

Do we have the Text Neck Syndrome?

Both teenagers and adults spend hours every day in front of our mobile phones. ✓

But we don't pay attention to our postures or worry about the consequences for our health!

Excessive and inappropriate use of these devices has led to the so-called *Text Neck Syndrome*.

Symptoms

Forward head posture (FHP).
Stiff back, neck and back pain.

- We wondered if people of our age are already exhibiting these symptoms.
- We took a **sample** of 170 students from our school: 107 girls and 63 boys between 15 and 17 years old.
- We designed a questionnaire, took measurements and analyzed data.

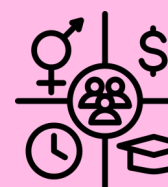
Data collection

Online questionnaire

1. Informed consent



2. Demographic data



3. Smartphone use:

Daily average use of the mobile phone in the previous week is requested.

4. Neck pain:

Questions about the frequency and intensity of pain, as well as prior back conditions.



Record sheet

Code: Ensures anonymity and matches sheet data with online questionnaire.

FORWARD HEAD POSTURE (FHP) ASSESSMENT.



CODE: C413	TIME SPENT ON THE MOBILE PHONE
FHP MEASURE	3h 42 min
	A X C D

Observed posture: The posture that students spontaneously adopt is evaluated according to this scale:



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The questionnaires are completed on days with similar prior weeks, without holidays and without many exams.

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Students do not know that their posture is being evaluated, to avoid influencing them. The two measures are always carried out by the same researcher.

Data analysis

SIGNIFICANCE LEVEL

5%

OBJECTIVE #1 is to examine the effect of the time the mobile phone is used (X) on the natural position of the head (Y) in teenagers.

- NULL HYPOTHESIS H_0 :** The position of the head is independent of the time the mobile phone is used.
- ALTERNATIVE HYPOTHESIS H_a :** The position of the head depends on the time the mobile phone is used.

ANALYSIS METHOD: X-Quantitative vs. Y-Quantitative: Regression Analysis

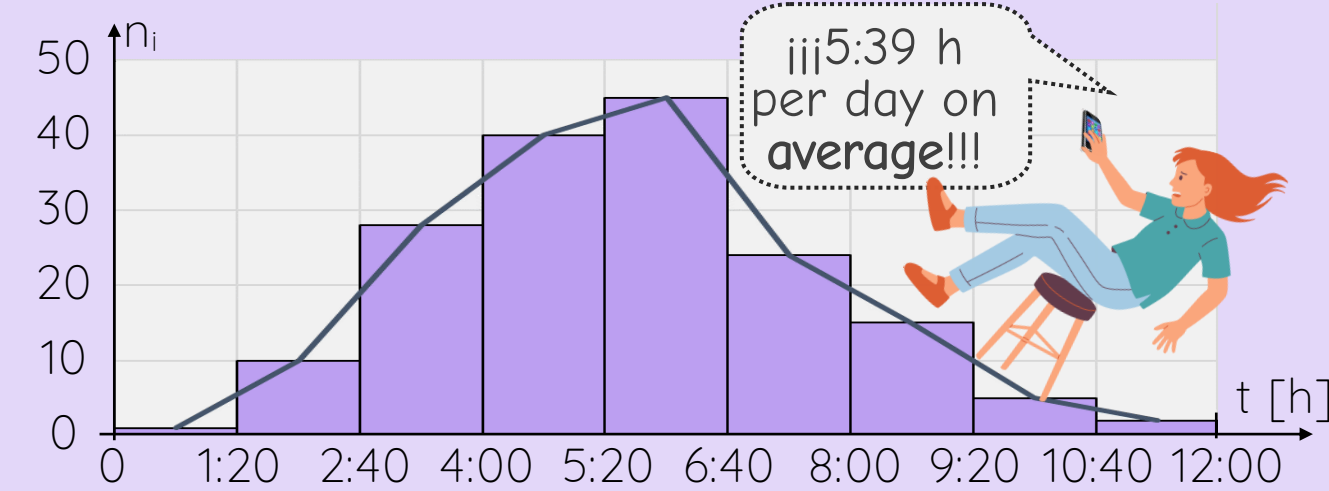


Figure 1. How many hours a day on average did you use your phone last week? Average time vs. absolute frequency.

