

Sequential Writing Assignments to Critically Evaluate Psychological Journal Articles

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Overview

As undergraduate educators, it is not uncommon for us to engage our students in practicing the interpretation and analysis of original psychological research articles. This can be a challenging task, however, that could benefit from being broken down into its component parts. This instructional resource details assignments to help instructors with this task, organized by the increasing levels of complexity in the cognitive domain of Bloom's taxonomy. It consists of assignment descriptions and rubrics, along with common problems seen in student responses. It is hoped that engaging in this kind of scaffolded practice will allow psychology students to significantly advance their understanding of primary literature.



Background

Reading, summarizing and interpreting psychological research are skills that psychology students should develop as undergraduates, according to APA undergraduate guidelines (see *Goal 2: Scientific Inquiry and Critical Thinking* in Dunn, Enns, & McCarthy, 2013). However, many of our students may believe that peer-reviewed, published work is the final word on a research topic. Given the current replication crisis facing psychology (e.g., Aarts et al., 2015), it is imperative we give our students the skills necessary to not only understand scientific journal articles, but also critique them. They need to practice challenging research findings, even those that have passed peer-review. This instructional resource consists of assignments to help support psychology instructors in creating and implementing assessments of learning that tap into a range of student abilities, from describing ideas presented in journal articles to critically evaluating them.

Bloom's taxonomy is a popular framework for detailing a hierarchical view of the cognitive domain of learning (Anderson & Krathwohl, 2001). While there are strong alternative models for designing the overall learning outcomes of university courses (e.g., Fink, 2003), the basic principles of Bloom's have been applied frequently for purposes such as assessing the level of cognitive complexity of individual test items (e.g., Zheng, Lawhorn, Lumley, & Freeman, 2008). For the purposes of this instructional resource, Bloom's taxonomy is being used as a guide for the level of analysis of each assignment (see Table 1).

Thorough resources are available to guide students through the critical thinking process when faced with new research. One particularly impactful APA book expands upon the interpretation of each section of a research article, chapter-by-chapter (Meltzoff &



Cooper, 2017). This thorough resource culminates with practice articles for students to read critically, in a self-test format. This book is an excellent resource, but may be too detailed or lengthy to incorporate in some of our courses. There are also journal articles available that detail different methods for incorporating the analysis of journal articles in the classroom (e.g., Bodnar et al., 2016; Brownell, Price, & Steinman, 2013; Round & Campbell, 2013). Many of these necessitate a large use of class time or a complete restructuring of a course. The purpose of this resource is to provide instructors with freely-available tools to incorporate critical reading and analysis into their courses, regardless of the amount of time available.

This instructional resource consists of assignment descriptions, rubrics, and some common pitfalls for instructors to help students avoid. These assignments are categorized by their relevance to the different levels of Bloom's taxonomy (see Table 1). As first- and second-year psychology courses are likely too early for the development of higher-level critical thinking skills, practice in understanding journal articles may be a helpful initial step. In addition, as every psychology instructor may have different amounts of time available for addressing journal articles directly, multiple assignments may be used to build upon each other, or single assignments may be incorporated.

**Table 1. Overview of assignments, organized by Bloom's levels**

Bloom's Level	Assignment	Pedagogical Goal	Common Pitfalls
Understand	<u>Article Summary</u> <i>(Also incorporated into the beginning of the Guided Comparison and Critique assignments)</i> High-level summary of article	Distill what information is most important	Too detailed; missing "big picture"; lack of basic understanding of experimental techniques
Apply	<u>Experimental Prediction</u> New independent variable, same method	Use the methods of a paper to predict the outcome of a similar experiment	Inability to generalize impact of method on new IV; does not apply background knowledge of IV to construct valid prediction
Analyze	<u>Guided Comparison</u> Compare two articles	Uncover relevant differences and form argument about what makes one paper stronger	Focus on irrelevant differences; opinion about stronger paper unsubstantiated
Evaluate	<u>Critique</u> Weigh strengths and weaknesses of a single paper	Pinpoint important weaknesses or strengths	Focus on unimportant weaknesses or strengths; misidentify necessary methodological compromises as major weaknesses
Create	<u>Complete the Paper</u> Instructor provides part of a study (e.g., data, methods) and students write the rest	Generate new ideas incorporating theories and methods learned in journal articles	Lack of individual thought; modelled too closely to previous articles provided



Article Summary

Overview

ASSIGNMENT

Provide a high-level summary of an article.

