# The effect of social media on mental health

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# Main Question

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Conclusion

**How does social media usage relate to mental health across different age groups and countries?**

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# Motivations

- Mental health issues are a big problem.
- Helps us look at possible relations.
- Gives a start point for further research.

# Sub-questions

Sub-questions related to a person's <u>age</u>:

- **Sub-question 1**: Age & social media usage

- **Sub-question 2**: Age & mental health issues

Sub-questions related to a person's <u>country/continent</u>:

- **Sub-question 3**: Social media exposure & mental health issues

- **Sub-question 4**: Social media uptake & mental health changes

# Sub-question 1 - The question

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Conclusion

**Do certain age groups make more use of social media?**

Hypothesis:

- $H0$: There is no pattern in the relation between age and social media usage.

- $H1$: Younger age groups on average make longer use of social media and use more platforms.

# Sub-question 1 - The question

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**Do certain age groups make more use of social media?**

2 ways to observe this relation:
- The amount of time spent on social media.
- The amount and type of platforms used.

# Sub-question 1 - Methods

- Spearman correlation
  - Relation between age and social media time.
  - Gives a coefficient between -1 and 1.

- Chi-Square statistic
  - Platform usage differences between ages.
  - Difference between contingency table and independent data.

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# Method 1: Age vs. Daily social media time

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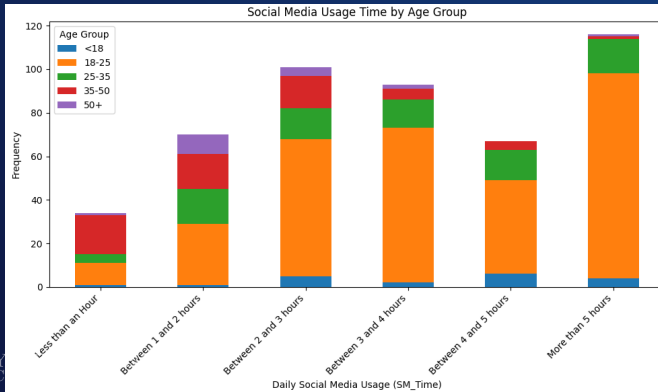Methods & Results
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Conclusion

- Younger age groups spend relatively much more time on social media than older age groups.

- Spearman correlation: **-0.267**



Social Media Usage Time by Age Group

# Method 2: Age vs. social media platform use

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Conclusion

- Platform use is more diverse for younger age groups, while older age groups are more focused.

- Chi-Square Statistic **75.666**



Relative Platform Usage by Age Group (Normalized)



Average Number of Platforms Used per Age Group

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# Sub-question 1 - Conclusion

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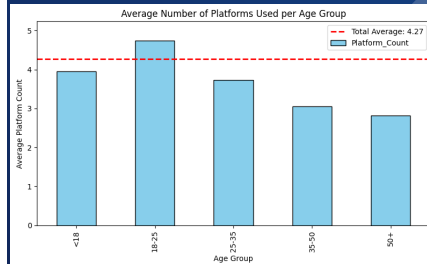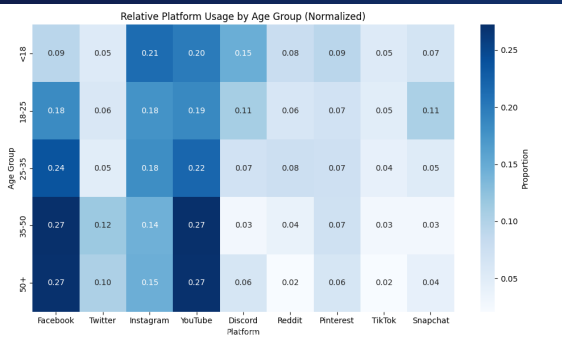Sub-question 1
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Conclusion

Results statistical tests:

- Spearman correlation: **-0.267**

- Chi-Square Statistic **75.666**

- p-value **< 0.0001**

These results show that:

- Younger age groups use social media for longer times.

- Younger age groups use a more diverse range of platforms, and often multiple.

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# Sub-question 2 - The question

**Do certain age groups suffer more from mental health issues?**

Hypothesis:

- H0: There is no pattern in the relation between age and mental health issues.

- H1: Certain age groups suffer on average more/less from mental health issues.

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# Sub-question 2 - Data collection

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Conclusion

**Do certain age groups suffer more from mental health issues?**

Data:

- List of mental health questions ranked 1-5.
- The score is the average score on those questions.

# Sub-question 2 - Methods

- Spearman correlation
  - Relation between age and mental health score.
  - Gives a coefficient between -1 and 1.

