AP Research Summer Assignment & Resources

Dear Researcher,

We must first and foremost congratulate you on your interest in challenging yourself with the AP Capstone program. The skills that you have and will continue to acquire due to the Capstone program are paramount in your post-high school success. So, to your dedication, we salute you!

Now, down to business. The following summer work has been created after much consideration and discussion with other AP Research colleagues as well as input from this year's AP Research students who all wished they had started the year with this work already completed. I realize this looks like a lot for the summer, but we know that if you frontload before the year starts you will alleviate some stress later when you also have other classes to contend with. I am NOT about busy work, but there are some concepts and items that you need to establish for yourself prior to starting AP Research. One such concept is that this course is more **self-directed** than your other high school classes; this should make you realize then that this course is not about your grade but about learning. Consequently, when we recommend you complete work—instead of require it for a grade—you need to be motivated enough to actually do it because it will help you be successful.

These concepts, and others, should be considered while taking long walks on the beach, while sitting in the back of the car on a road trip, while trying to fall asleep at camp, while playing video games, or whatever summer activity enhances your life. First, know that you will be asked to dig deep, so please start now. You are NOT required to have written response to the following questions; however, we recommend you to spend some time thinking about them before you start the actual assignment: What is "research"? Who is the audience for published research articles? Who is the audience for my research project? Why did I choose to take AP Research? How do I think AP Research will be different than AP Seminar? How **intrinsically motivated** am I to be successful in a **self-directed** course?

Our second recommendation for the summer is that you read Part I and II of *The Craft of Research* by Booth, Colomb, and Williams. Simply do a Google search for the title to find a free pdf file for either the 2nd or 3rd edition. If you prefer reading a hard copy book, see if you can check it out of the library. Reading these 100 pages will give you a considerable advantage when you go to complete the required written assignment. It would be even better to read the whole book. There is also a resource packet posted on our website with additional resources; please be sure to seek it out.

Here is the URL: http://course.sdu.edu.cn/G2S/eWebEditor/uploadfile/20140306165625006.pdf

Required Summer Research Question Work PART I:

Similar to AP Seminar, the College Board wants you to start your AP Research project with a leading question. The following concepts are things to consider when attempting to build an AP Research leading question. As resources you have been given a separate handout about **research questions** and the list of research questions from this year's research projects. However, it is essential that you realize not all **research questions** are created equal (hint: some of the ones from this year are better than others).

Remember, the **discipline**, specific **topic**, and **research question** you decide to work with must hold your interest for the entire year. Sit and reflect about your true interests for this course prior to settling on a **discipline**, specific **topic**, and **research question**; you must be passionate about your choice. Also, please realize that this is just an initial **research question**; by the time you actually start the **methods-driven** study portion of your project, you may have revised your question numerous times, and no one will be able to proceed past this basic assignment without teacher approval for your **research question**.

The following elements are critical when attempting to build your **research question**. As you proceed it is essential that you consider these four major concepts in connection to your research project: **focus**, **scope**, **value**, and **feasibility**. Use the table below as a guide to help you develop a solid initial **research question**. You are not required to have written answers for the reflection questions, but it is highly recommended that you be able to articulate an answer for each one. If you cannot, perhaps there is a problem with your chosen **topic** and **research question**. Additionally, your research must fill a **GAP** in the body of knowledge in your chosen field.

By the end of the process for PART I you should be ready to start putting your ideas down in black and white. Create a document that includes the following information:

Your name Date AP Research Summer Assignment **PART I** Your Discipline Your Specific Topic Your Research Question	Example	Jane Doe 14 August 2017 AP Research Summer Assignment **PART I** Discipline: Psychology Specific Topic: Social Stigma for Mental Disabilities [Type in the research question you developed]

Issues to Consider when Designing a Research Question

Concept	Description	Reflection Questions
Focus **Research Discipline & Topic**	*Discipline*: Lens or section of focus • Art • History • Humanities • Hard Sciences • Social Sciences • Mathematics *Topic*: Specific interest within a **discipline** that creates the basics of your **research question**	1. What **discipline** would you enjoy working in during your research? 2. What specific topic are you interested in examining? 3. Why are you interested in this particular **topic**? 4. What can you add to the **body of knowledge** that already exist on the **topic**?
Scope: **Depth & Size of Your Research Project**	*Depth*: The level of detail *Breadth*: The number of topics discussed (i.e., all people, teenagers, infants, etc.) *Context*: The specific setting of your research (i.e., a lab, a classroom, a sound booth, etc.) *Variables*: The items/people/situations/issues/concepts being studied and/or manipulated (i.e., blood pressure & music selection; IQ, personality type, & instructional method)	1. What specific things will you study? People? Animals? Concepts? Theories? 2. How can you limit the **scope** of your **research question** to make your project more **feasible**? 3. How and/or where will you work with these variables?
Value: **Contribution to the Body of Knowledge**	The value or significance of your research is determined by how your contribution enhances what is already known about the **topic**. You are required to fill a **gap** in the **body of knowledge (BoK)** by either adding to the current conversation of the **discipline** or using multiple **discipline** conversations to create a new understanding. You are not merely compiling or rehashing information; you are bringing something new to the table.	1. How will your research change the way we currently see the **topic**? How will it fill a **gap**? 2. What can you add to the **body of knowledge** that already exists on the topic? 3. How will your research benefit society or your **discipline**? 4. Will you create a new piece of art, music, dance, or theatre as part of your project? 5. Will you design and create a new device or product as part of your project?
Feasibility: **Possibility of Research**	*Time*, *money*, and *resources* will play a major role in determining your ability to complete your research project. This may include a research lab, special software, access to secondary data, art supplies, special equipment, etc. You will be required to design a **research method** to answer your question. Once you have developed a **research methods**, you will actually only have about 2 to 3 months to complete the **methods-driven** research study portion of your research project. The time leading up to it will be filled with learning the basics of scholarly research, conducting a **review of the literature** to become an expert on your topic, and designing your **research methods** (i.e., quantitative vs. qualitative, mixed methods, correlational, action research, phenomenological, experimental, etc.).	1. What **method** will you need to use to answer your research question? How will you generate new data with your **method**? How will you analyze that data? 2. What will you need, physically and/or monetarily, to complete your research project? 3. How long will the **methods-driven** research study portion of your research project take? 4. Do you have access to the things you need for your research? (Refer back to scope as you address this.) 5. Who can help you with your research? Who might be potential **expert advisers**?

Required Summer Research Question Work PART II:

After you have completed the initial reflection and thinking required in PART I and created the brief written portion for PART I, you are ready to complete the written work for PART II on the same document.

Explain the **focus**, **scope**, **value**, and **feasibility** of your **research question**. Write a detailed paragraph for each (for a total of 4 paragraphs) and include a subheading above each paragraph that identifies which element you are addressing (i.e., **focus**, **scope**, **value**, **feasibility**). The reflection questions included in the above table should help you with each explanation. In a 5th detailed paragraph under the subheading "Potential Challenges & Problems," address this question: What challenges or problems do you anticipate as you proceed with this project?

Required Summer Research Question Work PART III:

Now it is time to start gathering sources and building an understanding of the **body of knowledge** and how scholarly research works. Use the research skills you gained in AP Seminar to gather 10 sources that will help support you in this process. Use the table below to help you understand the 2 types of sources you will be using this year: **Anchor Sources** and **Mentor Sources**. You are required to find 7 to 8 **Anchor Sources** and 2 to 3 **Mentor Sources** for a total of 10 sources.

Type Of Source	Explanation	# Required
Anchor Sources	These are sources: • in your **discipline** • about your specific **topic** • that are most often scholarly, peer-reviewed articles • that address differing perspectives on your topic • that include contrasting views about your topic • that include information you may include in your **literature review** • that teach you about your specific **topic** • that help you become an expert on your specific **topic** • that help you improve your *ethos* • that help you identify the **gap** in the research • that help you understand the significance of your **research question** • that **ANCHOR** your understanding of the **body of knowledge** in your **discipline**	6 to 7
Mentor Sources	These sources: • may or may not be in your **discipline** • may or may not be about your specific **topic** • are most often scholarly, peer-reviewed articles • may include similar variables as your research project • include a **research design or method** similar to what you might use to answer your question • include similar data analysis methods • teach you how to conduct a research study • teach you about a particular element of the research process • help you improve your *ethos* • do NOT necessarily help you identify the **gap** in the research • do NOT necessarily help you learn about your specific **topic** • act as a **MENTOR** to you as a researcher	2 to 3

Required for each of the 10 sources:

- Bibliographic information in either MLA or APA documentation style (use the one most common in your discipline)
- A detailed paragraph that summarizes the sources in your own words
- Identify what type of source it is (i.e. **Anchor** or **Mentor)** and address why the source is valuable to your success; this should be completed in one or three sentences at the end of the paragraph that complete the appropriate statement for the source:
    - "This **ANCHOR SOURCE** is valuable to my research project because . . ."
    - "This **MENTOR SOURCE** is valuable to my research project because . . ."

NOTE FOR STUDENTS COMPLETING SCIENCE FAIR PROJECTS:

If you are continuing a project from a previous year, the College Board requires that your project—and ultimately, your paper and presentation—for AP Research be new; in other words, there must be a new research question and research method/design to generate new data. You are NOT allowed to merely rehash what you have already done or use the same data you have already generated or use the same paper you have already written. Additionally, any project that complies by ISEF rules is allowed as long as it can get IRB/IACUC approval. The College Board is not going to restrict your research as long as you follow the rules established by the university & ISEF; this includes projects involving working in a lab at UL, cell cultures, recombinant DNA, or any sort of chemical. Additionally, collaborative projects are NOT allowed.

NOTE ABOUT EXPERT ADVISERS AND MENTORS:

We highly recommend that every student in AP Research locate an expert adviser or mentor, even if you are not working in a lab at U of L. This can be a difficult process, so we have included some resource materials about the do's and don'ts of contacting professors and other potential mentors. We will eventually address this in class, but some of you may want to get a head start. We do NOT recommend that you actually contact them over the summer before school starts unless you have a contact that will make the introduction for you. However, compiling a list of potential mentors and drafting email communications over the summer would help you feel more confident about asking professors for assistance. If you have the messages written when we start school, you can set up a conference with your AP Research teacher to read over your messages and give you some feedback before you actually send them.

If anyone wants to work in a lab at U of L, the optimal time to search for one is August; this is when the graduate student rotation opens up lab spots. Sometimes professors are willing to take on students in their labs only if the student has some pre-existing connection to the university; therefore, you may want to contact your MST teachers or senior MST students to ask for advice or connections.

You may email me during the summer if you have questions, but I do not check my school email regularly.

alesia.williams@jefferson.kyschools.us

Other resources you may find helpful:

1. *Practical Research: Planning and Design* by P.D. Leedy and J.E. Ormrod
2. *Students and Research: Practical Strategies for Science Classrooms and Competitions*, Second Edition, by Julia H. Cothron, Ronald N. Giese, and Richard J Rezba
3. *The Bedford Researcher* by Mike Palmquist
4. USC's Library Guides at http://libguides.usc.edu/
5. AP Research Course and Exam Description Book at https://apcentral.collegeboard.org/pdf/ap-research-course-and-exam-description.pdf

DUE THE FIRST DAY OF CLASS

You will be required to upload it to Turnitin.com.

Remember:

Research is a recursive process. This is only one small step in that quest.

Adapted from an assignment originally created by Emily Lott, master AP Research teacher.

AP Research Assessment Overview

Students are assessed with one through-course performance task consisting of two distinct components. Both components will be included in the calculation of students' final AP scores.

- **Academic Paper — 75%**
- **Presentation and Oral Defense — 25%**

AP Research Through-Course Performance Task

Weight: 100% of the AP Research score

Recommended Completion Date for Both Components: April 15

Submission Deadline: **April 30, 11:59 p.m. ET**

For this task, by April 30, 11:59 PM ET, teachers must:

- ensure each student has submitted their Academic Paper (AP) as final in the AP Digital Portfolio
- submit scores for the Presentation and Oral Defense (POD) in the AP Digital Portfolio

Note: Teachers must carefully plan a calendar that provides time for the task to be completed, scored (POD only), and uploaded by April 30, 11:59 p.m. ET. Only the Academic Paper is uploaded to the AP Digital Portfolio.

RETENTION OF PERFORMANCE TASK PRESENTATION AND ORAL DEFENSE VIDEOS

AP Research teachers are required to keep video files of all performance task presentations and oral defenses for a minimum of one academic year because College Board may request to review the scoring for these components to identify samples for scoring training and to ensure scoring quality.

TASK OVERVIEW

Students design, plan, and implement a yearlong, in-depth study or investigation in an area of personal interest through a chosen or designed inquiry method and develop a well-reasoned argument based on the evidence collected in an academic paper of 4,000–5,000 words. As a culmination of their research, students deliver (using appropriate media) a presentation and orally defend their research design, approach, and findings. Students whose academic paper is accompanied by an additional piece of scholarly work (e.g., performance, exhibit, product) must arrange for the teacher and panelists to view this work prior to the presentation and oral defense. Throughout the inquiry process, students communicate regularly with their teacher and, when appropriate, consult with an internal or external expert.

