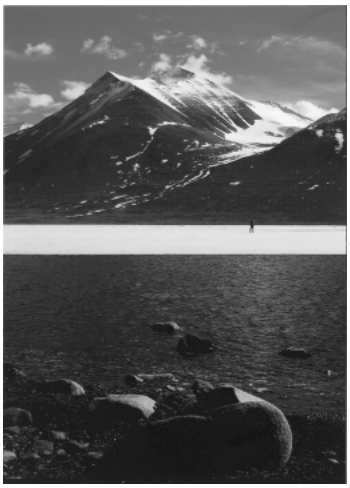

CONTRIBUTIONS

Commentary

Ten Generic Seminar Questions

Often it is difficult for many faculty and graduate students to come up with good questions after a seminar. However, after attending many seminars over more than three decades in science, it is apparent to me that there are categories of substantive questions that are often asked, or could be asked, at seminars. Although my experience is generally with seminars in ecology, evolution, and related fields, these categories probably extend to other areas of biology.

Below I have listed 10 such generic questions, ones that may be fitted with specific details, indicated by ellipses, to fit the topic or data from the seminar. The questions are set in a statistical or scientific hypothesis framework, the general categories of which are indicated in parentheses at the end of the question. Not only may such a framework give credibility to the question, but also it should provide a common language for the speaker, questioner, and the rest of the audience.

Remember that these questions are being asked of your colleague or guest, and that you are honestly trying to find out more about the topic (sometimes this is hard to keep in mind). Questions should be asked in a positive and constructive tone so that profitable discussion ensues. If possible, it is useful to introduce the question with some kind of complimentary preface, such as, "I really thought that your experiment was well-designed and particularly liked ... ." or "Your data on the ... are very interesting and show that ... ."

These questions may prove useful in several other situations. For example, students, in preparing for their thesis defense, may find them helpful in thinking about their research in a framework that others may use to ask them questions. Also, when there are no questions from the audience after a talk at a colloquium, the moderator may base a question on one of them to start discussion.

My overall hope is that these questions will encourage the reluctant listener to ask his or her question and to stimulate important and reasonable discourse after seminars.

1) In your outline of the effect of ... , you assumed that ... . Is this predicted from a theoretical (mathematical) model, and how robust is it? (Verbal or conceptual model vs. explicit theoretical model.)

2) Your model has many parameters, and thus may be consistent with many different arrays of results. How possible is it to show that your model is inconsistent with your data? Can it be shown that your model is more appropriate than an alternative model that includes ... ? (Appropriate model.)

3) In order to eliminate the effect of ... , wouldn't it have been appropriate to have an experiment in which ... ? (Appropriate control.)

4) Is there another explanation for your results, for example ... , and how would you exclude that as a possibility? (Alternative hypotheses.)

5) Your results are consistent with the hypothesis (model) that ... . What specific, testable predictions follow from this hypothesis, and what experiments would you perform to examine it? (Testable predictions from hypotheses.)

6) Is there evidence that your results, ... , are general in other organisms, for other traits, etc.? (Generality of data, same results in independent experiments by other researchers.)

7) In an experiment (other data) ... showed that ... . This appears inconsistent with your results, model, etc. How could you explain this difference? (Generality of results.)

8) Your findings were consistent with your prediction (hypothesis, model) ... . How likely were you to detect a difference from your prediction if it were in fact present? (Statistical power, Type II error.)

9) In the figure (table) ... , it appeared that the ... was not consistent with your prediction (hypothesis). Have you followed up with observations to see if this replicable? Is it replicable for the same trait, in other organisms, etc.? (Repeatability of results, Type I error.)

10) You carried out a number of experiments (had many data sets, etc.). Should the significance level have been adjusted because of the large number of tests carried out? (Multiple comparisons.)

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Clarification

A sentence in the Commentary article, *Where the ocean meets the sky* . . . , in the *ESA Bulletin* 81(3), July 2000, pp. 232–234, may suggest that scientists know that air deposition contributes significantly to Pacific coastal water quality problems. In the paragraph beginning, "The Pacific Coast Workshop, . . . ," the excerpt, as edited, read: "Meeting participants highlighted the need to document a situation on the Pacific Coast, where atmospheric deposition is a significant contributor to water quality problems."

In fact, the opposite is true. Meeting participants stressed that they do *not* know whether air deposition is a significant source of Pacific coastal water quality problems. They identified this question as the highest priority for research on atmospheric deposition in that area.