

# The effect of social media on mental health



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**Students:**

Hero R. Brouwer  
15170284

Mingtao Cheng  
15163423

Maryelis Martinez Diaz  
16482816

Ryan de Klerk

 UNIVERSITY OF AMSTERDAM  
INFORMATICA  
15008827

**Group:**

4

**Lecturer:**

Mr. R. Quax

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# Main Question

**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.

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# Sub-questions

Sub-questions related to a person's age:

- **Sub-question 1:** Age & social media usage
- **Sub-question 2:** Age & mental health issues

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

- **Sub-question 3:** Social media exposure & mental health issues
- **Sub-question 4:** Social media uptake & mental health changes

# Sub-question 1 - The question

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

Hypothesis:

- $H_0$ : There is no pattern in the relation between age and social media usage.
- $H_1$ : Younger age groups on average make longer use of social media and use more platforms.

# Sub-question 1 - The question

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

2 ways to observe this relation:

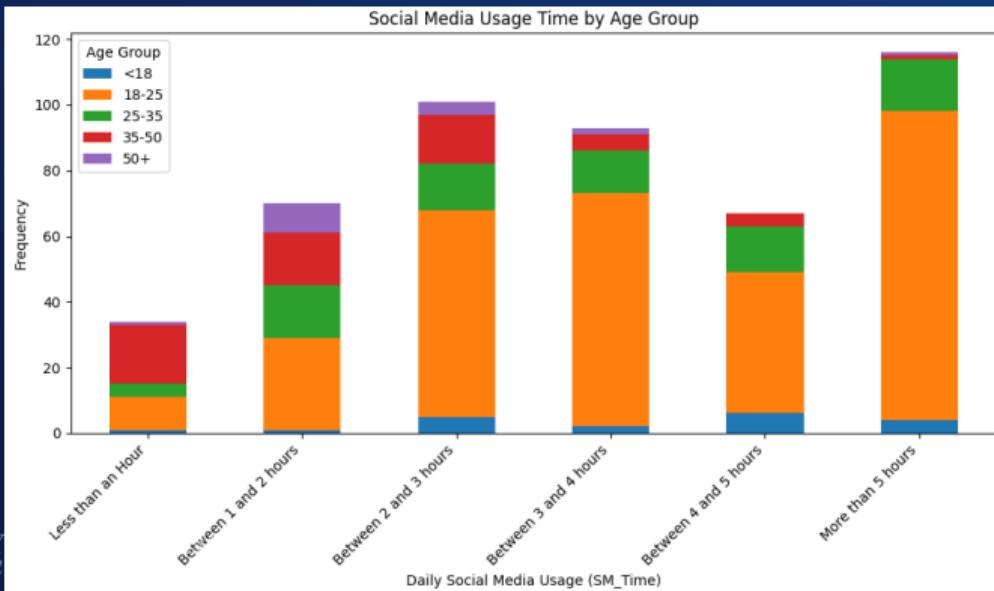
- The amount of time spent on social media.
- The amount and type of platforms used.

# 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.

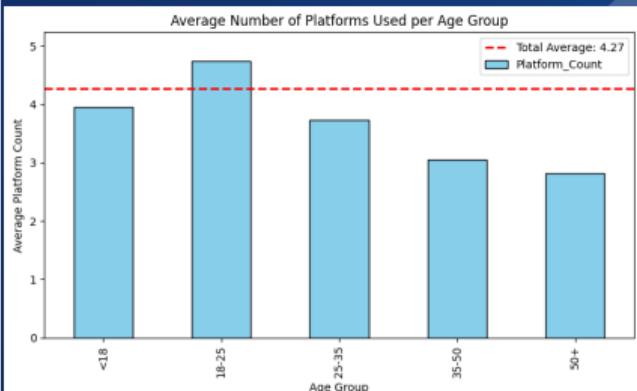
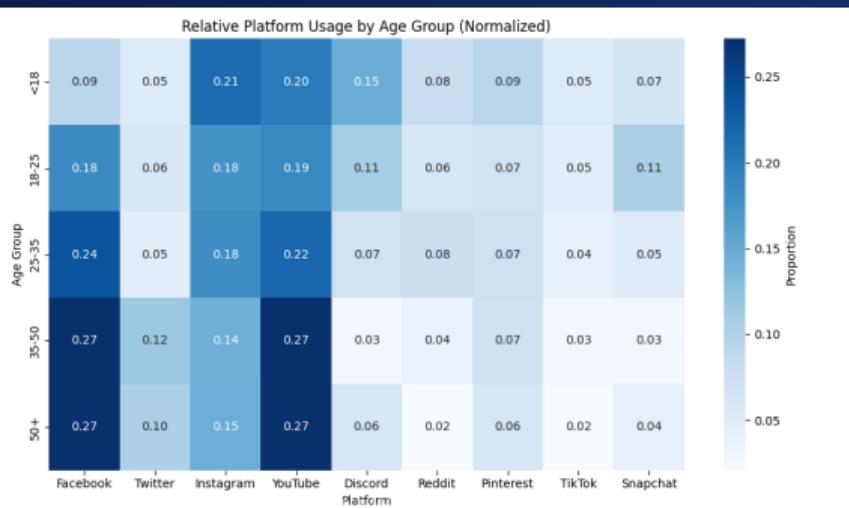
# Method 1: Age vs. Daily social media time