COMPONENTS

The following components are formally assessed:

Component	Scoring Method	Weight
Academic Paper (AP) 4,000–5,000 words	College Board scored	75%
Presentation and Oral Defense (POD) (15–20 minutes total for presentation followed by three or four questions from a panel of three evaluators).	Teacher scored	25%

TASK GUIDELINES

Students develop a research question/project goal on a topic of their own choosing in an area of personal interest. They submit an inquiry proposal (see Inquiry Proposal Form, p. 54) for the teacher's approval, and teachers provide feedback that helps students refine their research question/project goals.

With assistance from the teacher, students may identify one or more expert adviser(s) — internal or external to the school — to serve as an additional resource. These individuals should be experts in the chosen discipline or field that the student is investigating or in the research method that the student chooses to employ.

Under the teacher's guidance — and using the expert advisers' knowledge base as needed — students design or choose a method to collect data and information and then analyze, evaluate, and select relevant and credible evidence to develop a logical, well-reasoned argument or aesthetic rationale that results in an academic paper of 4,000–5,000 words. The argument or aesthetic rationale must directly address the research question/project goal. Upon completion of the academic paper, students will present their research question/project goal, method/process, and conclusions to an oral defense panel. If the academic paper is accompanied by an additional piece of scholarly work (e.g., performance, exhibit, product), this work is not formally assessed but is viewed by the teacher and oral defense panelists to contextualize the student's research.

Academic Paper (AP)

The body of the academic paper must contain the elements listed in the following table. These elements should be presented in a style and structure appropriate to the discipline in which the topic resides (e.g., psychology, science, music). Abstracts, if included, are not considered part of the body of the academic paper and are not assessed. The academic paper must be written for an educated, non-expert audience.

Required Element	Description
Introduction and Literature Review	Introduces research question/project goal and reviews previous work in the field. Synthesizes the varying perspectives in the scholarly literature to situate the research question/project goal within a gap in the current field of knowledge.
Method, Process, or Approach	Explains and provides justification for the chosen method, process, or approach and its alignment with the research question.
Results, Product, or Findings	Presents the findings, evidence, results, or performance/exhibit/product generated by the research method.
Discussion, Analysis, and/or Evaluation	Interprets the significance of the results, performance/exhibit/product, or findings; explores connections to original research question/project goal.
Conclusion and Future Directions	Articulates the new understanding generated through the research process and the limitations of the conclusion or creative work. Discusses the implications to the community of practice. Identifies areas for future research.
Bibliography	Provides a complete list of sources cited and consulted in the appropriate disciplinary style.

The nature of students' inquiries is open-ended in that students' approaches to their investigations and the type of research they conduct may vary widely. Students must avoid plagiarism by acknowledging, attributing, and/or citing sources throughout the paper and by including a bibliography. **Throughout the year and prior to submission, teachers and students should constantly check work for plagiarism.** Students must also observe ethical practices when gathering information through means such as surveys, interviews, or focus groups, and be prepared to sign agreements with individuals, institutions, or organizations that provide primary and private data. Students should also be prepared to obtain Institutional Review Board (IRB) approval if engaging in research

involving human subjects when required. Graphs, figures, data tables, images, footnoted citations, appendices, abstract, and the bibliography are not part of the total word count for the academic paper. Word count does include titles, sub-headings, and in-text citations.

Presentation and Oral Defense (POD)

All students will develop a 15–20 minute presentation (using appropriate media) and deliver it to an oral defense panel of three evaluators. It is suggested that students' oral presentation be no longer than 15 minutes to ensure at least 5 minutes for the oral defense. The presentation and oral defense should take no longer than 15–20 minutes total. Like the academic paper, the presentation provides an opportunity for students to showcase their research by communicating effectively and succinctly to an audience of educated, non-experts. Students whose academic paper is accompanied by an additional piece of scholarly work (e.g., performance, exhibit, product) must arrange for the teacher and panelists to view this work prior to the presentation and oral defense.

The presentation should distill the student's argument by:

- identifying the research question/project goal
- describing and explaining initial assumptions and hypotheses/ideas and their relation to the student's personal conclusion
- providing the rationale for choices made during the research process (cite or attribute sources or evidence as needed)
- explaining the research process/method, evidence generated, conclusions, and implications
- engaging the audience through a dynamic use of design, delivery, and performance techniques

Following the presentation, an oral defense panel will ask three questions of the student. The panel must consist of the AP Research teacher and two additional adult panel members (preferably expert advisers or discipline-specific experts) chosen by the AP Research teacher. This evaluative component is designed to assess a student's articulation of the inquiry process, understanding of results and conclusions, and reflection on the research experience.

Three of these questions must be chosen from the oral defense question list, which is provided to students in advance. The oral defense panel should ask one question pertaining to the student's research or inquiry process, one question focused on the student's depth of understanding, and one question about the student's reflection throughout the inquiry process as evidenced in their process and reflection portfolio (PREP). The wording of the questions may be tailored to a student's specific project. In addition, a fourth question is permitted to clarify one of the student's answers to a previous question. Any additional questions beyond the fourth question are at the discretion of the teacher but should not be used in scoring the oral defense.

Teachers should offer students presentation guidelines including best practices for delivering information (e.g., vocal and movement techniques, use of multimedia or visual aids). It is strongly suggested that students be given opportunities to practice in front of their peers to gather feedback and learn how to respond succinctly to questions and critiques. Such practice is important to assist students in preparing for their presentations and oral defense.

Oral Defense Questions

Research/Inquiry Process [choices made throughout the research process]

1. How did your initial exploration of the scholarly conversation lead to your final research question/project goal?
2. How did your review of the methods used by scholars in the field inform your selection of a research method/process that is aligned with your research question/project goal?
3. How did the choices you made when designing or implementing your research method impact your research process?
4. How did you determine which results generated by your research method were most important in informing your new understanding?

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Writing Studio
http://twp.duke.edu/writing-studio

What Makes a Good Research Question?

Thompson Writing Program
DUKE UNIVERSITY

What is a Research Question?

A research question guides and centers your research. It should be clear and focused, as well as synthesize multiple sources to present *your unique* argument. Even if your instructor has given you a specific assignment, the research question should ideally be something that you are interested in or care about. Be careful to avoid the "all-about" paper and questions that can be answered in a few factual statements.

Examples:

1. For instance, the following question is too broad and does not define the segments of the analysis:

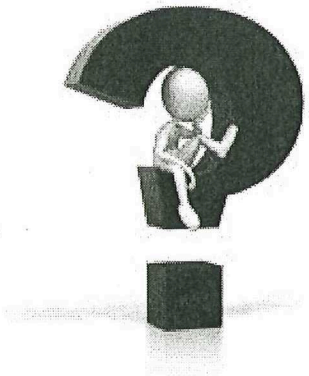
Why did the chicken cross the road?
(The question does not address which chicken or which road.)

2. Similarly, the following question could be answered by a hypothetical Internet search:

How many chickens crossed Broad Street in Durham, NC, on February 6, 2014?
(Ostensibly, this question could be answered in one sentence and does not leave room for analysis. It could, however, become data for a larger argument.)

3. A more precise question might be the following:

What are some of the environmental factors that occurred in Durham, NC between January and February 2014 that would cause chickens to cross Broad Street?
(This question can lead to the author taking a stand on which factors are significant, and allows the writer to argue to what degree the results are beneficial or detrimental.)



How Do You Formulate A Good Research Question?

Choose a general topic of interest, and conduct preliminary research on this topic in current periodicals and journals to see what research has already been done. This will help determine what kinds of questions the topic generates.

Once you have conducted preliminary research, consider: Who is the audience? Is it an academic essay, or will it be read by a more general public? Once you have conducted preliminary research, start asking open-ended "How?" "What?" and Why?" questions. Then evaluate possible responses to those questions.

Examples:

Say, for instance, you want to focus on social networking sites. After reading current research, you want to examine to what degree social networking sites are harmful. The Writing Center at George Mason University provides the following examples and explanations:

Possible Question: *Why are social networking sites harmful?*
An evaluation of this question reveals that the question is unclear: it does not specify which social networking sites or state what harm is being caused. Moreover, this question takes as a given that this "harm" exists. A clearer question would be the following:

Revised Question: *How are online users experiencing or addressing privacy issues on such social networking sites as Facebook and Twitter?*
This version not only specifies the sites (Facebook and Twitter), but also the type of harm (privacy issues) and who is harmed (online users).

While a good research question allows the writer to take an *arguable* position, it DOES NOT leave room for ambiguity.

Checklist of Potential Research Questions in the Humanities (from the Vanderbilt University Writing Center):

1) Is the research question something I/others care about? Is it arguable?
2) Is the research question a new spin on an old idea, or does it solve a problem?
3) Is it too broad or too narrow?
4) Is the research question researchable within the given time frame and location?
5) What information is needed?

Research Question in the Sciences and Social Sciences

While all research questions need to take a stand, there are additional requirements for research questions in the sciences and social sciences. That is, they need to have **repeatable** data. Unreliable data in the original research does not allow for a strong or arguable research question.

In addition, you need to consider what kind of problem you want to address. Is your research trying to accomplish one of these four goals?[1]

1) Define or measure a specific fact or gather facts about a specific phenomenon.
2) Match facts and theory.
3) Evaluate and compare two theories, models, or hypotheses.
4) Prove that a certain method is more effective than other methods.

Moreover, the research question should address what the variables of the experiment are, their relationship, and state something about the testing of those relationships. The Psychology department at California State University, Fresno, provides the following examples and explanations:

[1] David Porush, *A Short Guide to Writing About Science*. (New York: Harper Collins, 1995), 92-93.

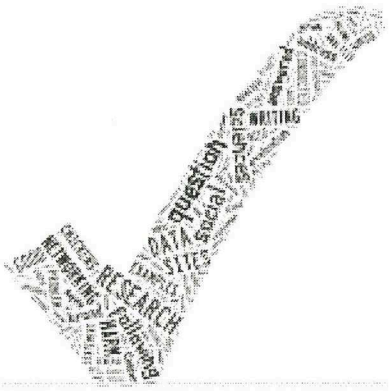
Examples:

Possible research question: *Are females smarter than males?*
This question delineates the variables to be measured: gender and intelligence. Yet, it is unclear how they will be evaluated: What method will be used to define and measure intelligence?

Revised question: *Do females age 18-35 score higher than adult males age 18-35 on the WAIS-III?* (The WAIS-III is a standardized intelligence test.)
This research question produces data that can be replicated. From there, the author can devise a question that takes a stand.

In essence, the research question that guides the sciences and social sciences should do the following three things:[2]

1) Post a problem.
2) Shape the problem into a testable hypothesis.
3) Report the results of the tested hypothesis.



There are two types of data that can help shape research questions in the sciences and social sciences: quantitative and qualitative data. While quantitative data focuses on the numerical measurement and analysis between variables, qualitative data examines the social processes that give rise to the relationships, interactions, and constraints of the inquiry.

Writing After the Research Question

The answer to your research question should be your thesis statement. Keep in mind that you will most likely continue to refine your thesis statement as you conduct and write about your research. A good research question, however, puts you well on your way to writing a strong research paper.

Helpful Links

- http://writingcenter.gmu.edu/?p=307
- http://vanderbilt.edu/writing/manage/wp-content/uploads/2013/06/Formulating%20Your%20Research%20Question.pdf
- http://www.esc.edu/online-writing-center/resources/research/research-paper-steps/developing-questions/
- http://psych.csufresno.edu/psy144/Content/Science/researchquestion.html

[2] Lee Cuba, *A Short Guide to Writing About Social Science*, third edition. (New York: Addison-Wesley Educational Publishers, Inc., 1997), 70-71.

Narrowing a Topic and Developing a Research Question

Narrowing a Topic

You may not know right away what your research question is. Gather information on the broader topic to explore new possibilities and to help narrow your topic.

- **Choose an interesting topic.** If you're interested in your topic, chances are that others will be, too. Plus researching will be a lot more fun!
- **Gather background information.**
  - For a general overview, **reference sources** may be useful.
  - The database **OneSearch@IU** is also a good place to start narrowing your focus and finding resources (libraries.iub.edu/onsearch).
  - Ask yourself:
    - What subtopics relate to the broader topic?
    - What questions do these sources raise?
    - What do you find interesting about the topic?
  - **Consider your audience.** Who would be interested in the issue?

Reference Sources

Reference sources are a great place to begin your research. They provide:

- a way to identify potential research topics.
- a starting point to gather information on your topic.
- an introduction to major works and key issues related to your topic.
- key authors in your area of research.

General Reference Sources

Dictionaries and encyclopedias provide general information about a variety of subjects. They also include definitions that may help you break down and better understand your topic. They are generally not cited, since they mainly give an overview of a topic.

From Topic to Research Question

After choosing a topic and gathering background information, add focus with a research question.

