 6 | 6 | A | 13 | |
| 7 | 7 | B | 12 | |
| 8 | 8 | B | 5 | |
| 9 | 9 | B | 9 | |
| 10 | 10 | B | 1 | |
| 11 | 11 | B | 4 | |
| 12 | 12 | B | 9 | |
| 13 | 13 | B | 10 | |
| 14 | 14 | B | 13 | |
| 15 | 15 | B | 14 | |
| 16 | 16 | B | 11 | |
| 17 | 17 | B | 12 | |
| 18 | 18 | A | 6 | |
| 19 | 19 | A | 9 | |
| 20 | 20 | A | 13 | |
| 21 | 21 | A | 20 | |
| 22 | 22 | A | 7 | |
| 23 | 23 | A | 11 | |
| 24 | 24 | A | 14 | |
| 25 | 25 | A | 15 | |
| 26 | 26 | A | 16 | |
| 27 | 27 | A | 15 | |
| 28 | 28 | A | 12 | |
| 29 | 29 | A | 19 | |
| 30 | 30 | A | 18 | |
| 31 | 31 | A | 12 | |
| 32 | 32 | A | 15 | |
| 33 | 33 | A | 14 | |
| 34 | 34 | A | 14 | |
| 35 | 35 | B | 15 | |
| 36 | 36 | B | 15 | |
| 37 | 37 | B | 8 | |
| 38 | 38 | B | 9 | |
| 39 | 39 | B | 10 | |
| 40 | 40 | B | 18 | |
| 41 | 41 | B | 19 | |
| 42 | 42 | B | 13 | |
| 43 | 43 | B | 11 | |
| 44 | 44 | B | 14 | |
| 45 | 45 | A | 19 | |
| 46 | 46 | A | 15 | |
| 47 | 47 | A | 16 | |

OU

| | participants | groupe | note | + |
|----|--------------|--------|------|---|
| 1 | 1 | A | 14 | |
| 2 | 2 | A | 18 | |
| 3 | 3 | A | 13 | |
| 4 | 4 | A | 6 | |
| 5 | 5 | A | 9 | |
| 6 | 6 | A | 13 | |
| 7 | 7 | A | 20 | |
| 8 | 8 | A | 7 | |
| 9 | 9 | A | 11 | |
| 10 | 10 | A | 14 | |
| 11 | 11 | A | 15 | |
| 12 | 12 | A | 16 | |
| 13 | 13 | A | 15 | |
| 14 | 14 | A | 12 | |
| 15 | 15 | A | 19 | |
| 16 | 16 | A | 18 | |
| 17 | 17 | A | 12 | |
| 18 | 18 | A | 15 | |
| 19 | 19 | A | 14 | |
| 20 | 20 | A | 14 | |
| 21 | 21 | A | 19 | |
| 22 | 22 | A | 15 | |
| 23 | 23 | A | 16 | |
| 24 | 24 | B | 10 | |
| 25 | 25 | B | 11 | |
| 26 | 26 | B | 16 | |
| 27 | 27 | B | 12 | |
| 28 | 28 | B | 5 | |
| 29 | 29 | B | 9 | |
| 30 | 30 | B | 1 | |
| 31 | 31 | B | 4 | |
| 32 | 32 | B | 9 | |
| 33 | 33 | B | 10 | |
| 34 | 34 | B | 13 | |
| 35 | 35 | B | 14 | |
| 36 | 36 | B | 11 | |
| 37 | 37 | B | 12 | |
| 38 | 38 | B | 15 | |
| 39 | 39 | B | 15 | |
| 40 | 40 | B | 8 | |
| 41 | 41 | B | 9 | |
| 42 | 42 | B | 10 | |
| 43 | 43 | B | 18 | |
| 44 | 44 | B | 19 | |
| 45 | 45 | B | 13 | |
| 46 | 46 | B | 11 | |
| 47 | 47 | B | 14 | |

