

Exercise – Report Reviews

You are a graduate student. As part of your professional training, your major advisor, Dr. B., has asked you to read and comment on the research notes and reports from three undergraduate teams.

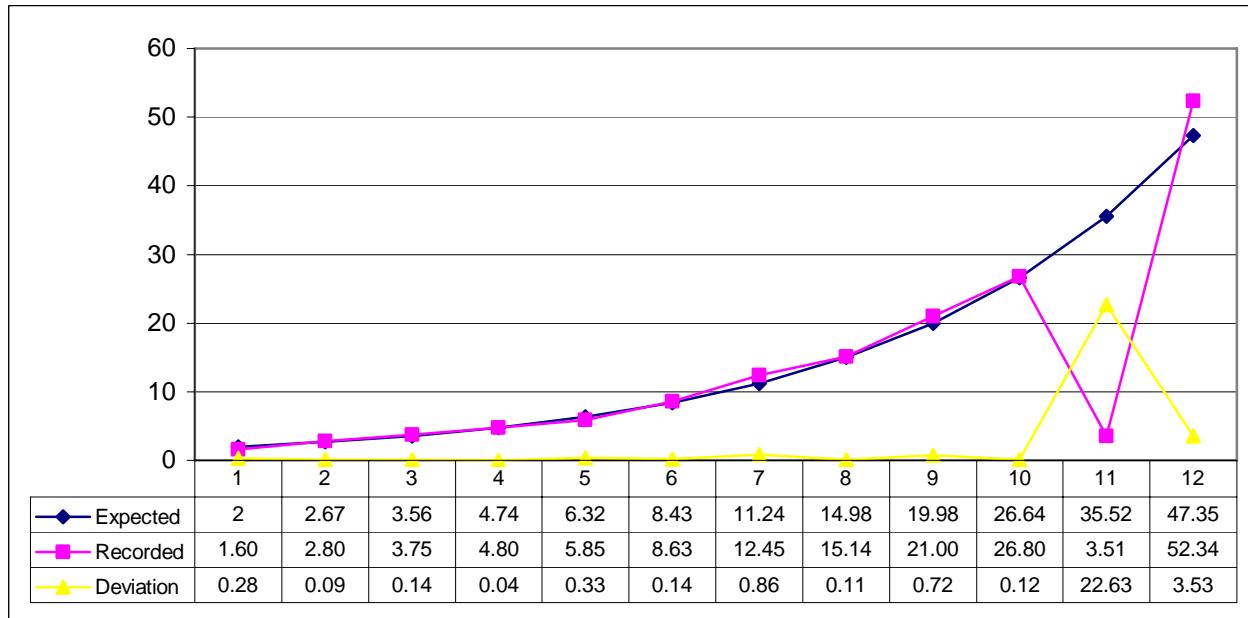
The undergraduate teams were each assigned to do a different experiment, take careful notes, and write up an informal report. After you and Dr. B. have evaluated the reports, the undergraduate teams will use them to write an article in the style of a scientific paper.

The notes for each team look good to you, as does the bulk of each research report. The only point of concern comes from the conclusion of one or more of the reports.

Your task is to read the conclusions to the three reports (below) and prepare a short memo to Dr. B with suggestions about how she or he should respond to each team's conclusion and recommendation.

Team A

Conclusion. The first ten of the twelve measurements we took are very near the predicted value (all with a deviation under 1), but the last two are way off the line. We think we must have made some kind of mistake on those two measurements. We might have read the instrument wrong or made a mistake in writing down the value, or maybe the instrument was malfunctioning near the end (could it have overheated?). Since these two points are obviously incorrect, and the other ten provide ample confirmation of the hypothesis, we think we have enough data to write our article without further experiments. We don't think it's necessary to mention the two outliers in our article.



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This exercise is adapted from Treichel 1999. I am indebted to George Bodner of Purdue University for advice on my adaptation; any shortcomings remain my own.

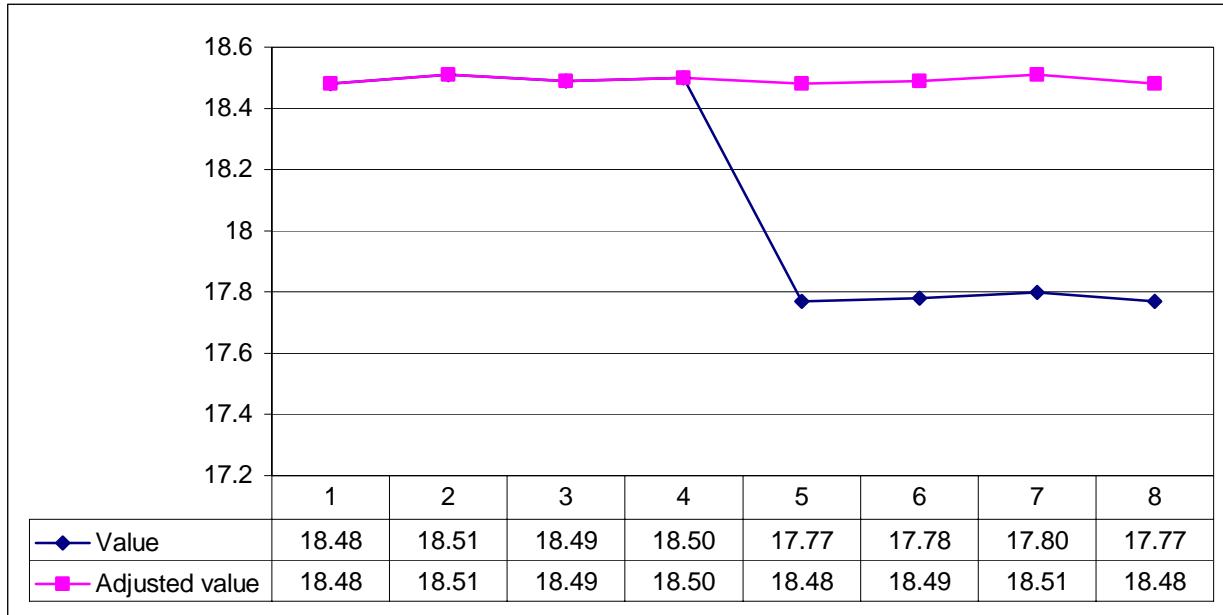
Team B

Conclusion. The three measurements we took were supposed to come out the same, but they didn't. The first and third are very close to each other, but the second is way off, and we don't know why. Our article requires at least three data points, but because this experiment is so time consuming and two of our three measurements were virtually identical, we plan to use the average of the first and third values for the second value.

Measurement #	Recorded value	Value for article
1	75.23	75.23
2	60.13	75.36
3	75.49	75.49

Team C

Conclusion. Our eight measurements were supposed to come out the same, but they didn't. The first four measurements are nearly the same, and the second four are also nearly the same, but the first four and the last four are pretty far off from each other. We were really upset when we looked at this after a long day in the lab, but we decided to sleep on it and hope things would look better after a good night's sleep. Sure enough, the next morning we realized that the second four measures were off by a pretty consistent amount and we remembered that we had used one instrument in the morning for the first four measurements and a different instrument in the afternoon for the second four (after lunch). The first instrument wasn't available to us after lunch. We figured that the two instruments must be calibrated differently or something. We calculated that a correction factor of 1.04 would bring the second four measures right into line with the first four. We will use the adjusted values in the article.



Reference cited

Treichel, Paul M. 1999. "Ethical conduct in science: The joys of teaching and the joys of learning." *Journal of Chemical Education* 76(10):1327-1329.