- **Explore questions.**
  - Ask open-ended "how" and "why" questions about your general topic.
  - Consider the "so what" of your topic. Why does this topic matter to you? Why should it matter to others?
  - Reflect on the questions you have considered. Identify one or two questions you find engaging and which could be explored further through research.
- **Determine and evaluate your research question.**
  - What aspect of the more general topic you will explore?
  - Is your research question clear?
  - Is your research question focused?
    (Research questions must be specific enough to be well covered in the space available.)
  - Is your research question complex?
    (Questions shouldn't have a simple yes/no answer and should require research and analysis.)
- **Hypothesize.** After you've come up with a question, consider the path your answer might take.
  - If you are making an argument, what will you say?
  - Why does your argument matter?
  - How might others challenge your argument?
  - What kind of sources will you need to support your argument?

Sample Research Questions

Clarity

Unclear: Why are social networking sites harmful?

Clear: How are online users experiencing or addressing privacy issues on social networking sites like MySpace and Facebook?

Focused

Unfocused: What is the effect on the environment from global warming?

Focused: How is glacial melting affecting penguins in Antarctica?

Simple vs. Complex

Too simple: How are doctors addressing diabetes in the U.S.?

Appropriately complex: What are common traits of those suffering from diabetes in America, and how can these commonalities be used to aid the medical community in prevention of the disease?

Adapted from: George Mason University Writing Center. (2008). How to write a research question. Retrieved from http://writingcenter.gmu.edu/?p=307

Tips for Reading Journal Articles

A quick & efficient way to review an article is to read:

1. **Title**
2. **Abstract**
3. Last paragraph in the **Background/Introduction/Literature** section (i.e. the purpose statement)
4. Scan the **Methods** section for data source and design
5. Review tables and charts in **Results** section. If these are unclear, go to 6.
6. Read first few paragraphs of the **Discussion** section, often summarizing the results and providing implications of the research.
7. Then, go back and check the Methods and Results section (if unclear), or re-read the entire article.

Ultimately, be an active reader. Identify the "what", "who", "when", "where", "how", and "why" as you read. Take notes in the margins (if possible) and look up what you don't know or understand to fill in gaps.

More Tips

- **Go from the general to the particular:**

Articles that report experiments were not necessarily intended to be read straight through. Don't waste time struggling with minute details if you do not first understand the big picture. Before you dive into the article, you should already know roughly what it is going to say! Get that information by reading the title, abstract, and headings and by skimming the introduction, the conclusion (or discussion), and any tables or figures.

- **Look for definitions:**

Jargon is usually defined somewhere in the article, at least by subtle context if not explicitly. If you do not understand a concept that is being discussed at length, look around for the definition. It may be helpful to consult a textbook or even a dictionary. Do not just pass over the terms you do not understand.

- **Examine the tables and figures:**

Briefly review the tables and figures presented by the authors to obtain a sense of the data presented in the article. Read the title legends to provide a context for the data presented. Note the important patterns that emerge from your review of the data presentation represented in the tables and figures. This review should provide a useful context when reading the methods, results, and discussion sections of the article.

- **Selectively read the method and results:**

Read these sections with certain questions in mind. How were the variables measured? Do those measures really capture the conceptual variable, or might they be measuring something else? What did the participants have to do? What were the actual numerical results7 Where are the findings that the authors discuss? Are there anomalies that they don't address? What was the main hypothesis? What were the findings regarding those variables?

- **A second reading may be necessary:**

It is not unusual to have to read an article twice to understand its message. Often there is so much information presented that it cannot all be absorbed in one pass. Even experienced scientists need to read articles slowly, carefully, and repeatedly so do not expect yourself to breeze through them! After you have a good feel for the article's results, go back and re-read the introduction, and finally, go back and read the general discussion to see how the author interprets his or her data.

Critical Evaluation of a Published Paper

During the course of the semester we will be reading, presenting, "writing", and critically evaluating journal articles (We will write our term papers as if we were writing a journal article, but with a modified Methods section and without the Results section). Below is a checklist that follows closely the format of a scientific report, conventionally divided into 6 sections. Please use the checklist as a reference for your a) term paper, b) peer review, AND c) as a guide when reading journal articles in general.

1. Abstract

The abstract serves as a summary of the paper, presenting the purpose, scope, and major findings. The title & abstract are often all that people will read, using this information to decide whether they want to continue. What did you do? What are the main results? What are your conclusions?

a) Is the abstract intelligible? Does it…
b) …accurately describe the objectives & results of paper?
c) …include data not presented in the paper?
d) …include material that cannot be substantiated (conclusions unsupported by results)?

2. Introduction

The introduction serves to logically present the background information/provide context for the study. What is the question (research/scientific hypothesis)? Why is it important (rationale & justification)? What are the alternative hypotheses & how do you test among them (statistical hypotheses)? Remember that a lot of studies begin by observing a pattern (correlation/association). Your research hypothesis states an explanation for this pattern (story), and a statistical hypothesis determines the generalities of the pattern. Hence, we test our predictions (statistical hypotheses) using statistical tests & use results of these tests to either support or refute the research hypothesis.

a) Did the authors indicate *why* the study was undertaken?
b) Was the background information adequate to understand the aims & objectives of the study?

3. Methods

The methods section should be a clear & succinctly stated, chronological description of what you did & how you did it. Could someone else repeat the research with the information provided? If the answer is "no," your methods section is incomplete.

a) Were methods described in sufficient detail for others to repeat or extend the study?
b) Were adequate references cited if standard methods were used?
c) If methods were modified, were modifications described carefully?
d) Have the authors indicated why particular procedures were used, the potential problems of the methods used, & limitations of their methods?
e) Have the authors specified the statistical procedures used?
f) Are the statistical methods appropriate?

4. Results

The results section is meant to highlight trends in the data (most often presented in figures and/or tables). Text should compliment the tables/figures, NOT repeat the information presented therein.

a) Are the results appropriate for the stated objectives?
b) Do the results make sense?
c) Do tables & figures clearly describe the data?
d) Have the appropriate statistical analyses been performed on the data?

5. Discussion

Use this section to synthesize your results & to tie your results to the literature.

Do not repeat your results…relate them to other studies. What are the potential explanations for the results? Have other studies come to similar/different conclusions? How do you account for those discrepancies? WHAT is the take home message? WHAT is the "so what" about your work? Remember your scope of inference (don't stretch your results too far). For example, if you sampled one species of lizard from a single county in Arizona, results do not apply to all lizards in North America.

a) Were the objectives of the study met? If not, do authors have an explanation as to why?
b) Were statistical hypotheses clearly supported or refuted?
c) Are results discussed in relation to similar studies?
d) Do authors indulge in needless speculation?
e) If results are statistically significant, are they also biologically significant?
f) Do authors adequately interpret their data & discuss the limitations of their study?

6. References

a) Do authors cite appropriate papers for comments made?
b) Do authors cite their own publications needlessly?

Use the format of *Journal of Physiology* (http://jp.physoc.org/) for your list of references, as well as for the parenthetical notation throughout your paper. Try to find recent references (within the last 2 or 3 years) so that your analysis is up to date.

General Writing Tips & Suggestions

-Outline before you write

-Define your terms

-Be accurate, concise, and to the point. Make sure your paper follows a logical sequence & moves smoothly from one thought to the next.

-Avoid the passive voice

-Use others as editors. A friend of mine suggests that I have 3 types of people read my work…1) someone knowledgeable in the field, 2) someone knowledgeable in some other scientific discipline, and 3) my mother (a layperson). Having others read your work may be intimidating, BUT it WILL make you a better writer!! CRITICISM is at the heart of science. Embrace it.

- Put the paper aside for a while, if possible. Fresh eyes are better vocabulary & punctuation police.

-Proofread and spell check

Role of the Expert Adviser in AP Research UPDATED 2020

Role of Expert Advisers in the Academic Paper

Should a student require such, they may engage in communication with one or more expert advisers. Expert advisers may be drawn from

- the faculty
- the community
- local or nonlocal businesses and industries
- higher education institutions

Expert advisers represent a resource for teachers and students in a variety of areas (i.e., expertise in specific disciplines, fields, or methods). Teachers must ensure students are transparent with any expert advisers about what they should and should not do.

AP Research: Role of Expert Advisers

DO	DO NOT
Engage in conversation with guiding questions and provide general feedback to students regarding their choice of research questions/project goals, data- or information-collection methods, and analysis strategies.	Generate research questions/project goals for students. Provide unsolicited help (i.e., students must initiate conversations that call for expert adviser feedback, such as asking a question to which the expert adviser can then respond).
May hold work-in-progress meetings with students to ask questions, monitor, discuss, and provide guidance on progress.	Write, revise, amend, or correct anything that is part of, or contributes to, the final work submitted for assessment. Provide specific, directive feedback to individuals (expert advisers must not tell students what to do).
Suggest possible resources that can help students further their research (e.g., additional data bases, local expert advisers, library assistance) – so that students are not disadvantaged in their exploration.	Conduct research or provide specific sources, articles or evidence for students.
Help students with the mechanics of the research process (e.g., strategizing to find answers to questions or helping them understand how to access resources).	Provide unsolicited help (i.e., students must initiate conversations that call for expert adviser feedback, such as asking a question to which the expert adviser can then respond).
Provide general feedback to students about elements of their papers or presentations that need improvement. Direct the students to the areas of the rubrics where their work may need improvement.	Write, revise, amend, or correct student work (anything that is part of, or contributes to, the final work submitted for assessment). Provide or identify the exact questions a student will be asked prior to his or her defense (i.e., students should be prepared to answer every one of the oral defense questions that have already been provided to the students in advance).

How to Email a Research Professor

https://ugr.ue.ucsc.edu/email_examples

Your email should:

- have an informative subject line
- be concise
- be formal: Dear Dr. Smith; Sincerely, Your Name
- not use Mrs. or Ms.
- NOT have slang, abbreviations, or emoticons
- if applying for an opening:
    - address any qualifications the professor is looking for
    - demonstrate your experience
- if asking for a research opportunity:
    - state specifically your interest in that research group (you need to read the professor's website)
    - explain why research is important for your goals
    - ask to schedule a meeting or say that you will be coming to office hours

DO NOT SEND THIS EMAIL
Generalized from an email to a UCSC Professor
Hi Joe,
My name is **Name** and I am a major in **Major**. Is there space in your lab for an undergraduate? If so, what is the pay rate?
Thanks,
Name

DO SEND AN EMAIL LIKE THESE
General email to a STEM professor
Subject: Meeting to discuss undergraduate research opportunities in **topic**
Dear Dr. **Professor,**

I am a **year** student at **university** majoring in **major**. **How you found out about the professor's research. Expression of interest in specific paper or topic.** I would appreciate the chance to talk with you about your research in **topic of interest** and about possible undergraduate opportunities in your lab.

My experience in **research experience or class,** confirmed my intention to develop my research skills and **goal.** I know you are very busy. We could schedule an appointment or I can drop by your office hours on **day and time**.
I have attached my resume and unofficial transcript. Please let me know if there is any other information I can provide. I look forward to talking to you soon.
Best,
Name

Generalized from an email to a UCSC professor
Subject: Possible undergraduate research opportunities
Dear Dr. **Professor**,

I am a **(year, major)** at **(university)** and I am writing to ask about opportunities for undergraduate research in your lab beginning **(time period)**. I have conducted undergraduate research on **(topic)**with **(names)** in **(program or class)**. **(Expression of interest in the topic)**. I would like to

continue a path of research on **(topic)** and would ultimately allow me to **(career goal)**. I am especially interested in your previous work on **(describe a paper or talk)**.
I have attached my CV and unofficial transcript to this e-mail, but if there is additional information that I have not included that you would like, I would be happy to provide it to you. Thank you for your consideration.
Sincerely,
Ambitous Student
Email address

From University of Virginia, How to Sucessfully E-mail Professors
Dear Dr. Smith,

My name is David Wu and I'm a second year biology major at UVa. In my introductory and upper-level coursework, I've developed a passion for science and am extremely interested in pursuing independent research as an undergraduate. An extensive research experience will greatly help me consolidate my future career choice.

I am personally greatly interested in the molecular biology of stem cells. Recently I read your 2011 paper on the role of microRNAs in the differentiation of muscle stem cells and became fascinated by your work. In particular, I found it amazing that microRNAs can alter the fate of a cell in such a profound way. If possible, I would love to start working on a long-term project in your lab beginning this summer.

Would you be available to meet sometime this week to discuss your research? I would also be happy to volunteer in your lab for a few weeks before we commit to anything to see if this is a good match. My transcript and resume are attached in case you are interested. I look forward to hearing from you!

Thank you,

David Wu

Template from UC Irvine Undergraduate Research Opportunities Program
Dear ***Professor X***:

My name is ***Peter Anteater***, and I am very interested in becoming involved in research in ***Subject Area***. I am a ***X*** year student with a GPA of ***X***. I have taken ***Courses*** and ***Additional Experiences***. My goal is to ***Goal***.

I have reviewed your faculty profile and am interested in the work that you have done. I was intrigued by your journal article, ***"Article Title."*** It ***Additional Information about Topic***. I would like to get involved in research in this area because it will help me to better prepare for ***Goals***.
Would it be possible to meet with you to further discuss ***Topic*** and my possible involvement in research? I am available ***Days and Times***. I look forward to hearing from you.

