

Writing Empirical Papers: Instructions for Beginners  
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Note: This guide is intended for students new to writing empirical papers. It is based on conventions used in social psychology; different sub-disciplines have additional or different requirements. The emphasis of the guide is on *writing* process and content. This guide assumes students have or will invest time outside the guide learning things like how to report statistical results, proper formatting for tables or figures, line-spacing and headings, and APA citation style.

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### Writing Empirical Papers: Instructions for Beginners

In his [frequently cited chapter](#), Daryl Bem suggests that crafting a well-written empirical paper is like "telling a story." There is exposition at the beginning (the Introduction), rising action (the Method), a climax (the Results), and denouement (the Discussion). Many students believe an empirical paper requires a unique writing style that is new and foreign to their typical writing style. This is usually a mistake. Like any piece of analytic writing, your primary objective is to communicate a coherent and well-organized argument to the reader. Make good use of the writing and critical thinking skills you already have. Although your language will be formal and you must attend to the proper content required by APA-style, your paper will turn out better if you keep this notion of story-telling in mind as you write. As you write, never forget you are communicating with a person.

#### Overall Shape of Paper

A well-written empirical paper should be shaped like an hourglass. That is, the Introduction begins very broadly by introducing the topic and defining terms, and then begins to narrow to more specifically focus on the variables in your study. At the end of the Introduction, the paper is at its most specific (or "narrow") in that the Method and Results both provide extremely focused information about your study. The Discussion begins by reviewing your specific findings, but then starts to slowly broaden out again as the implications are discussed. By the end of the Discussion, the paper has become as broad in focus as it was at the beginning of the Introduction. Thus, an hourglass shape. Below is information about the content within the hourglass.



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#### Introduction

The purpose of the Introduction is to explain your research question. In doing so, you will emphasize the importance of the question and present a possible answer to the question (the hypothesis). The very first paragraph of the paper is important and difficult to write. It is often easiest to write this paragraph after you have finished writing the rest of the paper. This first paragraph should capture the reader's interest and orient the reader to your topic, giving a sense of the concepts the paper will cover. However, you should not present your hypothesis or summarize your entire argument in this first paragraph. This is a stylistic paragraph more so than one that engages in analysis. so will probably just confuse the reader. It is mostly a stylistic paragraph to orient the reader to the general topic and your question. For more on this, see the section on "Opening Statements" in the [Bem Chapter](#).

You probably know you will be presenting past research in the Introduction. You may not, however, have considered the underlying *goals* of this review of the literature. Your central goal is for the reader to understand the need for more research in the area (i.e., your proposed study), and to be able to clearly see the reasoning for your hypothesis. Thus, after you have gathered the theories, concepts, and empirical findings you want to include, be intentional about your organizational strategy. A common rookie mistake is to write a brief paragraph for each theory or study, without any organizational structure at all. A common way of fixing that mistake is to add transition sentences between paragraphs. Unfortunately, that overall approach usually makes for a poorly written paper.

Instead, try using this as a guiding question: "what does the reader need to know *now* so they will understand what I'm going to tell them *later*?" Put the elements of your paper into a sequence that, at each step, gives the best answer to that question. You already know that the very last thing you will tell the reader in this section is your hypothesis. Everything prior to the hypothesis should be organized in a way that logically builds to your study. You are not just describing past research, you are crafting a line of reasoning which leads to your research question. By the time you present your hypothesis, the reader should be able to guess what it will be based on the way you have reviewed and analyzed past literature. Thus, your first step should be to develop an organizational strategy. Writing separate paragraphs for each theory or study before considering the organizational strategy makes it very difficult to adhere to the best, most logical ordering of the information.

What follows is an example of one organizational strategy. It is not right for every paper, but it is a good example if you are uncertain how to begin.

**INTRODUCE YOUR TOPIC, REVIEW BACKGROUND LITERATURE**

After your opening statement, choose one of the concepts (i.e., variables) that is relevant to your study. If you wish, you can label this section of the paper with the name of that concept.