Analyse JASP

Independent Samples T-Test

participants

Variables: note

Grouping Variable: groupe

Tests

- Student
- Welch
- Mann-Whitney

Alt. Hypothesis

- Group 1 ≠ Group 2
- Group 1 > Group 2
- Group 1 < Group 2

Assumption Checks

- Normality
- Equality of variances

Additional Statistics

- Location parameter
- Confidence interval 95.0 %
- Effect Size
 - Cohen's d
 - Glass' delta
 - Hedges' g
 - Confidence interval 95 %
- Descriptives
- Descriptives plots
- Confidence interval 95.0 %
- Vovk-Selkoe maximum p-ratio

Missing Values

- Exclude cases per dependent variable
- Exclude cases listwise

Results

Independent Samples T-Test

Independent Samples T-Test

| | t | df | p | Cohen's d | 95% CI for Cohen's d | |
|------|-------|----|-------|-----------|----------------------|-------|
| | | | | | Lower | Upper |
| note | 2.553 | 45 | 0.014 | 0.745 | 0.140 | 1.333 |

Note: Student's t-test.

Assumption Checks

Test of Normality (Shapiro-Wilk)

| | | W | p |
|--|---|-------|-------|
| | | | |
| | B | 0.973 | 0.737 |

Note: Significant results suggest a deviation from normality.

Test of Equality of Variances (Levene's)

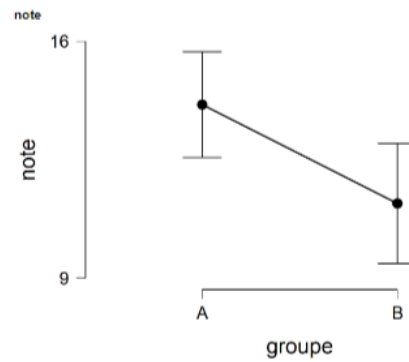
| | F | df | p |
|--|---|----|---|
| | | | |

Descriptives

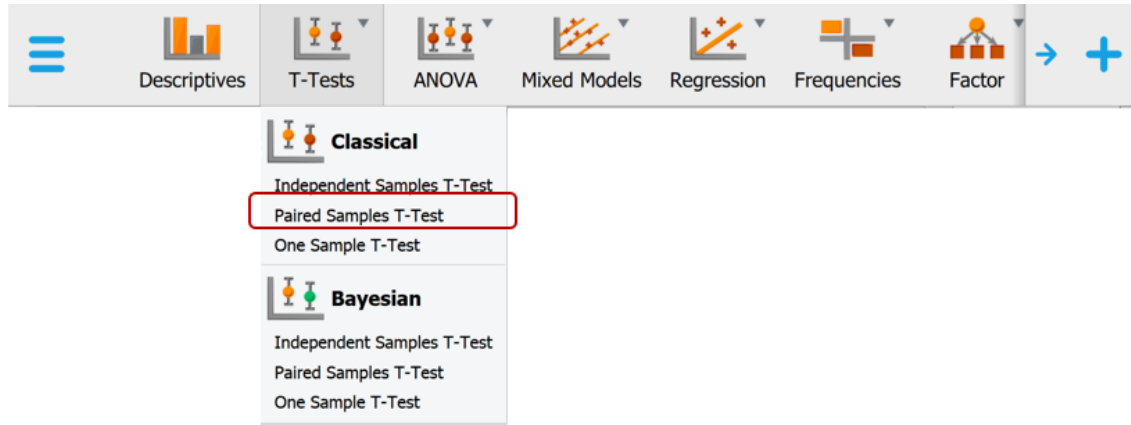
Group Descriptives

| | Group | N | Mean | SD | SE |
|--|-------|----|--------|-------|-------|
| | | | | | |
| | B | 24 | 11.208 | 4.201 | 0.858 |

Descriptives Plots



Test de Student pour échantillons appariés



1^{er} exemple

Description de l'expérience

Design expérimental ; VI = Temps

- 2 échantillons appariés
- n = 21 étudiants
- k= 2 conditions : un test disciplinaire proposé en novembre et un en janvier