- Kruskal-Wallis H-test
  - Compares the distribution of mental health scores.
  - Gives a H-value indicating differences.

# Age vs. Mental Health score

- The median score for younger age groups is much higher than for older age groups.

- Kruskal-Wallis H: **57.944**



Mental Health Scores by Age Group

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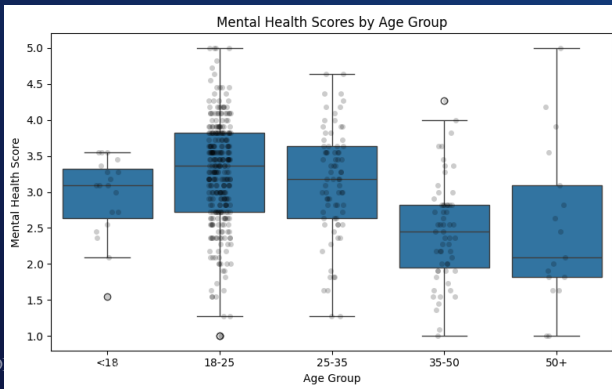Sub-questions

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# Sub-question 2- Conclusion

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Conclusion

Results statistical tests:

- Spearman correlation: **-0.220**

- Kruskal-Wallis H: **57.944**

- p-value < **0.0001**

These results show that:

- Younger age groups report on average higher mental health scores.

# Sub-question 3 - The question

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Conclusion

- **Do countries/continents that have more exposure to social media suffer more from mental health issues?**

Hypothesis:

– **H0:** Countries/continents where social media is more often used, have relatively less cases of mental health issues.

– **H1:** Countries/continents where social media is more often used, also have relatively more cases of mental health issues.

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# Sub-question 3

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Conclusion

- **Do countries/continents that have more exposure to social media suffer more from mental health issues?**

  We will look at 2 different cases:
  - Country-level
  - Continent-level

# Sub-question 3 - Continents

Data:
- Social media share (% of population)
- Mental disorder prevalence

Methods:
- Bootstrap: Estimate each continent's mean and its 95% confidence interval.
- KS tests: Applied only to continent pairs whose confidence intervals overlap.

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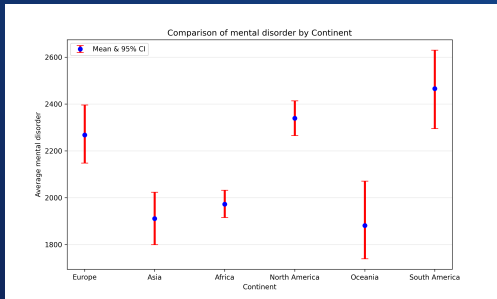  Sub-question 1
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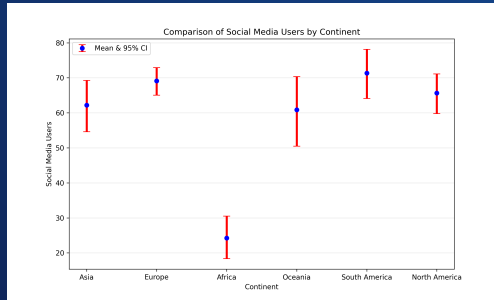  Sub-question 3
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# Continents - Mental disorder prevalence

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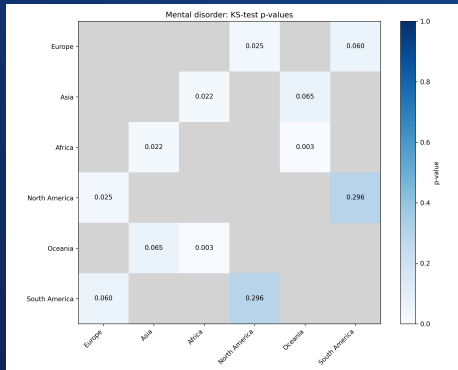Sub-question 4

Conclusion

- Europe, North America and South America: higher levels of mental disorder



Comparison of mental disorder by Continent

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# Continents - Social media usage

- Except for Africa, all continents have a high share of social media users.



Comparison of Social Media Users by Continent

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# Continents - Results

- Mental disorders: Europe vs North America, Asia vs Africa, and Africa vs Oceania.

# Continents - Results

- Social media usage: Europe vs North America.

- Mental health differs greatly by continent, but social media usage remains relatively consistent globally.