- Younger age groups spend relatively much more time on social media than older age groups.
- Spearman correlation: **-0.267**



# Method 2: Age vs. social media platform use

- Platform use is more diverse for younger age groups, while older age groups are more focused.
- Chi-Square Statistic **75.666**



# Sub-question 1 - 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.

# 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.

# Sub-question 2 - Data collection

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

Data:

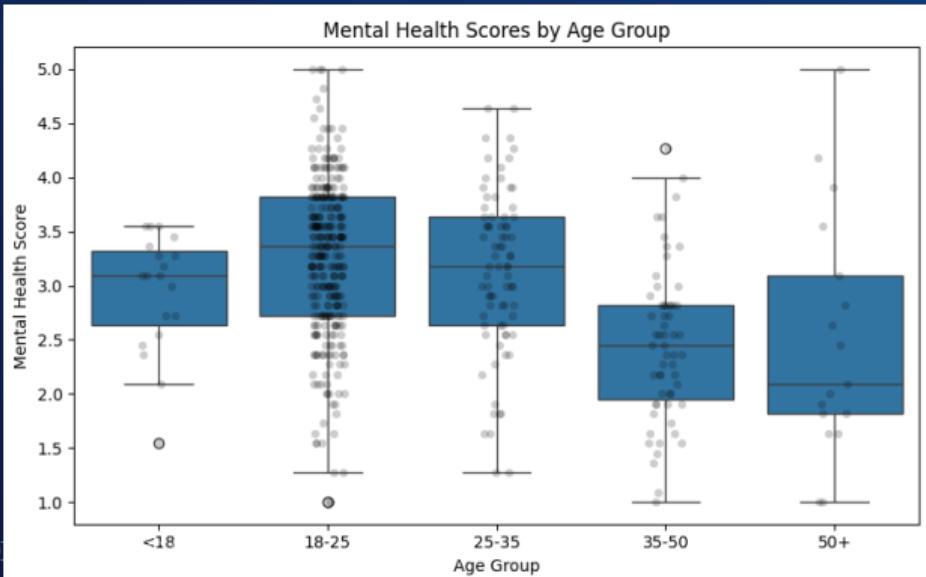
- List of mental health questions ranked 1-5.
- The score is the average score on those questions.

# 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**



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# Sub-question 2- 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

- **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.

# Sub-question 3

- **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:

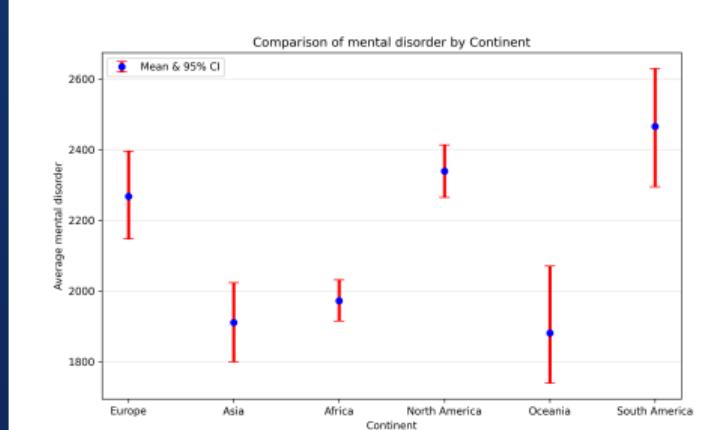
- Social media share (% of population)
- Mental disorder prevalence

Methods:

