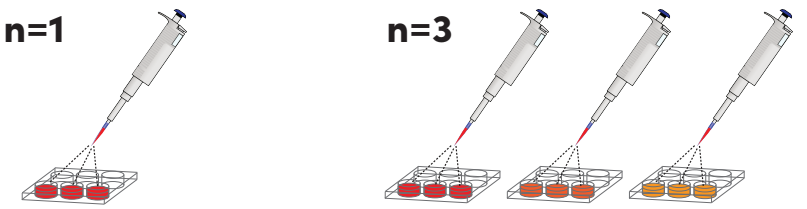
HEY, RESEARCHER! Leave those bars alone!

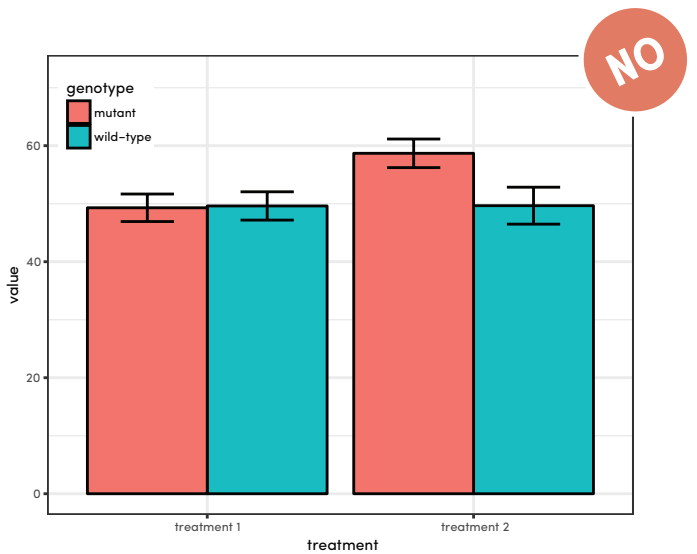
Best practices for reporting numerical and statistical results

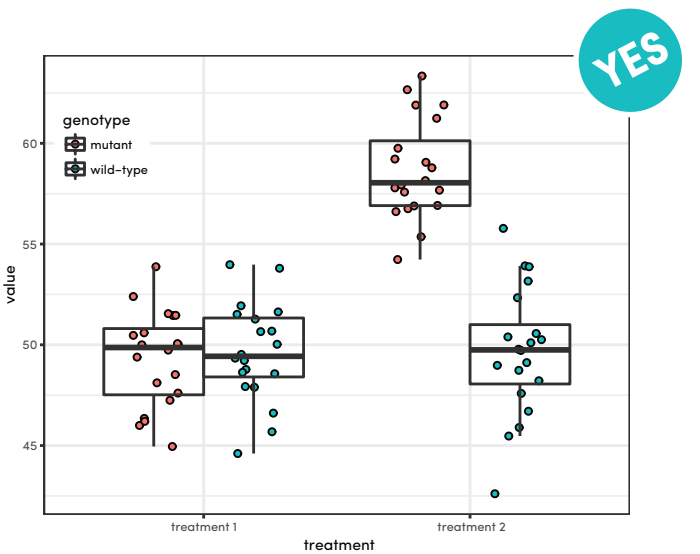
1. State the number of technical and/or biological replicates depicted in the figure legends. *If only technical replicates from a single experiment are shown in a figure, the legend needs to include information about the reproducibility of the observations across biological replicates.*



Technical replicates *Biological replicates*

2. Show the true variability in your data by using scatter plots. *Scatter plots depict data more transparently than bar graphs alone by presenting actual data points and focusing on the important range of the y-axis. Scatter plots can also be superimposed over a bar graph. Larger data sets are often better represented using a box/whisker plot, or even a violin plot.*





3. When error bars are used, show experimental error by reporting the standard deviation (SD). *Standard deviation (SD) should be used to show error because it measures the variability or spread of the data in one group. Standard error of the mean (SEM) is an estimate of the precision in estimating a true population mean, and is not appropriate for depicting experimental error.*

4. State all statistical methods used to analyze experimental results in each figure legend. *The legend should report the exact values of any p-values that were obtained and include the full results from any ANOVA or other analyses (i.e., degrees of freedom, F-statistics, p-values, and any post-hoc comparisons).*

Further Reading

Learn about standards for transparently reporting experimental design, reproducibility and uncertainty:

Fosang, A. J., and Colbran, R. J. (2015) Transparency Is the Key to Quality. *J. Biol. Chem.* **290**, 29692-29694 doi: 10.1074/jbc.E115.000002.

Find easy-to-use tools for plotting data:

Weissgerber, T. L., Savic, M., Winham, S. J., Stanisavljevic, D., Garovic, V. D., and Milic, N. M. (2017) Data visualization, bar naked: A free tool for creating interactive graphics. *J. Biol. Chem.* **292**, 20592-20598 doi: 10.1074/jbc.RA117.000147

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