Sincerely,
Peter Anteater
Student ID
Address
Phone
Email

USC Library Guides

Abstract Resource from USC Library Guides

Definition

An abstract summarizes, usually in one paragraph of 300 words or less, the major aspects of the entire paper in a prescribed sequence that includes: 1) the overall purpose of the study and the research problem(s) you investigated; 2) the basic design of the study; 3) major findings or trends found as a result of your analysis; and, 4) a brief summary of your interpretations and conclusions.

Importance of a Good Abstract

Sometimes your professor will ask you to include an abstract, or general summary of your work, with your research paper. **The abstract allows you to elaborate upon each major aspect of the paper and helps readers decide whether they want to read the rest of the paper.** Therefore, enough key information [e.g., summary results, observations, trends, etc.] must be included to make the abstract useful to someone who may want to examine your work.

How do you know when you have enough information in your abstract? A simple rule-of-thumb is to imagine that you are another researcher doing a similar study. Then ask yourself: if your abstract was the only part of the paper you could access, would you be happy with the amount of information presented there? Does it tell the whole story about your study? If the answer is "no" then the abstract likely needs to be revised.

How to Write a Research Abstract. Office of Undergraduate Research. University of Kentucky; Staiger, David L. "What Today's Students Need to Know about Writing Abstracts." *International Journal of Business Communication* January 3 (1966): 29-33; Swales, John M. and Christine B. Feak. *Abstracts and the Writing of Abstracts*. Ann Arbor, MI: University of Michigan Press, 2009.

Structure and Writing Style

I. Types of Abstracts

To begin, you need to determine which type of abstract you should include with your paper. There are four general types.

Critical Abstract

A critical abstract provides, in addition to describing main findings and information, a judgement or comment about the study's validity, reliability, or completeness. The researcher evaluates the paper and often compares it with other works on the same subject. Critical abstracts are generally 400-500 words in length due to the additional interpretive commentary. These types of abstracts are used infrequently.

Descriptive Abstract

A descriptive abstract indicates the type of information found in the work. It makes no judgments about the work, nor does it provide results or conclusions of the research. It does incorporate key words found in the text and may include the purpose, methods, and scope of the research. Essentially, the descriptive abstract only describes the work being summarized. Some researchers consider it an outline of the work, rather than a summary. Descriptive abstracts are usually very short, 100 words or less.

Informative Abstract

The majority of abstracts are informative. While they still do not critique or evaluate a work, they do more than describe it. A good informative abstract acts as a surrogate for the work itself. That is, the researcher presents and explains all the main arguments and the important results and evidence in the paper. An informative abstract includes the information that can be found in a descriptive abstract [purpose, methods, scope] but it also includes the results and conclusions of the research and the recommendations of the author. The length varies according to discipline, but an informative abstract is usually no more than 300 words in length.

Highlight Abstract

A highlight abstract is specifcally written to attract the reader's attention to the study. No pretence is made of there being either a balanced or complete picture of the paper and, in fact, incomplete and leading remarks may be used to spark the reader's interest. In that a highlight abstract cannot stand independent of its associated article, it is not a true abstract and, therefore, rarely used in academic writing.

II. Writing Style

Use the active voice when possible, but note that much of your abstract may require passive sentence constructions. Regardless, write your abstract using concise, but complete, sentences. Get to the point quickly and **always use the past tense** because you are reporting on research that has been completed.

Although it is the first section of your paper, the abstract, by definition, should be written last since it will summarize the contents of your entire paper. To begin composing your abstract, take whole sentences or key phrases from each section and put them in a sequence that summarizes the paper. Then revise or add connecting phrases or words to make it cohensive and clear. Before handing in your final paper, check to make sure that the information in the abstract completely agrees with what your have written in the paper.

The abstract SHOULD NOT contain:

- Lengthy background information,
- References to other literature [say something like, "current research shows that..." or "studies have indicated..."],
- Using ellipticals [i.e., ending with "..."] or incomplete sentences,
- Abbreviations, jargon, or terms that may be confusing to the reader, and
- Any sort of image, illustration, figure, or table, or references to them.

Introduction Resource from USC Library Guides

Definition

The introduction leads the reader from a general subject area to a particular field of research. It establishes the context and significance of the research being conducted by summarizing current understanding and background information about the topic, stating the purpose of the work in the form of the research problem supported by a hypothesis or a set of questions, briefly explaining the methodological approach used to examine the research problem, highlighting the potential outcomes your study can reveal, and outlining the remaining structure of the paper.

Key Elements of the Research Proposal. Prepared under the direction of the Superintendent and by the 2010 Curriculum Design and Writing Team. Baltimore County Public Schools.

Importance of a Good Introduction

Think of the introduction as a mental road map that must answer for the reader these four questions:

1. What was I studying?
2. Why was this topic important to investigate?
3. What did we know about this topic before I did this study?
4. How will this study advance new knowledge or new ways of understanding?

A well-written introduction is important because, quite simply, you never get a second chance to make a good first impression. The opening paragraphs of your paper will provide your readers with their initial impressions about the logic of your argument, your writing style, the overall quality of your research, and, ultimately, the validity of your findings and conclusions. A vague, disorganized, or error-filled introduction will create a negative impression, whereas, a concise, engaging, and well-written introduction will lead your readers to think highly of your analytical skills, your writing style, and your research approach.

Hirano, Eliana. "Research Article Introductions in English for Specific Purposes: A Comparison between Brazilian, Portuguese, and English." *English for Specific Purposes* 28 (October 2009): 240-250; Samraj, B. "Introductions in Research Articles: Variations Across Disciplines." *English for Specific Purposes* 21 (2002): 1–17; Introductions. The Writing Center. University of North Carolina; "Writing Introductions." In *Good Essay Writing: A Social Sciences* Guide. Peter Redman. 4th edition. (London: Sage, 2011), pp. 63-70.

Structure and Writing Style

I. Structure and Approach

The introduction is the broad beginning of the paper that answers three important questions for the reader:

1. What is this?
2. Why should I read it?
3. What do you want me to think about / consider doing / react to?

Think of the structure of the introduction as an inverted triangle of information. Organize the information so as to present the more general aspects of the topic early in the introduction, then narrow your analysis to more specific topical information that provides context, finally arriving at your research problem and the rationale for studying it and, whenever possible, a description of the potential outcomes your study can reveal.

These are general phases associated with writing an introduction:

1. Establish an area to research by:

    - Highlighting the importance of the topic, and/or
    - Making general statements about the topic, and/or
    - Presenting an overview on current research on the subject.

2. Identify a research niche by:

    - Opposing an existing assumption, and/or
    - Revealing a gap in existing research, and/or
    - Formulating a research question or problem, and/or
    - Continuing a disciplinary tradition.

3. Place your research within the research niche by:

    - Stating the intent of your study,
    - Outlining the key characteristics of your study,
    - Describing important results, and
    - Giving a brief overview of the structure of the paper.

NOTE: Even though the introduction is the first main section of a research paper, it is often useful to finish the introduction late in the writing process because the structure of the paper, the reporting and analysis of results, and the conclusion will have been completed. Reviewing and, if necessary, rewriting the introduction ensures that it correctly matches the overall structure of your final paper.

II. Delimitations of the Study

Delimitations refer to those characteristics that limit the scope and define the conceptual boundaries of your research. This is determined by the conscious exclusionary and inclusionary decisions you make about how to investigate the research problem. In other words, not only should you tell the reader what it is you are studying and why, but you must also acknowledge why you rejected alternative approaches that could have been used to examine the topic.

Obviously, the first limiting step was the choice of research problem itself. However, implicit are other, related problems that could have been chosen but were rejected. These should be noted in the conclusion of your introduction. For example, a delimitating statement could read, "Although many factors can be understood to impact the likelihood young people will vote,

this study will focus only on socioeconomic factors related to the need to work full-time while in school." The point is not to document every possible delimiting factor, but to highlight why obvious issues related to the research problem were not addressed.

Examples of delimitating choices would be:

- The key aims and objectives of your study,
- The research questions that you address,
- The variables of interest [i.e., the various factors and features of the phenomenon being studied],
- The method(s) of investigation,
- The time period your study covers, and
- Any relevant alternative theoretical frameworks that could have been adopted.

Review each of these decisions. Not only do you clearly establish what you intend to accomplish in your research, but you should also include a declaration of what the study does not intend to cover. In the latter case, your exclusionary decisions should be based upon criteria understood as, "not interesting"; "not directly relevant"; "too problematic because..."; "not feasible," and the like. Make this reasoning explicit!

NOTE: Delimitations refer to the initial choices made about the broader, overall design of your study and should not be confused with documenting the limitiations of your study discovered after the research has been completed.

ANOTHER NOTE: Do not view delimitating statements as admitting to an inherent failing or shortcoming in your research. They are an accepted element of academic writing intended to keep the reader focused on the research problem by explicitly defining the conceptual boundaries and scope of your study. It addresses any critical questions in the reader's mind of, "Why the hell didn't the author examine this?"

III. The Narrative Flow

Issues to keep in mind that will help the narrative flow in your introduction:

- **Your introduction should clearly identify the subject area of interest**. A simple strategy to follow is to use key words from your title in the first few sentences of the introduction. This will help focus the introduction on the topic at the appropriate level and ensures that you get to the subject matter quickly without losing focus, or discussing information that is too general.
- **Establish context by providing a brief and balanced review of the pertinent published literature that is available on the subject.** The key is to summarize for the reader what is known about the specific research problem before you did your analysis. This part of your introduction should not represent a comprehensive literature review. It consists of a general review of the important, foundational research literature [with citations] that lays a foundation for understanding key elements of the research problem. See the drop-down menu under this tab for "Background Information" regarding types of contexts.

- **Clearly state the hypothesis that you investigated.** When you are first learning to write in this format it is okay, and actually preferable, to use a past statement like, "The purpose of this study was to...." or "We investigated three possible mechanisms to explain the...."
- **Why did you choose this kind of research study or design?** Provide a clear statement of the rationale for your approach to the problem studied. This will usually follow your statement of purpose in the last paragraph of the introduction.

IV. Engaging the Reader

The overarching goal of your introduction is to make your readers want to read your paper. The introduction should grab your reader's attention. Strategies for doing this can be to:

1. Open with a compelling story,
2. Include a strong quotation or a vivid, perhaps unexpected anecdote,
3. Pose a provocative or thought-provoking question,
4. Describe a puzzling scenario or incongruity, or
5. Cite a stirring example or case study that illustrates why the research problem is important.

NOTE: Choose only <u>one</u> strategy for engaging your readers; avoid giving an impression that your paper is more flash than substance.

Literature Review Resource from USC Library Guides

Definition

A literature review surveys books, scholarly articles, and any other sources relevant to a particular issue, area of research, or theory, and by so doing, provides a description, summary, and critical evaluation of these works in relation to the research problem being investigated. Literature reviews are designed to provide an overview of sources you have explored while researching a particular topic and to demonstrate to your readers how your research fits within a larger field of study.

Fink, Arlene. *Conducting Research Literature Reviews: From the Internet to Paper*. Fourth edition. Thousand Oaks, CA: SAGE, 2014.

Importance of a Good Literature Review

A literature review may consist of simply a summary of key sources, but in the social sciences, a literature review usually has an organizational pattern and combines both summary and synthesis, often within specific conceptual categories. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling, of that information in a way that informs how you are planning to investigate a research problem. The analytical features of a literature review might:

- Give a new interpretation of old material or combine new with old interpretations,
- Trace the intellectual progression of the field, including major debates,
- Depending on the situation, evaluate the sources and advise the reader on the most pertinent or relevant research, or
- Usually in the conclusion of a literature review, identify where gaps exist in how a problem has been researched to date.

The purpose of a literature review is to:

- Place each work in the context of its contribution to understanding the research problem being studied.
- Describe the relationship of each work to the others under consideration.
- Identify new ways to interpret prior research.
- Reveal any gaps that exist in the literature.
- Resolve conflicts amongst seemingly contradictory previous studies.
- Identify areas of prior scholarship to prevent duplication of effort.
- Point the way in fulfilling a need for additional research.
- Locate your own research within the context of existing literature [very important].

Fink, Arlene. *Conducting Research Literature Reviews: From the Internet to Paper*. 2nd ed. Thousand Oaks, CA: Sage, 2005; Hart, Chris. *Doing a Literature Review: Releasing the Social Science Research Imagination*. Thousand Oaks, CA: Sage Publications, 1998; Jesson, Jill. *Doing Your Literature Review: Traditional and Systematic Techniques*. Los Angeles, CA: SAGE, 2011; Ridley, Diana. *The Literature Review: A Step-by-Step Guide for Students*. 2nd ed. Los Angeles, CA: SAGE, 2012.

Types of Literature Reviews

It is important to think of knowledge in a given field as consisting of three layers. First, there are the primary studies that researchers conduct and publish. Second are the reviews of those studies that summarize and offer new interpretations built from and often extending beyond the primary studies. Third, there are the perceptions, conclusions, opinion, and interpretations that are shared informally that become part of the lore of field.