Mesure de la VD

Score au test

Organisation des données pour JASP

| participant | condition1 | condition 2 |
|-------------|------------|-------------|
| 1 | 34 | 48 |
| 2 | 15 | 27 |
| 3 | 32 | 44 |
| ... | ... | ... |
| ... | ... | ... |
| ... | ... | ... |
| 15 | 50 | 54 |
| ... | ... | ... |
| 21 | 45 | 65 |

Données et analyse JASP

| | participant | note_novembre | note_janvier |
|----|-------------|---------------|--------------|
| 1 | 1 | 34 | 48 |
| 2 | 2 | 15 | 27 |
| 3 | 3 | 32 | 44 |
| 4 | 4 | 24 | 49 |
| 5 | 5 | 45 | 24 |
| 6 | 6 | 27 | 74 |
| 7 | 7 | 45 | 54 |
| 8 | 8 | 32 | 22 |
| 9 | 9 | 48 | 66 |
| 10 | 10 | 51 | 57 |
| 11 | 11 | 43 | 69 |
| 12 | 12 | 29 | 54 |
| 13 | 13 | 31 | 51 |
| 14 | 14 | 59 | 71 |
| 15 | 15 | 50 | 54 |
| 16 | 16 | 36 | 57 |
| 17 | 17 | 51 | 53 |
| 18 | 18 | 34 | 62 |
| 19 | 19 | 33 | 51 |
| 20 | 20 | 65 | 53 |
| 21 | 21 | 45 | 65 |

Paired Samples T-Test

Variable pairs: note_novembre, note_janvier

Tests: Student, Wilcoxon signed-rank

Alt. Hypothesis: Measure 1 ≠ Measure 2, Measure 1 > Measure 2, Measure 1 < Measure 2

Assumption Checks: Normality

Additional Statistics: Location parameter, Effect Size, Descriptives, Descriptives plots, Vovk-Sellke maximum p-ratio

Missing Values: Exclude cases per dependent variable, Exclude cases listwise

Results

Paired Samples T-Test

| Measure 1 | Measure 2 | t | df | p | Cohen's d | 95% CI for Cohen's d | |
|---------------|----------------|--------|----|--------|-----------|----------------------|--------|
| | | | | | | Lower | Upper |
| note_novembre | - note_janvier | -3.058 | 20 | < .001 | -0.864 | -1.360 | -0.352 |

Note: Student's t-test.

Assumption Checks

Test of Normality (Shapiro-Wilk)

| | W | p |
|------------------------------|-------|-------|
| note_novembre - note_janvier | 0.957 | 0.451 |

Note: Significant results suggest a deviation from normality.

Descriptives

| | N | Mean | SD | SE |
|---------------|----|--------|--------|-------|
| note_novembre | 21 | 39.476 | 12.221 | 2.697 |
| note_janvier | 21 | 52.019 | 14.239 | 3.107 |

Descriptives Plots

note_novembre - note_janvier

2^{ème} exemple

Description de l'expérience

Design expérimental ; VI = correcteur

- 2 échantillons appariés
- n = 25 copies
- k= 2 conditions ; examinateur A et examinateur B



Examinateur A

Examinateur B

Mesure de la VD

Note attribuée à la copie



Organisation des données pour JASP

| id | condition1 | condition 2 |
|-----|------------|-------------|
| 1 | 13 | 14 |
| 2 | 15 | 16 |
| 3 | 12 | 13 |
| ... | ... | ... |
| ... | ... | ... |
| ... | ... | ... |
| 19 | 13 | 14 |
| ... | ... | ... |
| 25 | 15 | 15 |