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

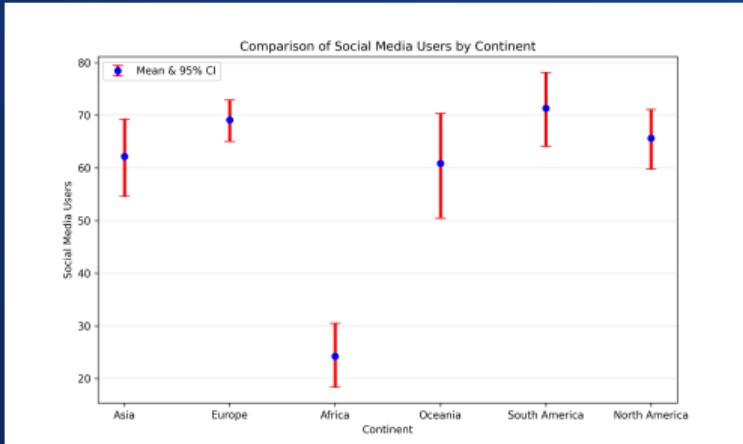
# Continents - Mental disorder prevalence

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



# Continents - Social media usage

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



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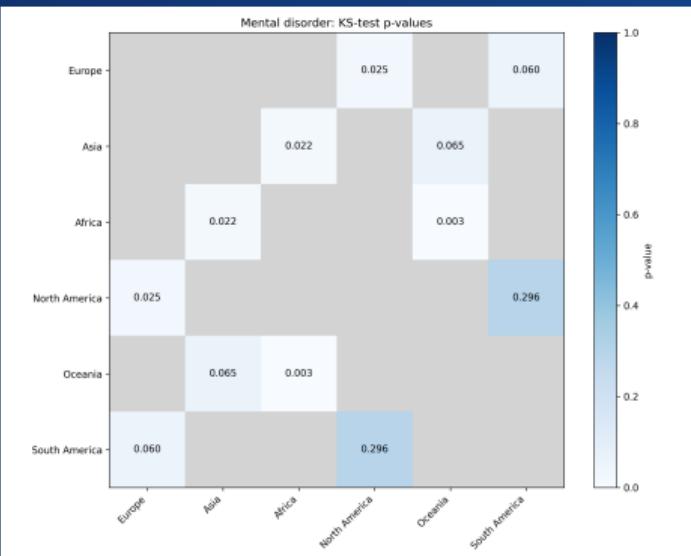
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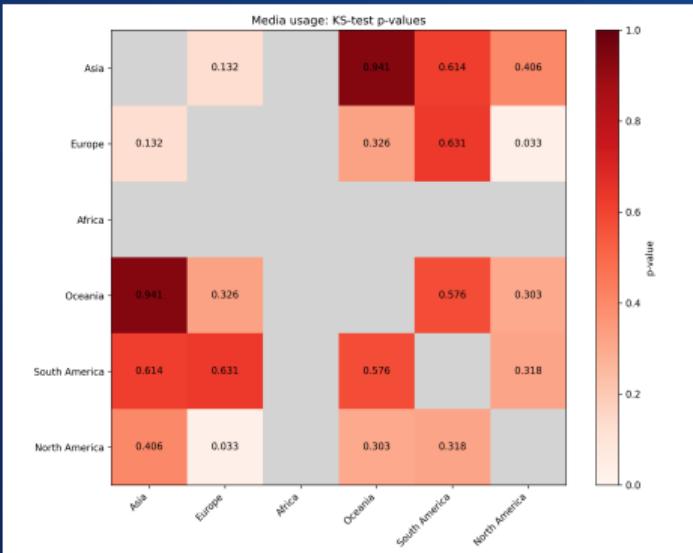
# Continents - Results

- 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.