In composing a literature review, it is important to note that it is often this third layer of knowledge that is cited as "true" even though it often has only a loose relationship to the primary studies and secondary literature reviews. Given this, while literature reviews are designed to provide an overview and synthesis of pertinent sources you have explored, there are a number of approaches you could adopt depending upon the type of analysis underpinning your study.

Types of Literature Reviews

Argumentative Review

This form examines literature selectively in order to support or refute an argument, deeply imbedded assumption, or philosophical problem already established in the literature. The purpose is to develop a body of literature that establishes a contrarian viewpoint. Given the value-laden nature of some social science research [e.g., educational reform; immigration control], argumentative approaches to analyzing the literature can be a legitimate and important form of discourse. However, note that they can also introduce problems of bias when they are used to make summary claims of the sort found in systematic reviews [see below].

Integrative Review

Considered a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated. The body of literature includes all studies that address related or identical hypotheses or research problems. A well-done integrative review meets the same standards as primary research in regard to clarity, rigor, and replication. This is the most common form of review in the social sciences.

Historical Review

Few things rest in isolation from historical precedent. Historical literature reviews focus on examining research throughout a period of time, often starting with the first time an issue, concept, theory, phenomena emerged in the literature, then tracing its evolution within the scholarship of a discipline. The purpose is to place research in a historical context to show familiarity with state-of-the-art developments and to identify the likely directions for future research.

Methodological Review

A review does not always focus on **what** someone said [findings], but **how** they came about saying what they say [method of analysis]. Reviewing methods of analysis provides a framework of understanding at different levels [i.e. those of theory, substantive fields, research approaches, and data collection and analysis techniques], how researchers draw upon a wide variety of knowledge ranging from the conceptual level to practical documents for use in fieldwork in the areas of ontological and epistemological consideration, quantitative and qualitative integration, sampling, interviewing, data collection, and data analysis. This approach helps highlight ethical issues which you should be aware of and consider as you go through your own study.

Systematic Review

This form consists of an overview of existing evidence pertinent to a clearly formulated research question, which uses pre-specified and standardized methods to identify and critically appraise relevant research, and to collect, report, and analyze data from the studies that are included in the review. Typically it focuses on a very specific empirical question, often posed in a cause-and-effect form, such as "To what extent does A contribute to B?"

Theoretical Review

The purpose of this form is to examine the corpus of theory that has accumulated in regard to an issue, concept, theory, phenomena. The theoretical literature review helps to establish what theories already exist, the relationships between them, to what degree the existing theories have been investigated, and to develop new hypotheses to be tested. Often this form is used to help establish a lack of appropriate theories or reveal that current theories are inadequate for explaining new or emerging research problems. The unit of analysis can focus on a theoretical concept or a whole theory or framework.

Baumeister, Roy F. and Mark R. Leary. "Writing Narrative Literature Reviews." *Review of General Psychology* 1 (September 1997): 311-320; Mark R. Fink, Arlene. *Conducting Research Literature Reviews: From the Internet to Paper.* 2nd ed. Thousand Oaks, CA: Sage, 2005; Hart, Chris. *Doing a Literature Review: Releasing the Social Science Research Imagination.* Thousand Oaks, CA: Sage Publications, 1998; Kennedy, Mary M. "Defining a Literature." *Educational Researcher* 36 (April 2007): 139-147; Petticrew, Mark and Helen Roberts. *Systematic Reviews in the Social Sciences: A Practical Guide.* Malden, MA: Blackwell, 2006; Torracro, Richard. "Writing Integrative Literature Reviews: Guidelines and Examples." *Human Resource Development Review* 4 (September 2005): 356-367; Rocco, Tonette S. and Maria S. Plakhotnik. "Literature Reviews, Conceptual Frameworks, and Theoretical Frameworks: Terms, Functions, and Distinctions." *Human Ressource Development Review* 8 (March 2008): 120-130; Sutton, Anthea. *Systematic Approaches to a Successful Literature Review.* Los Angeles, CA: Sage Publications, 2016.

I. Thinking About Your Literature Review

The structure of a literature review should include the following:

- An overview of the subject, issue, or theory under consideration, along with the objectives of the literature review,
- Division of works under review into themes or categories [e.g. works that support a particular position, those against, and those offering alternative approaches entirely],
- An explanation of how each work is similar to and how it varies from the others,
- Conclusions as to which pieces are best considered in their argument, are most convincing of their opinions, and make the greatest contribution to the understanding and development of their area of research.

The critical evaluation of each work should consider:

- **Provenance** -- what are the author's credentials? Are the author's arguments supported by evidence [e.g. primary historical material, case studies, narratives, statistics, recent scientific findings]?
- **Methodology** -- were the techniques used to identify, gather, and analyze the data appropriate to addressing the research problem? Was the sample size appropriate? Were the results effectively interpreted and reported?
- **Objectivity** -- is the author's perspective even-handed or prejudicial? Is contrary data considered or is certain pertinent information ignored to prove the author's point?
- **Persuasiveness** -- which of the author's theses are most convincing or least convincing?
- **Value** -- are the author's arguments and conclusions convincing? Does the work ultimately contribute in any significant way to an understanding of the subject?

II. Development of the Literature Review

Four Stages

1. Problem formulation -- which topic or field is being examined and what are its component issues?
2. Literature search -- finding materials relevant to the subject being explored.
3. Data evaluation -- determining which literature makes a significant contribution to the understanding of the topic.
4. Analysis and interpretation -- discussing the findings and conclusions of pertinent literature.

Consider the following issues before writing the literature review:

Clarify

If your assignment is not very specific about what form your literature review should take, seek clarification from your professor by asking these questions:

1. Roughly how many sources should I include?
2. What types of sources should I review (books, journal articles, websites; scholarly versus popular sources)?
3. Should I summarize, synthesize, or critique sources by discussing a common theme or issue?
4. Should I evaluate the sources?
5. Should I provide subheadings and other background information, such as definitions and/or a history?

Find Models

Use the exercise of reviewing the literature to examine how authors in your discipline or area of interest have composed their literature review sections. Read them to get a sense of the types of themes you might want to look for in your own research or to identify ways to organize your final review. The bibliography or reference section of sources you've already read are also excellent entry points into your own research.

Narrow the Topic

The narrower your topic, the easier it will be to limit the number of sources you need to read in order to obtain a good survey of relevant resources. Your professor will probably not expect you to read everything that's available about the topic, but you'll make your job easier if you first limit scope of the research problem. A good strategy is to begin by searching the HOMER catalog for books about the topic and review the table of contents for chapters that focuses on specific issues. You can also review the indexes of books to find references to specific issues that can serve as the focus of your research. For example, a book surveying the history of the Israeli-Palestinian conflict may include a chapter on the role Egypt has played in mediating the conflict, or look in the index for the pages where Egypt is mentioned in the text.

Consider Whether Your Sources are Current

Some disciplines require that you use information that is as current as possible. This is particularly true in disciplines in medicine and the sciences where research conducted becomes obsolete very quickly as new discoveries are made. However, when writing a review in the social sciences, a survey of the history of the literature may be required. In other words, a complete understanding the research problem requires you to deliberately examine how knowledge and perspectives have changed over time. Sort through other current bibliographies or literature reviews in the field to get a sense of what your discipline expects. You can also use this method to explore what is considered by scholars to be a "hot topic" and what is not.

III. Ways to Organize Your Literature Review

Chronology of Events

If your review follows the chronological method, you could write about the materials according to when they were published. This approach should only be followed if a clear path of research building on previous research can be identified and that these trends follow a clear chronological order of development. For example, a literature review that focuses on continuing research about the emergence of German economic power after the fall of the Soviet Union.

By Publication

Order your sources by publication chronology, then, only if the order demonstrates a more important trend. For instance, you could order a review of literature on environmental studies of brown fields if the progression revealed, for example, a change in the soil collection practices of the researchers who wrote and/or conducted the studies.

Thematic ["conceptual categories"]

Thematic reviews of literature are organized around a topic or issue, rather than the progression of time. However, progression of time may still be an important factor in a thematic review. For example, a review of the Internet's impact on American presidential politics could focus on the development of online political satire. While the study focuses on one topic, the Internet's impact on American presidential politics, it will still be organized chronologically reflecting technological developments in media. The only difference here between a "chronological" and a "thematic" approach is what is emphasized the most: the role of the Internet in presidential politics. Note however that more authentic thematic reviews tend to break away from chronological order. A review organized in this manner would shift between time periods within each section according to the point made.

Methodological

A methodological approach focuses on the methods utilized by the researcher. For the Internet in American presidential politics project, one methodological approach would be to look at cultural differences between the portrayal of American presidents on American, British, and French websites. Or the review might focus on the fundraising impact of the Internet on a particular political party. A methodological scope will influence either the types of documents in the review or the way in which these documents are discussed.

Other Sections of Your Literature Review

Once you've decided on the organizational method for your literature review, the sections you need to include in the paper should be easy to figure out because they arise from your organizational strategy. In other words, a chronological review would have subsections for each vital time period; a thematic review would have subtopics based upon factors that relate to the theme or issue. However, sometimes you may need to add additional sections that are necessary for your study, but do not fit in the organizational strategy of the body. What other sections you include in the body is up to you but include only what is necessary for the reader to locate your study within the larger scholarship framework.

Here are examples of other sections you may need to include depending on the type of review you write:

- **Current Situation**: information necessary to understand the topic or focus of the literature review.
- **History**: the chronological progression of the field, the literature, or an idea that is necessary to understand the literature review, if the body of the literature review is not already a chronology.
- **Selection Methods**: the criteria you used to select (and perhaps exclude) sources in your literature review. For instance, you might explain that your review includes only peer-reviewed articles and journals.
- **Standards**: the way in which you present your information.
- **Questions for Further Research**: What questions about the field has the review sparked? How will you further your research as a result of the review?

IV. Writing Your Literature Review

Once you've settled on how to organize your literature review, you're ready to write each section. When writing your review, keep in mind these issues.

Use Evidence

A literature review section is, in this sense, just like any other academic research paper. Your interpretation of the available sources must be backed up with evidence [citations] that demonstrates that what you are saying is valid.

Be Selective

Select only the most important points in each source to highlight in the review. The type of information

you choose to mention should relate directly to the research problem, whether it is thematic, methodological, or chronological. Related items that provide additional information but that are not key to understanding the research problem can be included in a list of further readings.

Use Quotes Sparingly
Some short quotes are okay if you want to emphasize a point, or if what an author stated cannot be easily paraphrased. Sometimes you may need to quote certain terminology that was coined by the author, not common knowledge, or taken directly from the study. Do not use extensive quotes as a substitute for your own summary and interpretation of the literature.

Summarize and Synthesize
Remember to summarize and synthesize your sources within each thematic paragraph as well as throughout the review. Recapitulate important features of a research study, but then synthesize it by rephrasing the study's significance and relating it to your own work.

Keep Your Own Voice
While the literature review presents others' ideas, your voice [the writer's] should remain front and center. For example, weave references to other sources into what you are writing but maintain your own voice by starting and ending the paragraph with your own ideas and wording.

Use Caution When Paraphrasing
When paraphrasing a source that is not your own, be sure to represent the author's information or opinions accurately and in your own words. Even when paraphrasing an author's work, you still must provide a citation to that work.

V. Common Mistakes to Avoid

These are the most common mistakes made in reviewing social science research literature.

- Sources in your literature review do not clearly relate to the research problem;
- You do not take sufficient time to define and identify the most relevent sources to use in the literature review related to the research problem;
- Relies exclusively on secondary analytical sources rather than including relevant primary research studies or data;
- Uncritically accepts another researcher's findings and interpretations as valid, rather than examining critically all aspects of the research design and analysis;
- Does not describe the search procedures that were used in identifying the literature to review;
- Reports isolated statistical results rather than synthesizing them in chi-squared or meta-analytic methods; and,
- Only includes research that validates assumptions and does not consider contrary findings and alternative interpretations found in the literature.

Methodology Resource from USC Library Guides

Definition

The methods section describes the rationale for the application of specific procedures or techniques used to identify, select, and analyze information applied to understanding the research problem, thereby, allowing the reader to critically evaluate a study's overall validity and reliability. The methodology section of a research paper answers two main questions: How was the data collected or generated? And, how was it analyzed? The writing should be direct and precise and always written in the past tense.

Kallet, Richard H. "How to Write the Methods Section of a Research Paper." *Respiratory Care* 49 (October 2004): 1229-1232.

Importance of a Good Methodology Section

You must explain how you obtained and analyzed your results for the following reasons:

- Readers need to know how the data was obtained because the method you chose affects the findings and, by extension, how you likely interpreted them.
- Methodology is crucial for any branch of scholarship because an unreliable method produces unreliable results and, as a consequence, undermines the value of your interpretations of the findings.
- In most cases, there are a variety of different methods you can choose to investigate a research problem. The methodology section of your paper should clearly articulate the reasons why you chose a particular procedure or technique.
- The reader wants to know that the data was collected or generated in a way that is consistent with accepted practice in the field of study. For example, if you are using a multiple choice questionnaire, readers need to know that it offered your respondents a reasonable range of answers to choose from.
- The method must be appropriate to fulfilling the overall aims of the study. For example, you need to ensure that you have a large enough sample size to be able to generalize and make recommendations based upon the findings.
- The methodology should discuss the problems that were anticipated and the steps you took to prevent them from occurring. For any problems that do arise, you must describe the ways in which they were minimized or why these problems do not impact in any meaningful way your interpretation of the findings.
- In the social and bahavioral sciences, it is important to always provide sufficient information to allow other researchers to adopt or replicate your methodology. This information is particularly important when a new method has been developed or an innovative use of an exisiting method is utilized.