Données et analyses JASP

| | id | examinateur_A | examinateur_B |
|----|----|---------------|---------------|
| 1 | 1 | 13 | 14 |
| 2 | 2 | 15 | 16 |
| 3 | 3 | 12 | 13 |
| 4 | 4 | 16 | 16 |
| 5 | 5 | 18 | 17 |
| 6 | 6 | 15 | 15 |
| 7 | 7 | 14 | 15 |
| 8 | 8 | 18 | 17 |
| 9 | 9 | 15 | 16 |
| 10 | 10 | 14 | 17 |
| 11 | 11 | 18 | 17 |
| 12 | 12 | 17 | 17 |
| 13 | 13 | 20 | 15 |
| 14 | 14 | 15 | 18 |
| 15 | 15 | 16 | 16 |
| 16 | 16 | 15 | 14 |
| 17 | 17 | 17 | 16 |
| 18 | 18 | 16 | 12 |
| 19 | 19 | 13 | 14 |
| 20 | 20 | 15 | 18 |
| 21 | 21 | 11 | 16 |
| 22 | 22 | 14 | 15 |
| 23 | 23 | 15 | 18 |
| 24 | 24 | 17 | 20 |
| 25 | 25 | 15 | 15 |

Paired Samples T-Test

Variable pairs: examinateur_A, examinateur_B

Tests: Student, Wilcoxon signed-rank

Alt. Hypothesis: Measure 1 ≠ Measure 2, Measure 1 > Measure 2, Measure 1 < Measure 2

Assumption Checks: Normality

Additional Statistics: Location parameter, Confidence interval (15.0 %), Effect Size, Confidence interval (15.0 %), Descriptives, Descriptives plots, Vovk-Selke maximum p-ratio

Missing Values: Exclude cases per dependent variable, Exclude cases listwise

Results

Paired Samples T-Test

| Measure 1 | Measure 2 | t | df | p | Cohen's d | 95% CI for Cohen's d | |
|---------------|-----------------|--------|----|-------|-----------|----------------------|-------|
| | | | | | | Lower | Upper |
| examinateur_A | - examinateur_B | -1.181 | 24 | 0.249 | -0.236 | -0.831 | 0.164 |

Note: Student's t-test.

Assumption Checks

Test of Normality (Shapiro-Wilk)

| | W | p |
|-------------------------------|-------|-------|
| examinateur_A - examinateur_B | 0.928 | 0.077 |

Note: Significant results suggest a deviation from normality.

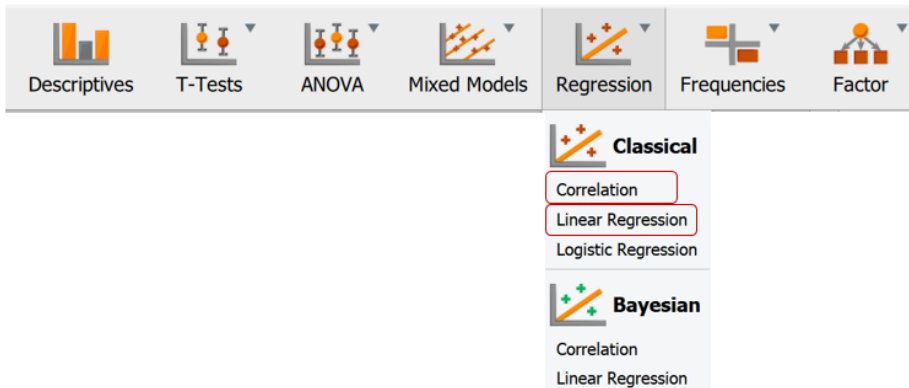
Descriptives

| Descriptives | N | Mean | SD | SE |
|---------------|----|--------|-------|-------|
| examinateur_A | 25 | 15.360 | 2.039 | 0.408 |
| examinateur_B | 25 | 15.880 | 1.784 | 0.353 |

Descriptives Plots


examinateur_A - examinateur_B

Test de corrélation de Pearson / Régression linéaire simple



Description de l'expérience

- 1 échantillon
- n = 30 doctorants
- Nombre de pages et nombre de cafés



2 VD

Organisation des données pour JASP

| id | VD1 | VD2 |
|-----|-----|-----|
| 1 | 0 | 3 |
| 2 | 3 | 5 |
| 3 | 2 | 4 |
| ... | ... | ... |
| ... | ... | ... |
| ... | ... | ... |
| 21 | 5 | 4 |
| ... | ... | ... |
| 30 | 2 | 4 |