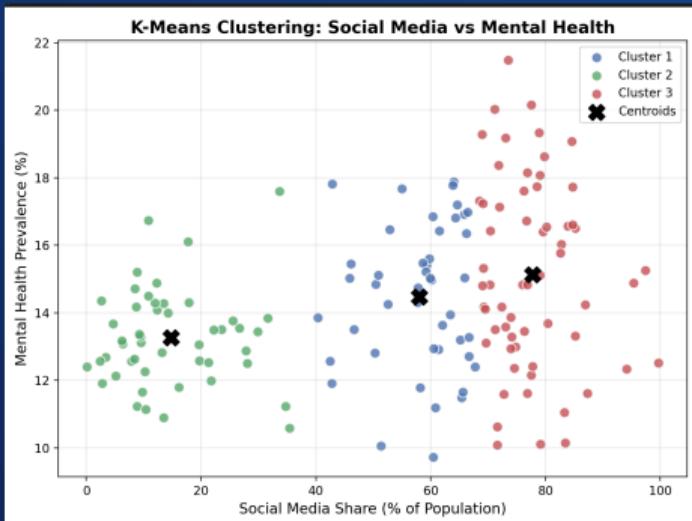
# Sub-question 3 - Countries

## Methods:

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

# Countries - Results

- Mediumhigh exposure clusters show slightly higher average mental disorder prevalence.
- No strong evidence for a clear relationship.



Project questions

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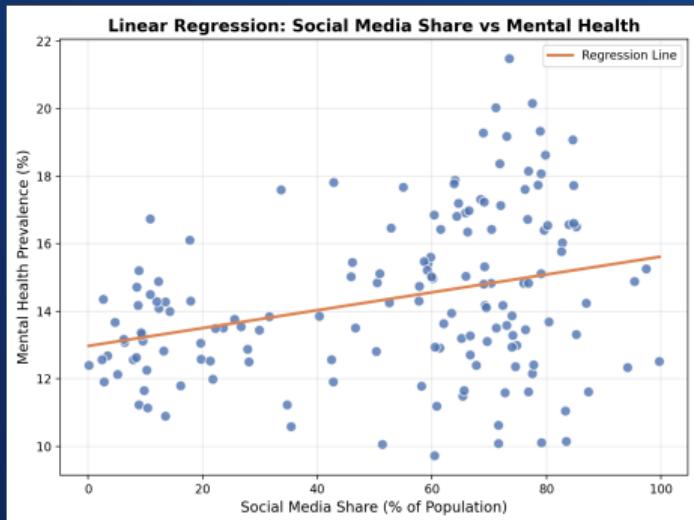
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# Countries - Results

- The regression line shows a slight positive relationship
- Spearman correlation = 0.277 indicates only a weak association.



## Project questions

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# Sub-question 4

- **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 ⇒ 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  $H_0$ 
    - Critical value = 1.96 for  $\alpha = 0.05$

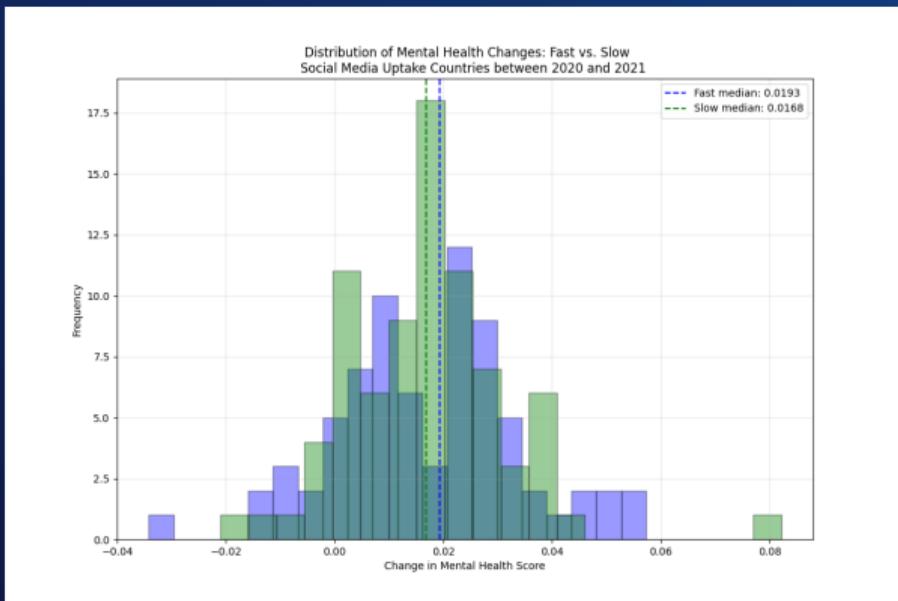
$$U_f = n_f n_s \frac{n_f(n_f + 1)}{2} - R_f$$

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

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

# Sub-question 4: Results

- $|z| = 0.52 \leq 1.96 \Rightarrow \text{Fail to reject } H_0$



# 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: A person's age does 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, does not seem to have a major effect on the mental health of a person.

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# Conclusion

**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 other personal factors.

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# Thanks for listening, any questions?