To begin, explain the concept. Your explanation should define the concept and explain "how it works." Explaining how it works might mean presenting a theory and/or it might mean explaining important relationships the concept has with other variables. Discussing theory and empirical findings helps illustrate and provide evidence for your explanation of the concept.

As you choose how much detail to include in the paper, remember that your goal is to provide the reader with information about the variable that will help them understand *your* study. So, try to choose evidence and details that will specifically meet that goal.

Note: this entire section is about the one concept. You do not need to incorporate your other variables, or even mention your hypothesis yet.



Provide a transition to...

Review the next relevant concept from your hypothesis. If you used a section heading for the previous variable, provide a new heading for this one.

Again, explain the concept, providing information about what is known about the variable/theory/concept (using empirical study descriptions where appropriate).

Continue this process until you have defined all relevant concepts and reviewed most of the relevant background literature.



**BRINGING IT ALL TOGETHER:  
PRESENTING YOUR RESEARCH QUESTION AND LOGIC FOR HYPOTHESIS**

Many papers use the heading "The Present Study" for this section of the paper. Now that the reader knows the relevant definitions and background, you can bring together the research evidence reviewed above to present your research question.

Begin by explaining what is unique/original about your research; that is, explain the "gap" in past research that your study seeks to fill. There are different kinds of gaps including:

- a. a contradiction among past findings;
- b. a reason why the conclusions reflected in the reviewed literature might be wrong;
- c. a more literal gap – something you consider important that has not been studied;
- d. a point that, although it is dealt with in the readings, ought to be extended further in some other way.

In describing this gap, writers often find that there is at least one "key" study that is especially important. Perhaps it is the study that most clearly illustrates the gap, or comes closest to addressing the gap. Perhaps the "key" study is one you plan to replicate and extend. Sometimes the best organizational strategy is to present that study in detail here (rather than in the previous section of the Introduction). In deciding how much and which details to include, remember your guiding question: "What does the reader need to know to understand the importance of and logic for my hypothesis?" This "gap" in the literature is your research question. You should provide a possible answer to the question; this is known as your hypothesis. As you know, a hypothesis is a prediction. A rookie mistake is to provide the hypothesis with no explanation. Step-by-step, explain *why* you are making the prediction you are.

In the last paragraph of your Introduction, name the specific variables you intend to study and *generally* what you will be asking your participants to do (e.g. "...we plan to administer a survey measuring both variables X and Y to determine if there is a correlation."). Finally, re-state your hypothesis(-es) formally, referring to the specific variable names and using relevant statistical language (e.g., "We hypothesize that X will have a positive correlation with Y." or "We hypothesize that participants in the experimental condition will score higher on Y than participants in the control condition.")

## Method

Note, the title of this section is Method not Methods (no s). All method sections need at least three basic categories of information:

**Participants** – who was in your study and did they volunteer or get some sort of course credit.

**Materials** – what were your measured variables (a.k.a. operational definitions)

**Procedure** – what exactly did you do (literally during the study session)

You may choose to use three different heading for this information (as presented in the example below), or you might want to combine procedures and materials into one section. Format the method section however it works best for you – but be sure to put participant information first and in its own section. Write in the past tense. The example below provides you with some conventional ways of writing out this information.

### Participants

Participants were 180 college students enrolled in introductory psychology classes. The students received extra credit in exchange for their participation. One hundred and two participants identified themselves as women, 75 identified as men, and one participant identified as transgender. Participants were generally in their late teens and early twenties ( $M = 20.65$ ,  $SD = .83$ ), and most selected "White" when asked their race/ethnicity ( $n = 170$ ). Five participants identified their race/ethnicity as "Black," three selected "Asian," and two selected "Hispanic/Latinx." *Note: In the participants section, gender, age (or year in school), and ethnicity are typical standard demographic statistics to include. You should also report any other demographic statistic that relates to your hypothesis. Be sure to give the mean and standard deviation for age (it is a continuous variable so that statistical information is available).*

### Materials

**Contingencies of Self-Worth Scale.** Selected subscales from the contingencies of worth scale (Crocker & Wolfe, 2001) were used. The subscale of interest for this study was the school competency scale. The measure of school competency as a basis of worth consisted of six items. An example item is: "I feel a boost when I get a good grade." Participants indicated the extent to which they endorsed each statement using a 7-point Likert type scale (1=strongly disagree, 7=strongly agree). After reverse coding the appropriate items, the scale was created by averaging across items. The internal consistency of the scale for our sample was [adequate/high/low] ( $\alpha = .86$ ).