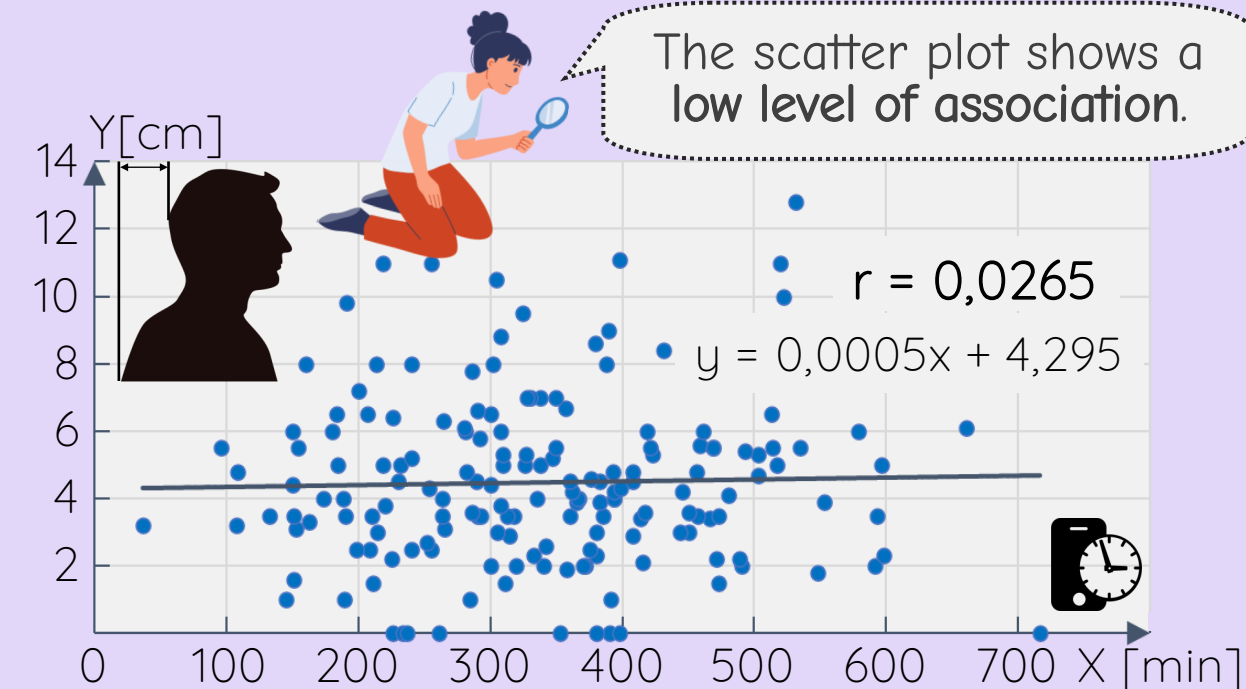


Figure 2. Scatter plot: Mobile phone usage time (X) vs. Measurement of Forward Head Posture (FHP) (Y)

FINDING: $p\text{-value} = 0,7294 > 0,05$.
THE NULL HYPOTHESIS CANNOT BE REJECTED

OBJECTIVE #2 is to examine the effect of the time the mobile phone is used (X) on the neck pain (Y) in teenagers.

- NULL HYPOTHESIS H_0 :** Neck pain is independent of the time the mobile phone is used.
- ALTERNATIVE HYPOTHESIS H_a :** Neck pain depends on the time the mobile phone is used.

ANALYSIS METHOD: X-Quantitative vs. Y-Categorical: Two sample t-test (big samples $n > 30$)