Bem, Daryl J. Writing the Empirical Journal Article. Psychology Writing Center. University of Washington; Lunenburg, Frederick C. *Writing a Successful Thesis or Dissertation: Tips and Strategies for Students in the Social and Behavioral Sciences*. Thousand Oaks, CA: Corwin Press, 2008.

Structure and Writing Style

I. Groups of Research Methods

There are two main groups of research methods in the social sciences:

1. **The empirical-analytical group approaches the study of social sciences in a similar manner that researchers study the natural sciences.** This type of research focuses on objective knowledge, research questions that can be answered yes or no, and operational definitions of variables to be measured. The empirical-analytical group employs deductive reasoning that uses existing theory as a foundation for formulating hypotheses that need to be tested. This approach is focused on explanation.
2. **The interpretative group of methods is focused on understanding phenomenon in a comprehensive, holistic way.** Interpretive methods focus on analytically disclosing the meaning-making practices of human subjects [the why, how, or by what means people do what they do], while showing how those practices arrange so that it can be used to generate observable outcomes. Interpretive methods allow you to recognize your connection to the phenomena under study but, because the interpretative group focuses more on subjective knowledge, it requires careful interpretation of variables.

II. Content

An effectively written methodology section should:

- **Introduce the overall methodological approach for investigating your research problem.** Is your study qualitative or quantitative or a combination of both (mixed method)? Are you going to take a special approach, such as action research, or a more neutral stance?
- **Indicate how the approach fits the overall research design.** Your methods should have a clear connection with your research problem. In other words, make sure that your methods will actually address the problem. One of the most common deficiencies found in research papers is that the proposed methodology is not suitable to achieving the stated objective of your paper.
- **Describe the specific methods of data collection you are going to use**, such as, surveys, interviews, questionnaires, observation, archival research. If you are analyzing existing data, such as a data set or archival documents, describe how it was originally created or gathered and by whom.
- **Explain how you intend to analyze your results.** Will you use statistical analysis? Will you use specific theoretical perspectives to help you analyze a text or explain observed behaviors? Describe how you plan to obtain an accurate assessment of relationships, patterns, trends, distributions, and possible contradictions found in the data.
- **Provide background and a rationale for methodologies that are unfamiliar for your readers.** Very often in the social sciences, research problems and the methods for investigating them require more explanation/rationale than widely accepted rules governing the natural and physical sciences. Be clear and concise in your explanation.
- **Provide a justification for subject selection and sampling procedure.** For instance, if you propose to conduct interviews, how do you intend to select the sample population? If you are analyzing texts, which texts have you chosen, and why? If you are using statistics, why is this set of statistics being used? If other data sources exist, explain why the data you chose is most appropriate to addressing the research problem.
- **Describe potential limitations.** Are there any practical limitations that could affect your data collection? How will you attempt to control for potential confounding variables and errors? If your methodology may lead to problems you can anticipate, state this openly and show why pursuing this methodology outweighs the risk of these problems cropping up.

NOTE: **Once you have written all of the elements of the methods section, subsequent revisions should focus on how to present those elements as clearly and as logically as possibly.** The description of how you prepared to study the research problem, how you gathered the data, and the protocol for analyzing the data should be organized chronologically. For clarity, when a large amount of detail must be presented, information should be presented in sub-sections according to topic.

III. Problems to Avoid

Irrelevant Detail

The methodology section of your paper should be thorough but to the point. Do not provide any background information that doesn't directly help the reader to understand why a particular method was chosen, how the data was gathered or obtained, and how it was analyzed.

Unnecessary Explanation of Basic Procedures

Remember that you are not writing a how-to guide about a particular method. You should make the assumption that readers possess a basic understanding of how to investigate the research problem on their own and, therefore, you do not have to go into great detail about specific methodological procedures. The focus should be on how you *applied a method*, not on the mechanics of *doing a method*.

NOTE: An exception to this rule is if you select an unconventional approach to doing the method; if this is the case, be sure to explain why this approach was chosen and how it enhances the overall research process.

Problem Blindness

It is almost a given that you will encounter problems when collecting or generating your data. Do not ignore these problems or pretend they did not occur. Often, documenting how you overcame obstacles can form an interesting part of the methodology. It demonstrates to the reader that you can provide a cogent rationale for the decisions you made to minimize the impact of any problems that arose.

Literature Review

Just as the literature review section of your paper provides an overview of sources you have examined while researching a particular topic, the methodology section should cite any sources that informed your choice and application of a particular method [i.e., the choice of a survey should include any citations to the works you used to help construct the survey].

It's More than Sources of Information!

A description of a research study's method should not be confused with a description of the sources of information. Such a list of sources is useful in itself, especially if it is accompanied by an explanation about the selection and use of the sources. The description of the project's methodology complements a list of sources in that it sets forth the organization and interpretation of information emanating from those sources.

Results/Findings Resource from USC Library Guides

Definition

The results section is where you report the findings of your study based upon the methodology [or methodologies] you applied to gather information. The results section should simply state the findings of the research arranged in a logical sequence without bias or interpretation. A section describing results [a.k.a., "findings"] is particularly necessary if your paper includes data generated from your own research.

Importance of a Good Results Section

When formulating the results section, it's important to remember that the results of a study do not prove anything. Findings can only confirm or reject the hypothesis underpinning your study. However, the act of articulating the results helps you to understand the problem from within, to break it into pieces, and to view the research problem from various perspectives.

The page length of this section is set by the amount and types of data to be reported. Be concise, using non-textual elements appropriately, such as figures and tables, to present results more effectively. In deciding what data to describe in your results section, you must clearly distinguish information that would normally be included in a research paper from any raw data or other content that could be included as an appendix. In general, raw data that has not been summarized should not be included in the main text of your paper unless requested to do so by your professor.

Avoid providing data that is not critical to answering the research question. The background information you described in the introduction section should provide the reader with any additional context or explanation needed to understand the results. A good strategy is to always re-read the background section of your paper after you have written up your results to ensure that the reader has enough context to understand the results [and, later, how you interpreted the results in the discussion section of your paper].

Brett, Paul. "A Genre Analysis of the Results Section of Sociology Articles." *English for Specific Speakers* 13 (1994): 47-59; Burton, Neil et al. *Doing Your Education Research Project.* Los Angeles, CA: SAGE, 2008; Results. The Structure, Format, Content, and Style of a Journal-Style Scientific Paper. Department of Biology. Bates College; Kretchmer, Paul. Twelve Steps to Writing an Effective Results Section. San Francisco Edit; "Reporting Findings." In *Making Sense of Social Research* Malcolm Williams, editor. (London;: SAGE Publications, 2003) pp. 188-207.

Structure and Writing Style

I. Organization and Approach

For most research paper formats in the social sciences, there are two possible ways of presenting and organizing the results. Both approaches are appropriate in how you report finding in the social sciences, but use only one or the other.

1. **Present a synopsis of the results followed by an explanation of key findings**. For example, you may have noticed an unusual correlation between two variables during the analysis of your findings. It is correct to point this out in the results section. However, speculating as to why this correlation exists, and offering a hypothesis about what may be happening, belongs in the discussion section of your paper.
2. **Present a result and then explain it, before presenting the next result then explaining it, and so on, then end with an overall synopsis**. This is more common in longer papers because it helps the reader to better understand each finding. This is also the preferred approach if you have multiple results of equal significance. In this model, it is helpful to provide a brief conclusion that ties each of the findings together and provides a narrative bridge to the discussion section of the your paper.

NOTE: The discussion section that follows with an interpretation and description of the significance of your results should utilize the same approach you used in presenting and organizing the results [i.e., a thorough explanation of the results or a sequential description and explanation of each finding].

II. Content

In general, the content of your results section should include the following elements:

1. An introductory context for understanding the results by restating the research problem underpinning your study.
2. A summary of your key findings arranged in a logical sequence that generally follows your methodology section.
3. Inclusion of non-textual elements, such as, figures, charts, photos, maps, tables, etc. to further illustrate key findings, if appropriate.
4. A systematic description of your results, highlighting for the reader observations that are most relevant to the topic under investigation [remember that not all results that emerge from the methodology used to gather the data may be relevant].
5. Use of the past tense when referring to your results.
6. The page length of your results section is guided by the amount and types of data to be reported. However, focus only on findings that are important and related to addressing the research problem.

III. Problems to Avoid

When writing the results section, avoid doing the following:

1. **Discussing or interpreting your results**. Save all this for the next section of your paper, although where appropriate, you should compare or contrast specific results to those found in other studies [e.g., "Similar to Smith [1990], one of the findings of this study is the strong correlation between motivation and academic achievement...."].
2. **Reporting background information or attempting to explain your findings.** This should have been done in your Introduction section, but don't panic! Often the results of a study point to the need for additional background information or to explain the topic further, so don't think you did something wrong. Revise your introduction as needed.
3. **Ignoring negative results**. If some of your results fail to support your hypothesis, do not ignore them. Document them, then state in your discussion section why you believe a negative result emerged from your study. Note that negative results, and how you handle them, offer you the opportunity to write a more engaging discussion section, therefore, don't be afraid to highlight them.
4. **Including raw data or intermediate calculations**. Ask your professor if you need to include any raw data generated by your study, such as transcripts from interviews or data files. If raw data is to be included, place it in an appendix or set of appendices that are referred to in the text.
5. **Be as factual and concise as possible in reporting your findings**. Do not use phrases that are vague or non-specific, such as, "appeared to be greater or lesser than..." or "demonstrates promising trends that...."
6. **Presenting the same data or repeating the same information more than once**. If it is important to highlight a particular finding, you will have an opportunity to emphasize its significance in the discussion section.
7. **Confusing figures with tables**. Be sure to properly label any non-textual elements in your paper. Don't call a chart an illustration or a figure a table. If you are not sure, **go here**.

Discussion Resource from USC Library Guides

Definition

The purpose of the discussion is to interpret and describe the significance of your findings in light of what was already known about the research problem being investigated, and to explain any new understanding or insights about the problem after you've taken the findings into consideration. The discussion will always connect to the introduction by way of the research questions or hypotheses you posed and the literature you reviewed, but it does not simply repeat or rearrange the introduction; the discussion should always explain how your study has moved the reader's understanding of the research problem forward from where you left them at the end of the introduction.

Annesley Thomas M. "The Discussion Section: Your Closing Argument." *Clinical Chemistry* 56 (November 2010): 1671-1674.

Importance of a Good Discussion

This section is often considered the most important part of your research paper because this is where you:

1. Most effectively demonstrates your ability as a researcher to think critically about an issue, to develop creative solutions to problems based upon a logical synthesis of the findings, and to formulate a deeper, more profound understanding of the research problem under investigation.
2. Present the underlying meaning of your research, note possible implications in other areas of study, and explore possible improvements that can be made in order to further develop the concerns of your research.
3. Highlight the importance of your study and how it may be able to contribute to and/or help fill existing gaps in the field. If appropriate, the discussion section is also where you state how the findings from your study revealed new gaps in the literature that had not been previously exposed or adequately described.
4. Engage the reader in thinking critically about issues based upon an evidence-based interpretation of findings; it is not governed strictly by objective reporting of information.

Annesley Thomas M. "The Discussion Section: Your Closing Argument." *Clinical Chemistry* 56 (November 2010): 1671-1674; Bitchener, John and Helen Basturkmen. "Perceptions of the Difficulties of Postgraduate L2 Thesis Students Writing the Discussion Section." *Journal of English for Academic Purposes* 5 (January 2006): 4-18; Kretchmer, Paul. Fourteen Steps to Writing an Effective Discussion Section. San Francisco Edit, 2003-2008.

Structure and Writing Style

I. General Rules

These are the general rules you should adopt when composing your discussion of the results:

- Do not be verbose or repetitive
- Be concise and make your points clearly
- Avoid using jargon
- Follow a logical stream of thought; in general, interpret and discuss the significance of your findings in the same sequence you described them in your results section
- Use the present verb tense, especially for established facts; however, refer to specific works or prior studies in the past tense
- If needed, use subheadings to help organize your discussion or to categorize your interpretations into themes

II. The Content

The content of the discussion section of your paper most often includes:

1. **Explanation of results**: comment on whether or not the results were expected for each set of results; go into greater depth when explaining findings that were unexpected or especially profound. If appropriate, note any unusual or unanticipated patterns or trends that emerged from your results and explain their meaning in relation to the research problem.
2. **References to previous research**: either compare your results with the findings from other studies or use the studies to support a claim. This can include re-visiting key sources already cited in your literature review section, or, save them to cite later in the discussion section if they are more important to compare with your results instead of being a part of the general literature review of research used to provide context and background information. Note that you can make this decision to highlight specific studies after you have begun writing the discussion section.
3. **Deduction**: a claim for how the results can be applied more generally. For example, describing lessons learned, proposing recommendations that can help improve a situation, or highlighting best practices.
4. **Hypothesis**: a more general claim or possible conclusion arising from the results [which may be proved or disproved in subsequent research]. This can be framed as new research questions that emerged as a result of your analysis.