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# Sub-question 3 - Countries

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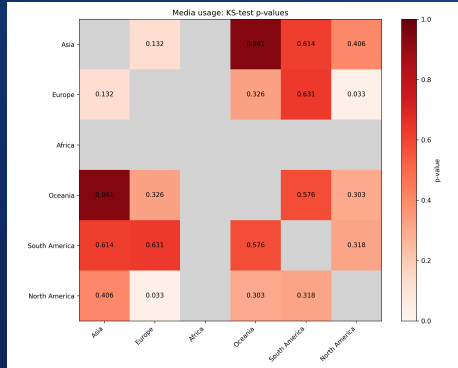  Sub-question 3
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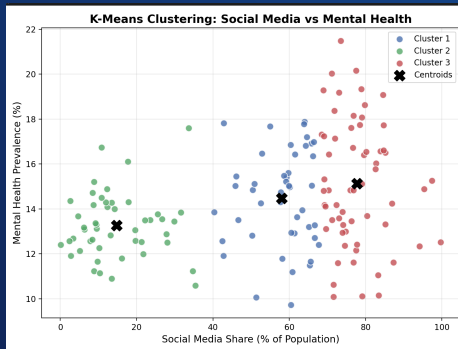
Conclusion

**Methods**:

- Linear regression: Estimates the association.
- K-Means clustering: Groups countries.
- Spearman correlation: measures the strength of the association.

# Countries - Results

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Conclusion

- Medium–high exposure clusters show slightly higher average mental disorder prevalence.

- No strong evidence for a clear relationship.



K-Means Clustering: Social Media vs Mental Health

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# Countries - Results

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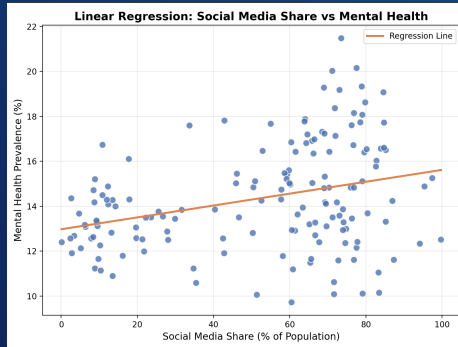Sub-question 3
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Conclusion

- The regression line shows a slight positive relationship

- Spearman correlation = 0.277 indicates only a weak association.



Linear Regression: Social Media Share vs Mental Health

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# Sub-question 4

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Conclusion

- **Do countries that have a faster uptake in social media users see a faster decline in mental health compared to slow-uptake countries?**

    – **H0:** There is no significant difference.

    – **H1:** Faster uptake in social media users $\Rightarrow$ faster decline in mental health

    * **Note:** Fast- and slow uptake countries are defined by the **median value.**

# Sub-question 4 - Methods

- Mann-Whitney U test with Z-score
  - Rank mental health changes
  - If $|z| >$ critical value, reject H0
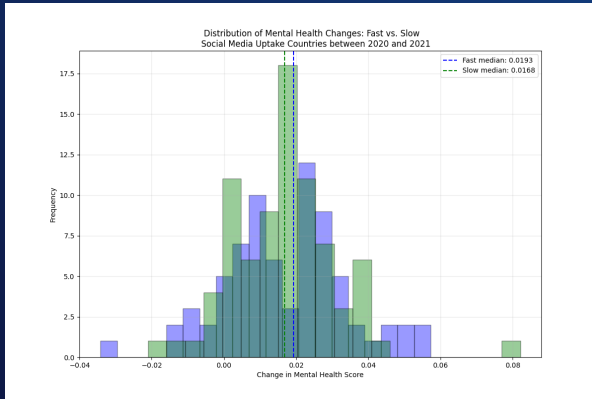    - Critical value = 1.96 for $\alpha = 0.05$

$$U_f = n_f n_s \frac{n_f(n_f + 1)}{2} - R_f$$

$$U_s = n_f n_s + \frac{n_s(n_s + 1)}{2} - R_s$$

$$z = \frac{min(U_f, U_s) - \mu_{U_{f,s}}}{\sigma_{U_{f,s}}}$$

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# Sub-question 4: Results

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- $|z| = 0.52 \leq 1.96 \Rightarrow$ Fail to reject H0

# Conclusion

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Conclusion

**How does social media usage relate to mental health across different age groups and countries?**

Results of sub-questions:

- Sub-questions 1 and 2: The age the users <u>does</u> seem to have an effect on the social media usage, and their mental health.

- Sub-questions 3 and 4: The exposure and uptake of social media in a country, <u>does not</u> seem to have a major effect on the mental health of users.

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# Conclusion

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**How does social media usage relate to mental health across different age groups and countries?**

**Final conclusion:**
The relation between social media and mental health, seems to be impacted by personal factors, such as age, but not as much by regional factors like a person's place of origin.

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# Future research

- Larger datasets

- Avoid missing 'important' countries.

- Better age distribution.

- More focus on individuals. *(ecological fallacy)*

- Experiment with different factors.

# Thanks for listening, any questions?

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