Données et analyses JASP

| | participants | nb_mails | Nb_cate_jour | nb_pages |
|----|--------------|----------|--------------|----------|
| 1 | 1 | 25 | 0 | 3 |
| 2 | 2 | 8 | 3 | 5 |
| 3 | 3 | 16 | 2 | 4 |
| 4 | 4 | 31 | 1 | 2 |
| 5 | 5 | 22 | 1 | 7 |
| 6 | 6 | 3 | 2 | 4 |
| 7 | 7 | 5 | 4 | 3 |
| 8 | 8 | 15 | 2 | 3 |
| 9 | 9 | 4 | 5 | 2 |
| 10 | 10 | 14 | 3 | 4 |
| 11 | 11 | 24 | 2 | 3 |
| 12 | 12 | 44 | 1 | 1 |
| 13 | 13 | 28 | 2 | 2 |
| 14 | 14 | 12 | 3 | 3 |
| 15 | 15 | 24 | 1 | 4 |
| 16 | 16 | 2 | 4 | 5 |

Correlation

participants, nb_mails

Variables: Nb_cate_jour, nb_pages

Condition on:

Sample Correlation Coefficient

- Pearson's r
- Spearman's rho
- Kendall's tau-b

Additional Options

- Display pairwise
- Report significance
- Flag significant correlations
- Confidence intervals
- Interval: 5.0 %
- Vovk-Sellke maximum p-ratio
- Sample size

Alt. Hypothesis

- Correlated
- Correlated positively
- Correlated negatively

Plots

- Scatter plots
- Densities for variables
- Statistics
- Confidence intervals: 5.0 %
- Prediction intervals: 5.0 %
- Heatmap

Assumption Checks

Options

Results

Correlation

| | Pearson's r | p |
|-------------------------|-------------|-------|
| Nb_cate_jour - nb_pages | 0.111 | 0.561 |

*p < .05, ** p < .01, *** p < .001

Scatter plots

Nb_cate_jour vs. nb_pages

$r = 0.111$

Correlation

Linear Regression

nb_pages
 nb_mails
 participants

Dependent Variable:
 Method: Enter
 Covariates:
 WLS Weights (optional):

Include intercept
 Components:
 Model Terms:

Statistics

Regression Coefficients
 Estimates
 From 2000 bootstraps
 Confidence intervals 95.0%
 Covariance matrix
 Vovk-Sellke maximum p-ratio
 Model fit
 R squared change
 Descriptives
 Part and partial correlations
 Collinearity diagnostics

Residuals
 Statistics
 Durbin-Watson
 Casewise diagnostics
 Standard residual >
 Cook's distance >
 All

Plots

Residuals Plots
 Residuals vs. dependent
 Residuals vs. covariates
 Residuals vs. predicted
 Residuals vs. histogram
 Standardized residuals
 Q-Q plot standardized residuals
 Partial plots
 Confidence intervals 95.0%
 Prediction intervals 95.0%

Results

Correlation

Pearson's Correlations

| | | Pearson's r | p |
|--------------|----------|-------------|-------|
| Nb_cafe_jour | nb_pages | 0.111 | 0.561 |

* p < .05. ** p < .01. *** p < .001

Scatter plots

Nb_cafe_jour vs. nb_pages

$r = 0.111$

Linear Regression

Model Summary - nb_pages

| Model | R | R ² | Adjusted R ² | RMSE |
|----------------|-------|----------------|-------------------------|-------|
| H ₀ | 0.000 | 0.000 | 0.000 | 1.224 |
| H ₁ | 0.111 | 0.012 | -0.023 | 1.238 |