III. Organization and Structure

Keep the following sequential points in mind as you organize and write the discussion section of your paper:

1. Think of your discussion as an inverted pyramid. Organize the discussion from the general to the specific, linking your findings to the literature, then to theory, then to practice [if appropriate].
2. Use the same key terms, narrative style, and verb tense [present] that you used when when describing the research problem in your introduction.
3. Begin by briefly re-stating the research problem you were investigating and answer all of the research questions underpinning the problem that you posed in the introduction.

4. Describe the patterns, principles, and relationships shown by each major findings and place them in proper perspective. The sequence of this information is important; first state the answer, then the relevant results, then cite the work of others. If appropriate, refer the reader to a figure or table to help enhance the interpretation of the data [either within the text or as an appendix]. The order of interpreting each major finding should be in the same order as they were described in your results section.
5. A good discussion section includes analysis of any unexpected findings. This part of the discussion should begin with a description of any unanticipated findings, followed by a brief interpretation as to why you believe it appeared and, if necessary, its possible significance in relation to the overall study. If more than one unexpected finding emerged during the study, describe each them in the order they appeared as you gathered or analyzed the data. The exception to discussing findings in the same order you described them in the results section would be to begin by highlighting the implications of a particularly unexpected or significant finding that emerged from the study, followed by a discussion of the remaining findings.
6. Before concluding the discussion, identify potential limitations and weaknesses if you do not plan to do so in the conclusion. Comment on their relative importance in relation to your overall interpretation of the results and, if necessary, note how they may affect the validity of your findings. Avoid using an apologetic tone; however, be honest and self-critical [e.g., in retrospective, you believe including a particular question in a survey instrument could have revealed additional data].
7. The discussion section should end with a concise summary of the principal implications of the findings regardless of significance. Give a brief explanation about why you believe the findings and conclusions of your study are important and how they support broader knowledge or understanding of the research problem. This can be followed by any recommendations for further research. However, do not offer recommendations which could have been easily addressed within the study. This would demonstrate to the reader that you have inadequately examined and interpreted the data.

IV. Overall Objectives

The objectives of your discussion section should include the following:

I. Reiterate the Research Problem/State the Major Findings

Briefly reiterate the research problem or problems you are investigating and the methods you used to investigate them, then move quickly to describe the major findings of the study. You should write a direct, declarative, and succinct proclamation of the study results, usually in one paragraph.

II. Explain the Meaning of the Findings and Why They are Important

Consider the likelihood that no one has thought as long and hard about your study as you have. Systematically explain the underlying meaning of your findings and state why you believe they are significant. After reading the discussion section, you want the reader to think critically about the results ["why didn't I think of that?"]. You don't want to force the reader to go through the paper multiple times to figure out what it all means. If applicable, begin this

part of the section by repeating what you consider to be your most significant or unanticipated finding first, then systematically review each finding. Otherwise, follow the general order you reported the findings in the results section.

III. Relate the Findings to Similar Studies

No study in the social sciences is so novel or possesses such a restricted focus that it has absolutely no relation to previously published research. The discussion section should relate your results to those found in other studies, particularly if questions raised from prior studies served as the motivation for your research. This is important because comparing and contrasting the findings of other studies helps to support the overall importance of your results and it highlights how and in what ways your study differs from other research about the topic. Note that any significant or unanticipated finding is often because there was no prior research to indicate the finding could occur. If there is prior research to indicate this, you need to explain why it was significant or unanticipated.

IV. Consider Alternative Explanations of the Findings

It is important to remember that the purpose of research in the social sciences is to *discover* and not to *prove*. When writing the discussion section, you should carefully consider all possible explanations for the study results, rather than just those that fit your hypothesis or prior assumptions and biases. This is especially important when describing the discovery of significant or unanticipated findings.

V. Acknowledge the Study's Limitations

It is far better for you to identify and acknowledge your study's limitations than to have them pointed out by your professor! Note any unanswered questions or issues your study did not address and describe the generalizability of your results to other situations. If a limitation is applicable to the method chosen to gather information, then describe in detail the problems you encountered and why.

VI. Make Suggestions for Further Research

You may choose to conclude the discussion section by making suggestions for further research [this can be done in the overall conclusion of your paper]. Although your study may offer important insights about the research problem, this is where you can address other questions related to the problem that remain unanswered or highlight previously hidden questions that were revealed as a result of conducting your research. You should frame your suggestions by linking the need for further research to the limitations of your study [e.g., in future studies, the survey instrument should include more questions that ask..."] or to critical issues revealed from the data that were not considered initially in your research.

NOTE: **Besides the literature review section, the preponderance of references to sources is usually found in the discussion section**. A few historical references may be helpful for perspective but most of the references should be relatively recent and included to aid in the interpretation of your results or used to link to similar studies. If a study that you cited disagrees with your findings, don't ignore it--clearly explain why your research findings differ from theirs.

V. Problems to Avoid

- **Do not waste time restating your results.** Should you need to remind the reader of a finding to be discussed, use "bridge sentences" that relate the result to the interpretation. An example would be: "In the case of determining available housing to single women with children in rural areas of Texas, the findings suggest that access to good schools is important," then move on to explaining this finding.
- **Recommendations for further research can be included in either the discussion or conclusion of your paper,** but do not repeat your recommendations in the both sections. Think about the overall narrative flow of your paper to determine where best to locate this information.
- **Do not introduce new results in the discussion section.** Be wary of mistaking the reiteration of a specific finding for an interpretation because it may confuse the reader. The description of findings [results] and the interpretation of their significance [discussion] should be distinct sections of your paper. If you choose to combine the results section and the discussion section into one narrative flow, you must be clear in how you report the information discovered and your own interpretation of each finding.
- **Use of the first person is generally acceptable.** Using first person can help emphasize a point or illustrate a contrasting finding. However, keep in mind that too much use of the first person can actually distract the reader from the main points [i.e., I know you're telling me this; just tell me!].

Limitations Resource from USC Library Guides

Definition

The limitations of the study are those characteristics of design or methodology that impacted or influenced the interpretation of the findings from your research. They are the constraints on generalizability, applications to practice, and/or utility of findings that are the result of the ways in which you initially chose to design the study and/or the method used to establish internal and external validity.

Price, James H. and Judy Murnan. "Research Limitations and the Necessity of Reporting Them." *American Journal of Health Education* 35 (2004): 66-67.

Importance of...

Always acknowledge a study's limitations. It is far better that you identify and acknowledge your study's limitations than to have them pointed out by your professor and be graded down because you appear to have ignored them.

Keep in mind that acknowledgement of a study's limitations is an opportunity to make suggestions for further research. If you do connect your study's limitations to suggestions for further research, be sure to explain the ways in which these unanswered questions may become more focused because of your study.

Acknowledgement of a study's limitations also provides you with an opportunity to demonstrate that you have thought critically about the research problem, understood the relevant literature published about it, and correctly assessed the methods chosen for studying the problem. A key objective of the research process is not only discovering new knowledge but to also confront assumptions and explore what we don't know.

Claiming limitations is a subjective process because you must evaluate the impact of those limitations. Don't just list key weaknesses and the magnitude of a study's limitations. To do so diminishes the validity of your research because it leaves the reader wondering whether, or in what ways, limitation(s) in your study may have impacted the results and conclusions. Limitations require a critical, overall appraisal and interpretation of their impact. You should answer the question: do these problems with errors, methods, validity, etc. eventually matter and, if so, to what extent?

Price, James H. and Judy Murnan. "Research Limitations and the Necessity of Reporting Them." *American Journal of Health Education* 35 (2004): 66-67; Structure: How to Structure the Research Limitations Section of Your Dissertation. Dissertations and Theses: An Online Textbook. Laerd.com.

Descriptions of Possible Limitations

All studies have limitations. However, it is important that you restrict your discussion to limitations related to the research problem under investigation. For example, if a meta-analysis of existing literature is not a stated purpose of your research, it should not be discussed as a limitation. **Do not apologize for not addressing issues that you did not promise to investigate in the introduction of your paper.**

Here are examples of limitations related to methodology and the research process you may need to describe and to discuss how they possibly impacted your results. **Descriptions of limitations should be stated in the past tense because they were discovered after you completed your research.**

Possible Methodological Limitations

- **Sample size** -- the number of the units of analysis you use in your study is dictated by the type of research problem you are investigating. Note that, if your sample size is too small, it will be difficult to find significant relationships from the data, as statistical tests normally require a larger sample size to ensure a representative distribution of the population and to be considered representative of groups of people to whom results will be generalized or transferred. Note that sample size is less relevant in qualitative research.
- **Lack of available and/or reliable data** -- a lack of data or of reliable data will likely require you to limit the scope of your analysis, the size of your sample, or it can be a significant obstacle in finding a trend and a meaningful relationship. You need to not only describe these limitations but to offer reasons why you believe data is missing or is unreliable. However, don't just throw up your hands in frustration; use this as an opportunity to describe the need for future research.
- **Lack of prior research studies on the topic** -- citing prior research studies forms the basis of your literature review and helps lay a foundation for understanding the research problem you are investigating. Depending on the currency or scope of your research topic, there may be little, if any, prior research on your topic. **Before assuming this to be true, though, consult with a librarian!** In cases when a librarian has confirmed that there is no prior research, you may be required to develop an entirely new research typology [for example, using an exploratory rather than an explanatory research design]. Note again that discovering a limitation can serve as an important opportunity to identify new gaps in the literature and to describe the need for further research.
- **Measure used to collect the data** -- sometimes it is the case that, after completing your interpretation of the findings, you discover that the way in which you gathered data inhibited your ability to conduct a thorough analysis of the results. For example, you regret not including a specific question in a survey that, in retrospect, could have helped address a particular issue that emerged later in the study. Acknowledge the deficiency by stating a need for future researchers to revise the specific method for gathering data.
- **Self-reported data** -- whether you are relying on pre-existing data or you are conducting a qualitative research study and gathering the data yourself, self-reported data is limited by the fact that it rarely can be independently verified. In other words, you have to take what people say, whether in interviews, focus groups, or on questionnaires, at face value. However, self-reported data can contain several potential sources of bias that you should be alert to and note as limitations. These biases become apparent if they are incongruent with data from other sources. These are: (1) **selective memory** [remembering or not remembering experiences or events that occurred at some point in the past]; (2) **telescoping** [recalling events that occurred at one time as if they occurred at another time]; (3) **attribution** [the act of attributing positive events and outcomes to one's own agency but attributing negative events and outcomes to external forces]; and, (4) **exaggeration** [the act of

representing outcomes or embellishing events as more significant than is actually suggested from other data].

Possible Limitations of the Researcher

- **Access** -- if your study depends on having access to people, organizations, or documents and, for whatever reason, access is denied or limited in some way, the reasons for this need to be described.
- **Longitudinal effects** -- unlike your professor, who can literally devote years [even a lifetime] to studying a single topic, the time available to investigate a research problem and to measure change or stability over time is pretty much constrained by the due date of your assignment. Be sure to choose a research problem that does not require an excessive amount of time to complete the literature review, apply the methodology, and gather and interpret the results. If you're unsure whether you can complete your research within the confines of the assignment's due date, talk to your professor.
- **Cultural and other type of bias** -- we all have biases, whether we are conscience of them or not. Bias is when a person, place, or thing is viewed or shown in a consistently inaccurate way. Bias is usually negative, though one can have a positive bias as well, especially if that bias reflects your reliance on research that only support for your hypothesis. When proof-reading your paper, be especially critical in reviewing how you have stated a problem, selected the data to be studied, what may have been omitted, the manner in which you have ordered events, people, or places, how you have chosen to represent a person, place, or thing, to name a phenomenon, or to use possible words with a positive or negative connotation. **NOTE:** If you detect bias in prior research, it must be acknowledged and you should explain what measures were taken to avoid perpetuating that bias.
- **Fluency in a language** -- if your research focuses on measuring the perceived value of after-school tutoring among Mexican-American ESL [English as a Second Language] students, for example, and you are not fluent in Spanish, you are limited in being able to read and interpret Spanish language research studies on the topic. This deficiency should be acknowledged.

Aguinis, Hermam and Jeffrey R. Edwards. "Methodological Wishes for the Next Decade and How to Make Wishes Come True." *Journal of Management Studies* 51 (January 2014): 143-174; Brutus, Stéphane et al. "Self-Reported Limitations and Future Directions in Scholarly Reports: Analysis and Recommendations." *Journal of Management* 39 (January 2013): 48-75; Senunyeme, Emmanuel K. Business Research Methods. Powerpoint Presentation. Regent University of Science and Technology; ter Riet, Gerben et al. "All That Glitters Isn't Gold: A Survey on Acknowledgment of Limitations in Biomedical Studies." PLOS One 8 (November 2013): 1-6.