**Sexual Orientation Prime Manipulation.** We designed a PowerPoint slide show in order to prime either heterosexual or homosexual relationships. Both slide shows consisted of 20 slides, ten of which showed photographs of neutral objects (e.g., trees, tables, houses) and ten of which showed photographs of two people hugging or holding hands. Participants in the heterosexual condition saw images of male/female couples. Participants in the homosexual condition saw five images of male/male couples and five images of female/female couples. All images were free-use photographs downloaded from various internet sites.

**Another Scale or Variable.** Continue in a new paragraph with a new heading for any other scales or manipulations that are relevant to your hypothesis. *Note: For scales/questionnaires, be sure to always include a reference (unless you wrote all the items), the number of items on the scale, the response format, the internal consistency, and an example question.*

### Procedure

In this section, first affirm participants received an informed consent statement. Affirm random assignment to condition for experiments. Explain what participants were initially told about the intent of study. Explain how they were run (e.g., in groups or individually? online?). Explain, in chronological order, everything participants did, including any noteworthy instructions. Affirm you debriefed participants. For studies involving deceptive false-feedback, provide a bit of detail about the process debriefing. (If there was no informed consent or debriefing, you should explain why in this section). You may wish to combine Materials & Procedure for studies with simple procedures (like a short survey). For a more complex study, you will probably want to keep the Procedure section separate from the Materials section.

### Results

The results section is where you tell the reader several things about your data and data analysis including (but not limited to), how you tested your hypothesis and what you found. Although a Result section is very structured, it should still be written clearly using complete sentences. The best strategy is to write a first draft consisting entirely of words (no statistical/numerical information). This allows you to describe what you did and what you found without getting tangled up by the numbers and specific formatting guidelines for statistical abbreviations, etc. Once you have this complete report of your findings, you can go back in and add the numerical/statistical information associated with each finding.

There are some minor stylistic differences across sub-disciplines of psychology for the Results section. This writing guide is based on what is typical in social psychology and excludes sections you might need for more complex projects. Include the following in exactly this order:

- a. If you conducted an experiment, first report the results of your manipulation check(s). If you measured a possible covariate, report on whether random assignment was successful in distributing participants evenly across conditions.
- b. Report the “overall descriptives” for all of the variables in your study (typically the mean and standard deviation). If you have more than 3 or 4 variables in your paper, you might want to put this descriptive information in a table to keep the text from being too choppy and bogged down (see the APA manual instructions on tables). The word “overall” indicates that the statistics you present here should be for the entire sample rather than broken down by group or condition (you report those later, keep reading). Again, you want a single mean and standard deviation for each (continuous) variable. For categorical variables use the summary statistic that makes the most sense (frequency, percentage). The purpose is to provide the reader with context for the subsequent statistical analyses. For example, imagine you used a manipulation that was intended to decrease participant’s prejudice and that there was a significant difference between the experimental and control conditions. If your entire sample scored exceptionally low on your prejudice scale regardless of which condition they were in, then the meaning of that result would be different compared to a situation in which everyone in your sample scored exceptionally high in prejudice. Reporting overall descriptives prepares the reader to better understand the results of your statistical analyses (which you report later, keep reading). In addition, if you noticed restriction of range or floor effects for any of your variables, you can set up your discussion of that by also including descriptives like mode, median, and range. For many variables, the means will be moderate rather than high or low. Nevertheless, you should provide this information for all variables. Note: you cannot claim one number is higher or lower than another without a significance test.
- c. The next section is about your hypothesis(-es). Provide a *brief* rephrasing of the hypothesis. Then tell the reader what statistical test you used and what the test revealed. Some hypotheses require multiple statistical tests. If you did more than one test, report each *in its entirety* (what you did and the results) before reporting the next test.
- d. End the Result section with any additional analyses you did. These are analyses that do not directly address the hypothesis, but provide insight into your research question.

