QALMRI INSTRUCTIONS

Adapted nearly verbatim from: Kosslyn, S. M., & Rosenberg, R. S. (2001). Psychology: The Brain, The Person, The World. Boston: Allyn & Bacon.

The QALMRI method provides a means for critically evaluating experiments, as well as for organizing your own experiment proposals. It helps you find connections between theory and data by making explicit the question being asked, the approach used to answer it, and the implications of the answer.

Q stands for **Question**

All research begins with a question, and the point of the research is to answer it. For example, we can ask whether a placebo is better than no action in curing depression. The first few paragraphs of the General Introduction should tell the reader what question the article is addressing. In addition, the context provided by the literature review should explain why the question is important and why anybody should care about answering it. Questions fall into two categories: broad and specific. Broad questions are typically too general to answer in a single experiment. For example, a broad question might be "Does language influence perception?" This sort of question provides the general topic of the paper, and can only be resolved by compiling many experimental results. The specific question typically can be addressed, at least in part, in a single experiment or set of experiments. A more specific question might be: "If one language has a specific term for a color and another language does not, will speakers of those two languages perceive the color differently?" In describing the question of an experiment, you should identify both the broad and specific questions being addressed.

A stands for **Alternatives**

Good experiments consider at least two possible answers to a specific question, and explain why both answers are plausible. For example, the possibility that speakers of different languages will perceive colors differently is plausible based on evidence that top-down influences often affect perception. The alternative hypothesis is that language does not influence perception of color. This alternative is also plausible because color perception might be relatively unaffected by top-down influences. That is, it might be based solely on properties of the visual system which are unaffected by language processing. Most good papers identify, at least implicitly, the primary alternatives being considered. When proposing a new study, you should always identify the alternatives and consider why each is plausible. If only one outcome is plausible, the study might not be worth conducting. When describing the alternatives of an experiment, you should explicitly list all of the alternatives being tested. You might also consider identifying (parenthetically) plausible alternatives that were not considered (see the Inferences section below).

L stands for **Logic**

The logic of the study identifies how the design will allow the experimenter to distinguish among the alternatives. The logic is typically explained toward the end of a study introduction and has the following structure: If alternative 1 (and not alternative 2) is correct, then when a particular variable is manipulated, the participant's behavior should change in a specific way. For example, the logic of the color experiment would sound like this: If a person's native language influences their perception of color, then speakers who lack a color term should perceive the boundary between that color and another color differently than a speaker who has that color term. Alternatively, if language does not influence the perception of color, then all speakers should perceive all color boundaries similarly. Note that the logic of the experiment is integrally related to the alternatives. Also note that the logic provides an initial hint about the specific design that will be used to test the hypothesis (e.g., what the critical variables will be). When describing the logic of the experiment, you should provide the "if…then…" statements.

M stands for **Method**

This section identifies the procedures that will be used to implement the logical design. How are participants selected and are they representative of the population of interest? Are the subject groups equivalent on other dimensions that might be relevant? What materials and equipment are used and how are they presented to participants? What exactly is done during the experiment? What are the control groups? What are the independently manipulated variables? What are the primary dependent variables (or measures). When describing the methods, you should provide a brief list of the relevant details. Focus on those method details that are central to implementing the logical design.

R stands for **Results**

What was the outcome of the experiment? What were the results on the primary measures (e.g., what were the means and did they differ? For the color example, did speakers who lacked color terms perceive color boundaries differently? If so, which ones? This section should note which results (or potential results) were obtained and should identify how reliable they seemed. Were the results likely due to chance variation or noise or did they seem to be robust. For most psychology experiments, inferential statistics are used to assign a probability to indicate how likely the results were due to noise (often noted as $p < .05$ or $p > .1$, etc.). Do these analysis suggest that the pattern of results was reliable? When describing the results, you should focus on describing the overall pattern, noting any findings that were central to testing the central hypotheses. Many analyses are of secondary importance and need not be described in a QALMRI (e.g., tests showing that the counterbalancing of conditions did not influence the main pattern of results).

I stands for **Inferences**

What can the results of the experiment tell us about the alternatives? If the study was well designed (the logic sound and the method rigorous), the results should allow you to eliminate at least one of the alternatives. For example, if a language lacks a color word, and speakers of that language perceive boundaries between that color and another color differently than speakers of other languages that have the color word, then the experiment supports the alternative that language influences color perception and fails to support the alternative that color perception is unaffected by language. At this point, take a step back and think about potential confounds that could have led to the results. Were any other alternative explanations possible? Consider any loose ends. For example, perhaps the populations differed on some other variable (e.g., education, nutrition) that could affect their perceptual performance even if language played no role in perception. When describing the inferences, you should identify the inferences drawn by the researchers and then you should consider what further research would be needed to eliminate any additional plausible hypothesis. Consider whether the inferences drawn from the results apply more generally or whether they are specific to the particular tests used and participants tested. For example, do the results of this color perception study generalize to color perception in general? How about to perception in general? What is the scope of the results and the generalizations the results allow?