PEDAGOGICAL GOAL

This exercise is designed to correspond to the “Understand” level of Bloom’s taxonomy. The pedagogical goal is for students to be able to distill what information is most important in a journal article.

USE

This could work well as either guided preparation for an in-class article discussion, or as the first part of a higher-level assignment (e.g., comparison or critique).

COMMON PITFALLS

Students tend to initially provide too many details. The biggest challenge of this exercise is for students to take a “big picture” view of the work and report only what is most important. It is easy for students to write a two-page summary of an article, reporting detailed summaries of each section using words from the authors. It is difficult to filter out details that are not relevant to the main “take-away” of the paper and keep the summary to a half-page. Students need to have a solid understanding of all aspects of a paper to write a successful summary in their own words.



Article Summary Guidelines

Here are the basic article summary requirements:

- No more than 250 words
- Assignment submitted via our learning management system **before** the class in which we discuss the article

SUMMARY (1 paragraph; 5 pts)

- Context in which study was run / why this study is important
- Hypothesis
- Methods (most important, main points, only)
- Results (most important, main points, only)
- Conclusions / implications / societal benefits (if applicable)



Article Summary Rubric

Criteria	Exceeds Expectations (100%)	(80%)	Meets Expectations (60%)	(40%)	Below Expectations (20%)
Summary (5)	Succinct, accurate summary that describes only the most relevant points	Accurate summary that hits the major points, but with a bit too much detail	Summary is accurate, but either too long or misses important point(s)	Accurate summary, but too long and misses important point(s)	Inaccurate summary, too long, and misses major points of the study



Experimental Prediction

Overview

ASSIGNMENT

Given a method discussed in a paper, predict the results of a new independent variable manipulated by this method. The instructor provides the new independent variable; the students write up their predictions about what the new results would be.

PEDAGOGICAL GOAL

This exercise is designed to correspond to the “Apply” level of Bloom’s taxonomy. The pedagogical goal is for students to apply a concept (in this case, the methods of a paper) to a new situation (given a new independent variable).

USE

This could work well as either a written assignment (submitted outside of class) or as a written response on an in-class assessment.

COMMON PITFALLS

Students may stick too directly to the findings of the published work, not considering the effects of the new independent variable introduced. Also, students tend to default to a prediction of either an increase or decrease in the dependent variable; it is particularly challenging if the predicted result is “no effect”.



Experimental Prediction Guidelines

Given what you have learned in the accompanying journal article, predict the results of a new study. In order to do this, please describe the methods employed in the journal article, in your own words. Next, describe what you think the results would be if these methods were applied to investigate the effects of the new independent variable provided.

METHODS (1 paragraph; 8 pts)

- Provide a summary of the methods used in the journal article, as much as would be relevant for the new study (when considering the new independent variable)

LOGIC (1-2 paragraphs; 12 pts)

- Considering the findings of the journal article and your background knowledge of the subject, form a prediction of the results of this study
- How does the new independent variable interact with the experimental task? How is it similar to or different from the original independent variable?

Sample written assignment prompts:

1. Given the results of the Di Chiara and Imperato (1988) paper as well as the class discussion of schizophrenia, compare the dialysis results in rats administered an atypical antipsychotic (not done in this study) with those administered haloperidol (a condition in this study). Assume the same brain regions are being investigated. What neurotransmitter(s) should be investigated and why? Describe the predicted results for each brain region.
2. Tse et al. (2009) studied the effects of caffeine on the Mixed Motives Task. Given their findings as well as the class section on affective disorders, what results would you predict if they performed the same task, but administered an antidepressant, instead? What about ketamine?