Coefficients

| Model | | Unstandardized | Standard Error | Standardized | t | p |
|----------------|--------------|----------------|----------------|--------------|--------|--------|
| H ₀ | (Intercept) | 3.133 | 0.224 | | 14.018 | < .001 |
| H ₁ | (Intercept) | 2.942 | 0.396 | | 7.425 | < .001 |
| | Nb_cafe_jour | 0.093 | 0.157 | 0.111 | 0.589 | 0.561 |

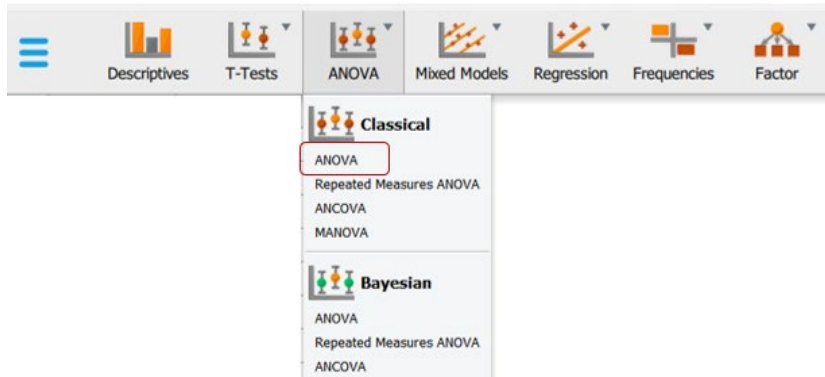
Descriptives

| | N | Mean | SD | SE |
|--------------|----|-------|-------|-------|
| nb_pages | 30 | 3.133 | 1.224 | 0.224 |
| Nb_cafe_jour | 30 | 2.067 | 1.461 | 0.267 |

Partial Regression Plot

nb_pages vs. Nb_cafe_jour

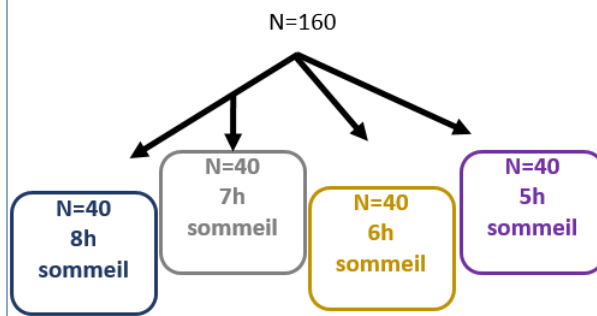
Test ANOVA



Description de l'expérience

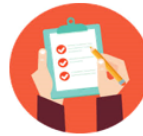
Design expérimental ; VI = nombre d'heures de carence de sommeil

- 160 étudiants répartis en 4 groupes (4 x n=40)
- 4 conditions donc 4 moyennes



Mesure de la VD

Score d'empan



| Item/essai | réponse | Note (0 ou 1) |
|-------------------------------|---------|---------------|
| 1 Essai 1 : 1-7 | | |
| Essai 2 : 6-3 | | |
| 2 Essai 1 : 5-8-2 | | |
| Essai 2 : 6-9-4 | | |
| 3 Essai 1 : 6-4-3-9 | | |
| Essai 2 : 7-2-8-6 | | |
| 4 Essai 1 : 4-2-7-3-1 | | |
| Essai 2 : 7-5-8-3-6 | | |
| 5 Essai 1 : 6-1-9-4-3-7 | | |
| Essai 2 : 3-9-2-4-6-7 | | |
| 6 Essai 1 : 5-9-1-7-4-2-8 | | |
| Essai 2 : 4-1-7-9-3-8-6 | | |
| 7 Essai 1 : 5-8-1-9-2-6-4-7 | | |
| Essai 2 : 3-8-3-9-5-1-7-4 | | |
| 8 Essai 1 : 2-7-5-8-6-2-5-8-4 | | |
| Essai 2 : 7-1-3-9-4-2-5-6-8 | | |

