

Decide what statistical test should be used in the following situations. Sometimes it should be clear whether you should use parametric or nonparametric tests. If it's not clear (if the situation doesn't inform you about assumptions), state both variants and when would you use them. If the situation says that the distribution is substantially different from normal, assume that no transformation would help.

1. A unified national math test has population mean $\mu = 15$. A headmaster wants to find out whether average score of students from his school equals the national mean. The scores are approximately normally distributed.
2. We want to find out whether men and women ($N_1=N_2=100$) differ in optimism level measured by interval scale.
3. We want to find out whether the level of optimism related is to age. Both variables are approximately normally distributed.
4. We want to find out whether is the level of optimism related to age, but we only know whether the respondents are adolescents, adults or seniors. Optimism is measured on interval scale and has approximately normal distribution.
5. We want to find out whether is the level of optimism related to age, but we only know whether the respondents are adolescents, adults or seniors. Optimism is measured on interval scale, but the distribution is substantially right skewed.
6. We want to find out whether years of education are associated with income level (income level has substantially right-skewed distribution).
7. A class of 30 students wrote two tests from geography (0-20 points, each student wrote both tests). We want to find out whether the two tests were equally difficult (assume normal distribution).
8. We want to find out whether the basic colours (white, black, red, green, blue, yellow, orange, brown) are popular to the same extent (that is – whether are the colours preferred by the same amount of people).
9. We want to find out whether patients with schizophrenia differ from healthy people in empathy measured by interval scale, but we have 150 healthy people and only 20 patients and the assumption of homoscedascity is substantially violated.
10. We want to find out whether full-time students and combined students ($N_1=200$, $N_2=80$) differ in preference of working during studying (yes/no).
11. In 30 families with two children we want to find out whether the younger and the older siblings are popular in the school to the same extent. Popularity is measured by interval scale with normal distribution.
12. In 30 families with two children we want to find out whether both younger and older siblings are popular in their school (yes/no).
13. We want to find out whether school grades from math and physics are related.

14. We want to find out whether number of points obtained from statistics tests increases with the preparation time. The distributions are approximately normal.
15. We want to find out whether willingness to donate money (yes/no) changed after an educational discussion (N=50).
16. We want to find out whether people who prefer different colours (preference of red, green, blue, yellow or black) differ in math test score.
17. We want to find out whether people who prefer different colours differ in school grade from painting.
18. In a sample of 30 functional romantic couples we want to find out whether the partners are satisfied to the same level (interval scale).
19. We want to find out whether the number of hours spent by exercising is associated with well-being level. Both variables are measured on interval scale, but the number of hours spent by exercising is substantially positively skewed and there are some outliers we don't want to remove from the analysis.
20. We want to find out whether attitudes of a research sample towards Ukraine minority are significantly positive or negative. The attitude was measured on a scale from 0 to 100 points, where 50 means neutral attitude.
21. We want to find out whether pairs of siblings differ in preferred colour.
22. We want to find out whether two classes differ in math test score (0-20 points). In each class, 35 children took the test.
23. We want to find out whether school grades of students who got extra tuition improved.
24. We want to find out whether men and women differ in income amount. Income amount distribution is substantially positively skewed with outliers.
25. We want to find out whether classes from three different schools differ in math grades.
26. We want to find out whether gender (men/woman) is associated with preference of sweet food (I like them/I don't like them).