Experimental Prediction Rubric

Criteria	Exceeds Expectations (100%)	(80%)	Meets Expectations (60%)	(40%)	Below Expectations (20%)
Methods (8)	Succinct, accurate description of methods that describes only the most relevant points	Accurate description of methods that hits the major points, but misses some detail	Description of methods is accurate, but misses some important points	Accurate description of methods, but misses major points	Inaccurate description of methods, misses major points
Logic (12)	Translation of method to new IV is accurate, clear and directly motivated by findings of the article	Translation of method to new IV is accurate and mostly motivated by findings of the article	Translation of method to new IV is mostly accurate and mostly motivated by findings of the article	Translation of method to new IV is flawed and somewhat motivated by findings of the article	Translation of method to new IV is inaccurate, and unrelated to findings of the article



Summary & Guided Article Comparison

Overview

ASSIGNMENT

Given two papers, compare their strengths and weaknesses and decide which paper is stronger.

PEDAGOGICAL GOAL

This exercise is designed to correspond to the “Analyze” level of Bloom’s taxonomy. The pedagogical goal is for students to identify relevant differences and form an argument about what makes for a stronger paper.

USE

This assignment helps introduce students to the idea that they are capable of forming opinions about published, peer-reviewed journal articles. It is not uncommon for students to believe that published work is infallible, or that students are not equipped to judge published work. By constraining the focus to comparing two articles, students are asked simply to make a judgement of which paper is “better”. In the sample guidelines, students have been asked to summarize the most recent article, only. The first article discussed was used as an example to model how to write a summary in class.

COMMON PITFALLS

Students tend to focus on weaknesses of papers; they have a harder time talking about strengths. They may also overemphasize weaknesses that either do not have a large impact (e.g., a dropout rate of 2% that is uniform across groups) or are intrinsic to the nature of the study (e.g., an animal study may not have direct implications in humans). Training students to weigh strengths and weaknesses is an important part of this assignment (e.g., only cocaine users *not* seeking treatment were recruited for a study in which cocaine was administered, but it would be unethical to recruit either drug-naïve participants or those seeking treatment for substance use disorders).



Summary & Guided Article Comparison Guidelines

Here are the basic article comparison requirements:

- No more than 800 words (roughly 3 pages, double-spaced)
- Article 1 is compared with one other article (Articles 2, 3 or 4) before the Midterm
- The comparison will be made up of a brief (1 paragraph) **summary**, as well as a **comparison** section
- Assignment submitted via our learning management system **before** the class in which we discuss the article

The following two sections make up the comparison assignment (worth 20 pts):

SUMMARY (1 paragraph; 5 pts)

- Written about the **new** article (*not* Article 1)
- Context in which study was run / why this study is important
- Hypothesis
- Methods (most important, main points, only)
- Results (most important, main points, only)
- Conclusions / implications / societal benefits (if applicable)

COMPARISON (2 - 2.5 pages; 15 pts)

In comparison to Article 1:

1. **Introduction:** What are the motivations and/or hypotheses for the different studies? Do they both seem like valid, important questions to be addressed, or does one of the studies seem more important to you? Why or why not?
2. **Methods:** Do both studies involve subjects and methods that adequately address the stated motivation/hypothesis for the study? Does one study do this better than the other? Are the findings in each study equally generalizable? Why or why not?
3. **Discussion:** Are the claims made by the authors supported by their data in both articles? Are weaknesses and/or null findings explained sufficiently in both articles? Are the results tied back to the big picture (in terms of what was brought up in the introduction and/or future directions) in both articles? Does one article do this better than the other? Why or why not?



Summary & Guided Article Comparison Rubric

Criteria	Exceeds Expectations (100%)	(80%)	Meets Expectations (60%)	(40%)	Below Expectations (20%)
Summary (5)	Succinct, accurate summary that describes only the most relevant points	Accurate summary that hits the major points, but with a bit too much detail	Summary is accurate, but either too long or misses important point(s)	Accurate summary, but too long and misses important point(s)	Inaccurate summary, too long, and misses major points of the study
Comparison: Motivation/Hypotheses (2)	Argument is clear, relevant; takes a clear position on which paper is better motivated	--	Opinion expressed is unclear; based on accurate interpretation of articles	--	No opinion expressed; inaccurate interpretation of articles
Comparison: Methods (8)	Interesting and important comparisons made of the most salient aspects of the methods	Many comparisons made but not all relevant; which comparisons are most important is unclear	Comparisons valid but one or more important comparison missing; some comparisons invalid or overstated	Comparisons unclear with some factual inaccuracies; most important comparisons are missing	No valid comparisons made; inaccurate interpretations of methods
Comparison: Discussion (5)	Interesting and important comparisons made of the most salient aspects of the discussion	Many comparisons made but not all relevant; which comparisons are most important is unclear	Comparisons valid but one or more important comparisons missing; some comparisons invalid or overstated	Comparisons unclear with some factual inaccuracies; most important comparisons are missing	No valid comparisons made; inaccurate interpretations of discussion



Summary & Guided Article Critique

Overview

ASSIGNMENT

Consider the strengths and weaknesses of a single paper and determine if it is a strong study.