Organisation des données pour JASP

| id | score | conditions |
|-----|-------|------------|
| 1 | 6 | M0 |
| 2 | 7 | M0 |
| 3 | 7 | M0 |
| ... | ... | M0 |
| 40 | 7 | M0 |
| 1 | 5 | M1 |
| 2 | 6 | M1 |
| ... | ... | M1 |
| 40 | ... | M1 |
| 1 | ... | M2 |
| ... | ... | M2 |
| 40 | ... | M2 |
| 1 | ... | M3 |
| ... | ... | M3 |
| 40 | ... | M3 |

Données JASP

| | participants | score_empan | sommeil |
|----|--------------|-------------|---------|
| 1 | 1 | 6 | M0 |
| 2 | 2 | 7 | M0 |
| 3 | 3 | 7 | M0 |
| 4 | 4 | 6 | M0 |
| 5 | 5 | 8 | M0 |
| 6 | 6 | 5 | M0 |
| 7 | 7 | 7 | M0 |
| 8 | 8 | 9 | M0 |
| 9 | 9 | 7 | M0 |
| 10 | 10 | 7 | M0 |
| 11 | 11 | 6 | M0 |
| 12 | 12 | 6 | M0 |
| 13 | 13 | 7 | M0 |
| 14 | 14 | 7 | M0 |
| 15 | 15 | 6 | M0 |
| 16 | 16 | 8 | M0 |
| 17 | 17 | 5 | M0 |
| 18 | 18 | 7 | M0 |
| 19 | 19 | 9 | M0 |
| 20 | 20 | 7 | M0 |
| 21 | 21 | 7 | M0 |
| 22 | 22 | 6 | M0 |
| 23 | 23 | 6 | M0 |
| 24 | 24 | 7 | M0 |
| 25 | 25 | 7 | M0 |
| 26 | 26 | 6 | M0 |
| 27 | 27 | 8 | M0 |
| 28 | 28 | 5 | M0 |
| 29 | 29 | 7 | M0 |
| 30 | 30 | 9 | M0 |
| 31 | 31 | 7 | M0 |
| 32 | 32 | 7 | M0 |
| 33 | 33 | 6 | M0 |
| 34 | 34 | 7 | M0 |
| 35 | 35 | 7 | M0 |
| 36 | 36 | 7 | M0 |
| 37 | 37 | 8 | M0 |
| 38 | 38 | 7 | M0 |
| 39 | 39 | 4 | M0 |
| 40 | 40 | 7 | M0 |
| 41 | 1 | 5 | M1 |
| 42 | 2 | 6 | M1 |
| 43 | 3 | 6 | M1 |
| 44 | 4 | 6 | M1 |

ou

| | participants | score_empan | sommeil |
|----|--------------|-------------|---------|
| 1 | 1 | 6 | 8 |
| 2 | 2 | 7 | 8 |
| 3 | 3 | 7 | 8 |
| 4 | 4 | 6 | 8 |
| 5 | 5 | 8 | 8 |
| 6 | 6 | 5 | 8 |
| 7 | 7 | 7 | 8 |
| 8 | 8 | 9 | 8 |
| 9 | 9 | 7 | 8 |
| 10 | 10 | 7 | 8 |
| 11 | 11 | 6 | 8 |
| 12 | 12 | 6 | 8 |
| 13 | 13 | 7 | 8 |
| 14 | 14 | 7 | 8 |
| 15 | 15 | 6 | 8 |
| 16 | 16 | 8 | 8 |
| 17 | 17 | 5 | 8 |
| 18 | 18 | 7 | 8 |
| 19 | 19 | 9 | 8 |
| 20 | 20 | 7 | 8 |
| 21 | 21 | 7 | 8 |
| 22 | 22 | 6 | 8 |
| 23 | 23 | 6 | 8 |
| 24 | 24 | 7 | 8 |
| 25 | 25 | 7 | 8 |
| 26 | 26 | 6 | 8 |
| 27 | 27 | 8 | 8 |
| 28 | 28 | 5 | 8 |
| 29 | 29 | 7 | 8 |
| 30 | 30 | 9 | 8 |
| 31 | 31 | 7 | 8 |
| 32 | 32 | 7 | 8 |
| 33 | 33 | 6 | 8 |
| 34 | 34 | 7 | 8 |
| 35 | 35 | 7 | 8 |
| 36 | 36 | 7 | 8 |
| 37 | 37 | 8 | 8 |
| 38 | 38 | 7 | 8 |
| 39 | 39 | 4 | 8 |
| 40 | 40 | 7 | 8 |
| 41 | 1 | 5 | 7 |
| 42 | 2 | 6 | 7 |
| 43 | 3 | 6 | 7 |
| 44 | 4 | 6 | 7 |