For the results of all statistical tests:

- You cannot use statistics as though they were parts of speech (i.e., nouns).
  - For example, do not write, “The correlation between prejudice and self-esteem was  $r(60) = -.26, p = .01$ .”
  - Instead, translate important data for the reader into words and provide the statistics as evidence for your reported results.
  - For example, “The negative correlation between prejudice and self-esteem indicates that prejudicial attitudes are associated with lower self-esteem;  $r(60) = -.26, p = .01$ .”

- Whether you comment on it or not, you must include an **effect size statistic** for every significance test. The effect size statistic is built-in to a Pearson’s *r* test: the “*r*” is the effect size. For a *t*-test, use Cohen’s *d*. For an ANOVA, use partial eta-squared.
- Do not merely give the statistical result without a supporting sentence. Indicate if a finding was statistically significant or not and if it was in the predicted direction or not. You may wish to comment on the effect size.
- For significant findings from *t*-tests and ANOVAs, remember to report both the significance and the means and standard errors. The means tell you the direction of the effect (for example, did your manipulation *increase* prejudice or *decrease* prejudice?). In addition, for two or three-way ANOVA results, first provide all of the relevant information for each of the main effects (including indicating non-significant effects), and then report on interactions (including indicating non-significant interactions).
- If a statistical finding was non-significant, but  $p < .10$ , it is still sometimes acceptable to interpret the results in your Discussion, especially if you have a problem with statistical power.
  - In the Results section you might write something like the following: “Although the correlation was not significant using the standard alpha level of .05, the *p*-value was less than .10;  $r(49) = .23, p = .08$ .”
  - If you want to later discuss the result, you must provide a **rationale** for why that is a legitimate decision (e.g., power, effect size issues). You may cautiously interpret such a correlation. Don’t make grand conclusions or use strong language based on the existence of a marginally significant finding. The jargon to refer to the finding is, “approaching significance.” Also, you should treat the finding as non-significant in a table.
- If putting the statistics in the body of your results section seems to make the section difficult to read (i.e., if you feel the reader is distracted from the text by too many numbers and statistics), consider putting the statistics in a table. For example, if you have many bivariate correlations, you could create a correlation matrix.
  - If you include a table, refer readers to the table in the text of the result section. Do not put information in both a table and the text. If you use a Table, you still need to include sentences describing the result.
    - For example, “As expected, college adjustment was positively correlated with the amount of contact with friends, with family members, and with professors (see Table 1).”
    - For example, “As shown in Table 1, the findings supported some of our predictions but not others. There was a significant correlation between extroversion and life satisfaction. However, life satisfaction was not significantly related to college adjustment.”
  - Never use graphs, figures, or tables produced by SPSS. You need to make these in Word or Excel.

### Discussion

You may already know a Discussion section has certain required elements including a summary of your findings, limitations, and ideas for future research. A Discussion section, however, is more than the sum of those parts. A common mistake is for students to use the required elements as the outline for both the content and organization of the Discussion section. The resulting paper is often stilted and incomplete.

Breaking away from preconceived notions about Discussion sections is important. One way to do this is to pretend the Discussion section is an entirely separate assignment. For this new assignment, imagine you are given a pile of previous research, a detailed description of a study, and the statistical results of the study. The assignment is to critique the study and explain how it does (or does not) add to the existing research literature. When writing a paper for that assignment, you would use your full complement writing and critical thinking skills. Among other tasks, you would decide on an organizational structure and an “angle” for the paper. You need to do all of that for a Discussion section too.

Like the Introduction, the challenge is to express your insights while also paying attention to the required elements. Begin the Discussion section with a very brief summary of the topic of research and the research question. The goal is to remind the reader of the factors that led you to conduct the study you did. Then explain your findings. Were the results consistent with your predictions or not? Were some predictions supported but not others? How do

your results relate to previous research? Remember your study was designed to address a gap in existing research literature; comment on how your findings fill that gap. Relate the results to the theories you introduced in the Introduction. Your findings are just one piece among many -- resist the tendency to make your results the final story about the phenomenon or theory of interest. Integrate the results and try to make sense of the pattern of the findings.