PEDAGOGICAL GOAL

This exercise is designed to correspond to the “Evaluate” level of Bloom’s taxonomy. The pedagogical goal is for students to pinpoint important strengths and weaknesses within a single paper.

USE

This assignment works nicely as a follow-up to the Comparison. In the Comparison, students are limited to two articles to consider. The Critique is essentially weighing one article against all others (is it “good”, given what has been published, or is it “weak”, compared to other published pieces).

COMMON PITFALLS

The pitfalls here are quite similar to those found in the Comparison assignment. Students are more likely to fall into simply summarizing an article here, compared to the Comparison. Emphasizing that students need to explain why a specific method of recruitment is relatively strong or weak, for example, should help avoid this problem.



Summary & Article Critique Guidelines

Here are the basic article critique requirements:

- No more than 800 words (roughly 3 pages, double-spaced)
- Critique is for one article after the Midterm (Articles 5, 6, 7, or 8)
- The critique will be made up of a brief (1 paragraph) **summary**, as well as a **critique** section
- Assignment submitted via our learning management system **before** the class in which we discuss the article

The following two sections make up the critique assignment (worth 20 pts):

SUMMARY (1 paragraph; 5 pts)

- Context in which study was run / why this study is important
- Hypothesis
- Methods (most important, main points, only)
- Results (most important, main points, only)
- Conclusions / implications / societal benefits (if applicable)

CRITIQUE (15 pts)

1. Do the authors convincingly justify the study? Is this study important?
2. Is the design strong/valid? Does it answer the question(s) posed in the introduction?
3. Are the claims made by the authors supported by their data? Are weaknesses and/or null findings explained sufficiently? Are the results tied back to the big picture (in terms of what was brought up in the introduction and/or future directions)?



Summary & Article Critique Rubric

Criteria	Exceeds Expectations (100%)	(80%)	Meets Expectations (60%)	(40%)	Below Expectations (20%)
Summary (5)	Succinct, accurate summary that describes only the most relevant points	Accurate summary that hits the major points, but with a bit too much detail	Summary is accurate, but either too long or misses important point(s)	Accurate summary, but too long and misses important point(s)	Inaccurate summary, too long, and misses major points of the study
Critique: Motivation/Hypotheses (2)	Argument is clear, relevant; takes a clear position on if paper is strongly motivated	--	Opinion expressed is unclear; based on accurate interpretation of article	--	No opinion expressed; inaccurate interpretation of article
Critique: Methods (8)	Interesting and important evaluations made of the most salient aspects of the methods; mitigating factors of design weaknesses discussed	Many evaluations made but not all relevant; which evaluations are most important is unclear; mitigating factors of design weaknesses mostly discussed	Evaluations valid but one or more important evaluation missing; some evaluations invalid or overstated; mitigating factors of design weaknesses left unexplained	Evaluations unclear with some factual inaccuracies; most important evaluations are missing; mitigating factors of design weaknesses left unexplained	No valid evaluations made; inaccurate interpretations of methods
Critique: Discussion (5)	Interesting and important evaluations made of the most salient aspects of the discussion	Many evaluations made but not all relevant; which evaluations are most important is unclear	Evaluations valid but one or more important evaluations missing; some evaluations invalid or overstated	Evaluations unclear with some factual inaccuracies; most important evaluations are missing	No valid evaluations made; inaccurate interpretations of discussion



Complete the Paper

Overview

ASSIGNMENT

Given a methods section and/or results section, students generate the remaining sections of a paper.

PEDAGOGICAL GOAL

This exercise is designed to correspond to the “Create” level of Bloom’s taxonomy. The pedagogical goal is for students to generate new ideas, incorporating theories and methods learned in journal articles and in the other class readings.

USE

This assignment is best used as a summative assignment later in the term, as it may require integrating information across multiple journal articles and lecture topics.