Analyse JASP

ANOVA

participants

Dependent Variable: score_empan

Fixed Factors: sommell

WLS Weights

Display

- Descriptive statistics
- Estimates of effect size
 - η^2
 - partial η^2
 - ω^2
- Volk-Sellke maximum p-ratio

Model

Assumption Checks

Contrasts

Post Hoc Tests

sommell

Type

- Standard
- From 1000 bootstraps
- Effect size
- Games-Howell
- Dunnett
- Dunn

Correction

- Tukey
- Scheffe
- Bonferroni
- Holm
- Sidak

Display

- Confidence intervals 95.0 %
- Flag Significant Comparisons

Descriptives Plots

Factors

sommell

Horizontal Axis

Separate Lines

Separate Plots

Display

- Display error bars
- Confidence Interval 95.0 %
- Standard error

Marginal Means

Results

ANOVA

ANOVA - score_empan

| Cases | Sum of Squares | df | Mean Square | F | p | η^2 | ω^2 |
|-----------|----------------|-----|-------------|--------|--------|----------|------------|
| sommell | 177.219 | 3 | 59.073 | 47.192 | < .001 | 0.476 | 0.464 |
| Residuals | 195.275 | 156 | 1.252 | | | | |

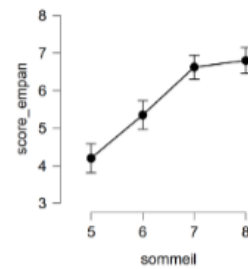
Note. Type III Sum of Squares

Descriptives

Descriptives - score_empan

| sommell | Mean | SD | N |
|---------|-------|-------|----|
| 5 | 4.200 | 1.203 | 40 |
| 6 | 5.350 | 1.189 | 40 |
| 7 | 6.625 | 1.005 | 40 |
| 8 | 6.800 | 1.067 | 40 |

Descriptives plots



Post Hoc Tests

Standard

Post Hoc Comparisons - sommell

| | | 95% CI for Mean Difference | | | | | | | |
|---|---|----------------------------|--------|--------|-------|---------|-----------|-------------|------------|
| | | Mean Difference | Lower | Upper | SE | t | Cohen's d | P_{Tukey} | P_{Dunn} |
| 5 | 6 | -1.150 | -1.800 | -0.500 | 0.250 | -4.597 | -0.962 | < .001*** | < .001*** |
| 7 | 6 | -2.425 | -3.075 | -1.775 | 0.250 | -9.693 | -2.188 | < .001*** | < .001*** |
| 8 | 6 | -2.600 | -3.250 | -1.950 | 0.250 | -10.393 | -2.287 | < .001*** | < .001*** |
| 6 | 7 | -1.275 | -1.925 | -0.625 | 0.250 | -5.096 | -1.159 | < .001*** | < .001*** |
| 8 | 7 | -1.450 | -2.100 | -0.800 | 0.250 | -5.796 | -1.284 | < .001*** | < .001*** |
| 7 | 8 | -0.175 | -0.825 | 0.475 | 0.250 | -0.700 | -0.169 | 0.897 | 1.000 |

*** p < .001

Note. Cohen's d does not correct for multiple comparisons.

Note. P-value and confidence intervals adjusted for comparing a family of 4 estimates (confidence intervals corrected using the Tukey method).