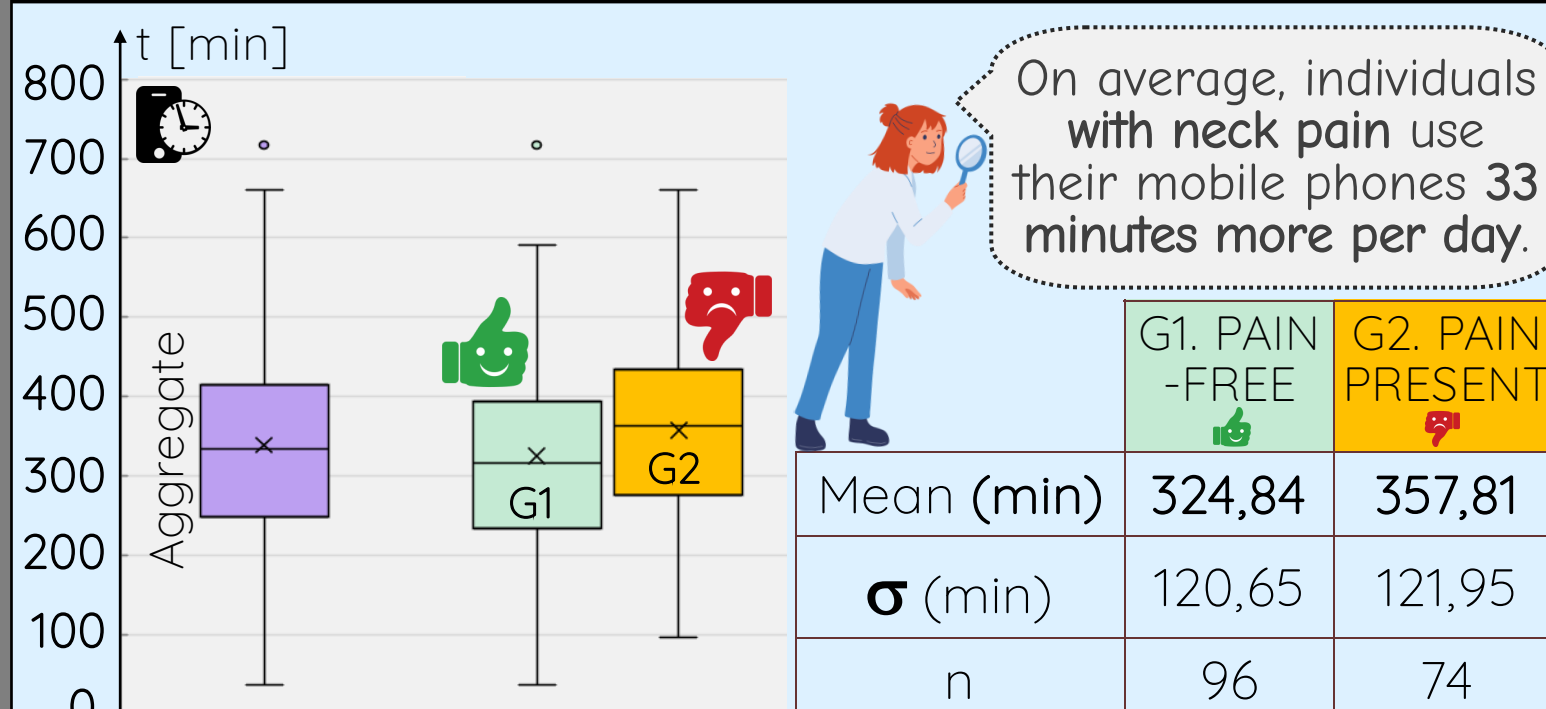


Figura 3. Box Plots: Mobile phone usage time (X). Aggregate results. Group 1 (G1): Pain-Free. Group 2 (G2): Pain Present.

FINDING: $p\text{-value} = 0,0396 < 0,05$.
THE NULL HYPOTHESIS CAN BE REJECTED

However... A confounding bias may exist due to prior back conditions, such as scoliosis.

	G1. PAIN -FREE	G2. PAIN PRESENT
Mean (min)	326,80	350,16
σ (min)	120,17	123,71
n	81	50

Table 1. Sample parameters for variable X: Mobile phone usage time, excluding individuals with prior back conditions.

EXCLUDING PRIOR BACK CONDITIONS: $p\text{-value} = 0,1443 > 0,05$.
THE NULL HYPOTHESIS CANNOT BE REJECTED

OBJECTIVE #3 is to examine the effect of the observed postures (X) on the neck pain (Y) in teenagers.

- NULL HYPOTHESIS H_0 :** Neck pain is independent of the observed posture when using the mobile phone.
- ALTERNATIVE HYPOTHESIS H_a :** Neck pain depends on the observed posture when using the mobile phone.

ANALYSIS METHOD: X-Categorical vs. Y-Categorical: Chi-square test for independence: χ^2

		X: Observed mobile phone usage posture				
		A	B	C	D	
Y: Neck pain presence	Never	26				
	1-2 times	70				
	Sometimes	54				
	Often	20				
		1	63	82	24	170

Table 2. Frequency table obtained from the analysis of Observed mobile phone usage posture (X) vs. Neck pain presence (Y).

If a statistically significant association between posture and pain is found... Might it be influenced by the same bias once more?

FINDING: Observed $\chi^2 = 4,796$
Expected $\chi^2 = 3,842$ (1 df)
 $4,796 > 3,842$ ($p\text{-value} = 0,029 < 0,05$)
THE NULL HYPOTHESIS CAN BE REJECTED

		X: Observed mobile phone usage posture				
		A/B	C/D			
Y: Neck pain presence	Never / 1-2 times	43	36,14	53	59,86	96
	Sometimes / Often	21	27,86	53	46,14	74
		64	106	170		

Table 3. OBSERVED and EXPECTED Chi-square contingency table for Observed mobile phone usage posture (X) vs. Neck pain presence (Y). (Aggregated categories. 1 degree of freedom)

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When calculating the expected frequencies, some cells exhibited very low values (< 5) (Table 2). These values can lead to an artificially high Chi-squared statistic, potentially resulting in a false or spurious relationship between the variables. Consequently, we decided to re-group the variables (Table 3).

EXCLUDING PRIOR BACK CONDITIONS Observed $\chi^2 = 3,338$
Expected $\chi^2 = 3,842$ (1 df)
 $3,338 < 3,842$ ($p\text{-value} = 0,0677 > 0,05$)
THE NULL HYPOTHESIS CANNOT BE REJECTED

CONCLUSIONS: Our findings suggest that young people of our age haven't developed Text Neck Syndrome yet. With 95% confidence, we can assert that:

- No alteration of the natural head position related to mobile phone use was found.
- Excluding prior back conditions, there is no evidence to suggest that neck pain is linked to mobile phone usage time or posture.