COMMON PITFALLS

This assignment requires both mastery of course content, as well as a degree of creativity. Students may feel more comfortable closely modeling published work rather than relying on their own thoughts and intuitions. Reminding students there may be multiple correct ways to address the same data may help them trust themselves more.



Complete the Paper Guidelines

For this assignment, you will be provided with the Methods and Results sections of a (fictional) journal article. It is your job to write the Abstract, Introduction and Discussion sections of this paper. Use what you have learned in this class to generate a “story” around this project. Why would researchers have performed this work? How would they have interpreted it?

Here are the basic “Complete the Paper” requirements:

- APA style (student version; 10 points are devoted to clarity and APA style)
- No more than 8 pages (double-spaced)
- Submit only the sections detailed below - no need to copy and paste Methods and Results sections provided

ABSTRACT (1 paragraph; 20 pts)

- Context in which study was run / why this study is important
- Prediction(s)
- Main methods
- Main results
- Conclusion statement

INTRODUCTION (2-3 pages; 30 pts)

- Inverted pyramid structure: start big picture, narrow down to specific predictions
- Provide a convincing reason that this study was done
- Detail what theory/theories motivated this study
- Use recent, relevant citations to support your arguments

DISCUSSION (3-4 pages; 40 pts)

- Restate main findings
- Explain what findings mean in context of the Introduction you provided
- Relate findings to theoretical underpinnings explained in Introduction
- Explain impact of any weaknesses in design on results and generalizability
- Posit future studies to follow up on this study; state what direction the field of research should head, given the results of this study



Complete the Paper Rubric

Criteria	Exceeds Expectations (100%)	(80%)	Meets Expectations (60%)	(40%)	Below Expectations (20%)
Abstract (20)	Succinct, accurate summary of study that touches upon all aspects of paper (motivation, methods, data, conclusions)	Accurate abstract that hits the major points, but with a bit too much detail	Accurate abstract, but either too long or misses important point(s); lacks focus	Accurate abstract, but too long and misses important point(s); lacks focus	Inaccurate abstract; too long; misses major points of the study; lacks focus
Introduction (30)	Pyramid structure is clear; logic and motivation of study clearly and strongly argued; citations highly relevant and as recent as possible	Pyramid structure is clear; logic and motivation of study argued accurately but lacking some clarity or missing some major points; citations relevant and as recent as possible	Pyramid structure is present but unclear; logic and motivation of study argued with some errors & lacking some clarity or missing some major points; citations somewhat relevant and some outdated	Pyramid structure is not present; logic and motivation of study has several errors, lacks clarity, and/or misses some major points; citations sparse and only somewhat related	Pyramid structure is not present; logic and motivation of study is virtually undetectable, has several errors, lacks clarity, and misses some major points; citations insufficient and/or inaccurate
Discussion (40)	Main results are clearly and succinctly summarized; all theoretical points presented in introduction are discussed; weaknesses are clearly stated; relevant and inspired future directions are developed;	Main results are clearly summarized; some theoretical points presented in introduction are discussed; weaknesses are stated; future directions are developed; citations relevant and as	Main results are summarized; some theoretical points presented in introduction are discussed; some weaknesses are stated, but some missing; future directions are developed, but lack creativity; citations somewhat	Some results are summarized, but lacking focus; some theoretical points presented in introduction are discussed; unimportant weaknesses are stated; future directions are unrelated and/or weakly developed;	Main results are not summarized; few to no theoretical points presented in introduction are discussed; weaknesses are not stated; future directions are not developed; citations



	citations highly relevant and as recent as possible	recent as possible	relevant and some outdated	citations sparse and only somewhat related	insufficient and/or inaccurate
Mechanics (10)	Student-specific APA style mechanics are without error; sophisticated word use; clear organization and structure; engaging to read	Student-specific APA style mechanics are with few errors; good word use; clear organization and structure; clear to read	Student-specific APA style mechanics are with several errors; accurate word use; clear organization and structure; takes some effort to read	Student-specific APA style mechanics are with many errors; inaccurate word use; organization and structure are decipherable but unclear; generally hard to read	Student-specific APA style mechanics are undetectable; inaccurate, confusing word use; structure is disorganized; generally hard to read



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