In some ways, decisions about how to organize your Discussion section come down to an awareness of what your paper is fundamentally *about*. For example, imagine you did a study looking at the correlation between perfectionism and self-esteem. The original focus of the project and the core area of interest in the paper could be perfectionism. If this were the case, you would write about self-esteem as one of many interesting things to understand about perfectionism. Alternatively, you could do the same study but with self-esteem as the core interest. In this case, you would write about perfectionism as one of many interesting things to understand about self-esteem. This decision – what is my paper about – is especially critical when considering what areas of the research literature you want to emphasize and what ideas for future research you want to include.

If your results did **not** support your hypothesis, a central goal in the Discussion section is to explain why not. In addressing this issue, the required elements about limitations and future research are often interwoven with each other, and with the explanation of what you found. Consider the narrative flow of the paper. For example, in an effort to fill in the blanks for each required element, many novice writers produce a Discussion section that is repetitive and lacks depth. For example: “We did not find a significant correlation. This is inconsistent with our prediction. We mostly likely did not find a significant correlation because our sample size was too low. A limitation of our study is that our sample size was too low. Future research ideas include obtaining a larger sample.” Do not force an artificial separation amongst your ideas. Rather, generate a Discussion section that is coherent and flows naturally. Most of the time, writing with this mindset does end up creating the form you need for the Discussion section as the bottom half of the hourglass (moving from your specific findings to broader implications).

If your results **did** support your hypothesis, the sections on limitations and future research are typically more encapsulated (separate). With significant results, a central goal of the Discussion section is to re-examine the research literature in light of your findings. What is the importance of your new discovery? *Every* research study has limitations, if only because of the methodology used (e.g., correlational research cannot establish causality). So, you will be examining your work for limitations. Future research can take any direction you wish. Now that we know the answer to this research question, what is the next gap in the literature we should address?

Be thorough when you think about the possible limitations of your research, and be judicious about what you choose to include. For studies that do support their hypotheses, common areas to examine include possible "third variable" explanations, unmeasured mediators, and/or issues with the generalizability of your results. For studies that do not support their hypotheses, there are three major areas to examine: (1) the logic of the research hypothesis; (2) the materials you used to conduct the study; (3) your sample.

1. Reconsider the logic of your hypothesis. You may not simply say, “we were wrong.” After all, you presented a thorough logical argument in favor of your hypothesis in the Introduction. Rather, there may be previously undiscussed nuance or detail that influenced your results. For example, could there be unmeasured moderators?
2. Consider the materials you used in your study. In particular, think through how you operationalized the constructs, the specific procedures used, and the possibility of self-report biases.
3. Consider your sample. Students’ favorite limitation to report is an unrepresentative sample, Think more deeply than that. Remember you are trying to explain why you did not support your hypotheses. Perhaps you have restriction of range problems because you did not have participants scoring at the high (or low) end of a particular scale. Put another way, why do you think your sample lacked variability? Ideas for future research can address these limitations but watch out for the tendency toward repetition (refer back to the poorly written Discussion section example above).

Be *specific* when discussing limitations. For example, if you claim that a third variable might affect your correlation, tell the reader what that third variable is and how it affects the results. If you think that the use of a convenience sample (and thus, a non-representative/random sample) is a limitation, you must explain what segment of the population might respond differently than did the participants in your sample and why. Avoid listing every possible limitation or qualification you can think of. Rather, what are the points other people might most likely notice? What are the points that have the strongest implications for future research?

A discussion section is about “what we have learned so far” and “where we should go next.” The stylistic paragraph that concludes your paper should talk briefly about the broader significance of your findings. You could reflect on the significance of this work with respect to the well-being of people, or the significance of the work with respect to the scientific literature. No need to be grandiose, but do leave the reader feeling like this is an important topic. In the very best papers, this final paragraph somehow relates back to the opening paragraph in the paper.