Structure and Writing Style

Information about the limitations of your study are generally placed either at the beginning of the discussion section of your paper so the reader knows and understands the limitations before reading the rest of your analysis of the findings, or, the limitations are outlined at the conclusion of the discussion section as an acknowledgement of the need for further study. Statements about a study's limitations should not be buried in the body [middle] of the discussion section unless a limitation is specific to something covered in that part of

the paper. If this is the case, though, the limitation should be reiterated at the conclusion of the section.

If you determine that your study is seriously flawed due to important limitations, such as, an inability to acquire critical data, consider reframing it as an exploratory study intended to lay the groundwork for a more complete research study in the future. Be sure, though, to specifically explain the ways that these flaws can be successfully overcome in a new study.

But, do not use this as an excuse for not developing a thorough research paper! Review the tab in this guide for developing a research topic. If serious limitations exist, it generally indicates a likelihood that your research problem is too narrowly defined or that the issue or event under study is too recent and, thus, very little research has been written about it. If serious limitations do emerge, consult with your professor about possible ways to overcome them or how to revise your study.

When discussing the limitations of your research, be sure to:

- Describe each limitation in detailed but concise terms;
- Explain why each limitation exists;
- Provide the reasons why each limitation could not be overcome using the method(s) chosen to acquire or gather the data [cite to other studies that had similar problems when possible];
- Assess the impact of each limitation in relation to the overall findings and conclusions of your study; and,
- If appropriate, describe how these limitations could point to the need for further research.

Remember that the method you chose may be the source of a significant limitation that has emerged during your interpretation of the results [for example, you didn't interview a group of people that you later wish you had]. If this is the case, don't panic. Acknowledge it, and explain how applying a different or more robust methodology might address the research problem more effectively in a future study. A underlying goal of scholarly research is not only to show what works, but to demonstrate what doesn't work or what needs further clarification.

Conclusion Resource from USC Library Guides

Definition

The conclusion is intended to help the reader understand why your research should matter to them after they have finished reading the paper. A conclusion is not merely a summary of the main topics covered or a re-statement of your research problem, but a synthesis of key points and, if applicable, where you recommend new areas for future research. For most essays, one well-developed paragraph is sufficient for a conclusion, although in some cases, a two or three paragraph conclusion may be required.

Conclusions. The Writing Center. University of North Carolina.

Importance of a Good Conclusion

A well-written conclusion provides you with important opportunities to demonstrate to the reader your understanding of the research problem. These include:

1. **Presenting the last word on the issues you raised in your paper**. Just as the introduction gives a first impression to your reader, the conclusion offers a chance to leave a lasting impression. Do this, for example, by highlighting key points in your analysis or results or by noting important or unexpected implications applied to practice.
2. **Summarizing your thoughts and conveying the larger significance of your study**. The conclusion is an opportunity to succinctly answer the "So What?" question by placing the study within the context of past research about the topic you've investigated.
3. **Identifying how a gap in the literature has been addressed**. The conclusion can be where you describe how a previously identified gap in the literature [described in your literature review section] has been filled by your research.
4. **Demonstrating the importance of your ideas**. Don't be shy. The conclusion offers you the opportunity to elaborate on the impact and significance of your findings.
5. **Introducing possible new or expanded ways of thinking about the research problem**. This does not refer to introducing new information [which should be avoided], but to offer new insight and creative approaches for framing or contextualizing the research problem based on the results of your study.

Bunton, David. "The Structure of PhD Conclusion Chapters." *Journal of English for Academic Purposes* 4 (July 2005): 207–224; Conclusions. The Writing Center. University of North Carolina; Kretchmer, Paul. Twelve Steps to Writing an Effective Conclusion. San Francisco Edit, 2003-2008.

Structure and Writing Style

I. General Rules

When writing the conclusion to your paper, follow these general rules:

- State your conclusions in clear, simple language. State how your findings differ or support those of others and why.
- Do not simply reiterate your results or the discussion of your results. Provide a synthesis of arguments presented in the paper to show how these converge to address the research problem and the overall objectives of your study
- Indicate opportunities for future research if you haven't already done so in the discussion section of your paper. Highlighting the need for further research provides the reader with evidence that you have an in-depth awareness of the research problem.

The function of your paper's conclusion is to restate the main argument. It reminds the reader of the strengths of your main argument(s) and reiterates the most important evidence supporting those argument(s). Do this by stating clearly the context, background, and necessity of pursuing the research problem you investigated in relation to an issue, controversy, or a gap found in the literature. Make sure, however, that your conclusion is not simply a repetitive summary of the findings. This reduces the impact of the argument(s) you have developed in your essay.

Consider the following points to help ensure your conclusion is appropriate:

1. If the argument or purpose of your paper is complex, you may need to summarize the argument for your reader.
2. If, prior to your conclusion, you have not yet explained the significance of your findings or if you are proceeding inductively, use the end of your paper to describe your main points and explain their significance.
3. Move from a detailed to a general level of consideration that returns the topic to the context provided by the introduction or within a new context that emerges from the data.

The conclusion also provides a place for you to persuasively and succinctly restate your research problem, given that the reader has now been presented with all the information about the topic. Depending on the discipline you are writing in, the concluding paragraph may contain your reflections on the evidence presented, or on the essay's central research problem. However, the nature of being introspective about the research you have done will depend on the topic and whether your professor wants you to express your observations in this way.

NOTE: If asked to think introspectively about the topics, do not delve into idle speculation. Being introspective means looking within yourself as an author to try and understand an issue more deeply, not to guess at possible outcomes or make up scenarios not supported by evidence.

II. Developing a Compelling Conclusion

Strategies to help you move beyond merely summarizing the key points of your research paper may include any of the following:

1. If your essay deals with a contemporary problem, warn readers of the possible consequences of not attending to the problem.
2. Recommend a specific course or courses of action that, if adopted, could address a specific problem in practice or in the development of new knowledge.
3. Cite a relevant quotation or expert opinion already noted in your paper in order to lend authority to the conclusion you have reached [a good place to look is research from your literature review].
4. Explain the consequences of your research in a way that elicits action or demonstrates urgency in seeking change.
5. Restate a key statistic, fact, or visual image to emphasize the ultimate point of your paper.
6. If your discipline encourages personal reflection, illustrate your concluding point with a relevant narrative drawn from your own life experiences.
7. Return to an anecdote, an example, or a quotation that you presented in your introduction, but add further insight derived from the findings of your study; use your interpretation of results to recast it in new ways.
8. Provide a "take-home" message in the form of a strong, succinct statement that you want the reader to remember about your study.

III. Problems to Avoid

Failure to be concise

The conclusion section should be concise and to the point. Conclusions that are too lengthy often have unnecessary information in them. The conclusion is not the place for details about your methodology or results. Although you should give a summary of what was learned from your research, this summary should be relatively brief, since the emphasis in the conclusion is on the implications, evaluations, insights, and other forms of analysis that you make.

Failure to comment on larger, more significant issues

In the introduction, your task was to move from general [the field of study] to specific [your research problem]. However, in the conclusion, your task is to move from a specific discussion [your research problem] back to a general discussion [i.e., how your research contributes new understanding or fills an important gap in the literature]. In short, the conclusion is where you should place your research within a larger context [visualize your paper as an hourglass--start with a broad introduction and review of the literature, move to the specific analysis and discussion, conclude with a broad summary of the study's implications and significance].

Failure to reveal problems and negative results

Negative aspects of the research process should never be ignored. Problems, drawbacks, and challenges encountered during your study should be summarized as a way of qualifying your overall conclusions. If you encountered negative or unintended results [i.e., findings that are validated outside the research context in which they were generated], you must report them in the results section and discuss their implications in the discussion section of your paper. In the conclusion, use your summary of the negative results as an opportunity to explain their possible significance and/or how they may form the basis for future research.

Failure to provide a clear summary of what was learned

In order to be able to discuss how your research fits back into your field of study [and possibly the world at large], you need to summarize briefly and succinctly how it contributes to new knowledge or a new understanding about the research problem. This element of your conclusion may be only a few sentences long.

Failure to match the objectives of your research

Often research objectives in the social sciences change while the research is being carried out. This is not a problem unless you forget to go back and refine the original objectives in your introduction. As these changes emerge they must be documented so that they accurately reflect what you were trying to accomplish in your research [not what you thought you might accomplish when you began].

Resist the urge to apologize

If you've immersed yourself in studying the research problem, you presumably should know a good deal about it, perhaps even more than your professor! Nevertheless, by the time you have finished writing, you may be having some doubts about what you have produced. Repress those doubts! Don't undermine your authority by saying something like, "This is just one approach to examining this problem; there may be other, much better approaches that...." The overall tone of your conclusion should convey confidence to the reader.

Appendix Resource from USC Library Guides

Definition

An appendix contains supplementary material that is not an essential part of the text itself but which may be helpful in providing a more comprehensive understanding of the research problem and/or it is information which is too cumbersome to be included in the body of the paper. A separate appendix should be used for each distinct topic or set of data and always have a title descriptive of its contents.

Tables, Appendices, Footnotes and Endnotes. The Writing Lab and The OWL. Purdue University.

Importance of...

Your research paper must be complete without the appendices, and it must contain all information including tables, diagrams, and results necessary to understand the research problem. The key point to remember when including an appendix is that the information is non-essential; if it were removed, the reader would still be able to comprehend the significance, importance, and implications of the research.

It is appropriate to include appendices to..

- Incorporate material in the body of the work that would make it poorly structured or interrupt the narrative flow,
- Address when the information is too long and detailed to be easily summarized in the body of the paper, and
- Ensure inclusion of helpful, supporting, or essential material that would otherwise clutter or break up the narrative flow of the paper, or it would be distracting to the reader.

Appendices. Academic Skills Office, University of New England.

Structure and Writing Style

I. General Points to Consider

When considering whether to include content in an appendix, keep in mind the following points:

1. **It is usually good practice to include your raw data** in an appendix, laying it out in a clear format so the reader can re-check your results. Another option if you have a large amount of raw data is to consider placing it online and note this as the appendix to your research paper.
2. **Any tables and figures included in the appendix should be numbered as a separate sequence from the main paper**. Remember that appendices contain non-essential information that, if removed, would not diminish a reader's understanding of the overall research problem being investigated. This is why non-textual elements should not carry over the sequential numbering of elements in the paper.
3. **If you have more than three appendices, consider listing them on a separate page at the beginning of your paper**. This will help the reader know before reading the paper what information is included in the appendices [always list the appendix or appendices in a table of contents].
4. **The appendix can be a good place to put maps, photographs, diagrams, and other non-textual elements**, if you feel that it will help the reader to understand the content of your paper, while keeping in mind the point that the paper should be understandable without them.
5. **An appendix should be streamlined and not loaded with a lot information**. If you have a very long and complex appendix, it is a good idea to break it down into separate appendices, allowing the reader to find relevant information quickly.

II. Content

Never include an appendix that isn't referred to in the text. All appendices should be summarized in the your paper where it is relevant to describing your findings. Here are some examples of items that can be included in an appendix:

- **Correspondence** -- if your research included collaborations with others or outreach to others, then correspondence in the form of such as, letters, memorandums, or copies of emails from those you interacted with should be included.
- **Interview Transcripts** -- in qualitative research, interviewing respondents is often used to gather information. The full transcript from an interview is important so the reader can read the entire dialog between researcher and respondent.
- **Non-textual elements** -- if there are a lot of non-textual items, such as, figures, tables, maps, charts, photographs, drawings, or graphs, think about placing examples within the text of the paper but the remainder in an appendix.
- **Questionnaires or surveys** -- this is a common form of data gathering. Always include the survey instrument or questionnaires in an appendix so the reader understands not only the questions asked but the sequence in which they were asked. Include all variations of the instruments as well if different items were sent to different groups.
- **Raw statistical data** – this can include any numerical data that is too lengthy to include in charts or tables in its entirety within the text.
- **Research instruments** -- if you used a camera, or a recorder, or some other device to gather information and it is important for the reader to understand how that device was used, this information can be placed in an appendix.
- **Sample calculations** – this can include quantitative research formulas or detailed descriptions of how calculations were used to determine relationships and significance.

NOTE: Do not include vague or irrelevant information in an appendix; this additional information will not help the reader's overall understanding and interpretation of your research and may only distract the reader from understanding your research study.

III. Format

Here are some general guideline on how to format appendices, but consult the writing style guide [e.g., APA] your professor wants you to use, if needed:

- Appendices may precede or follow your list of references.
- Each appendix begins on a new page.
- The order they are presented is dictated by the order they are mentioned in the text of your research paper.
- The heading should be "Appendix," followed by a letter or number [e.g., "Appendix A" or "Appendix 1"], centered and written in bold type.
- Appendices must be listed in the table of contents [if used].
- The page number(s) of the appendix/appendices will continue on with the numbering from the last page of the text.

Proofreading Resource from USC Library Guides

Definition

Proofreading is the act of searching for errors before you hand in the your final research paper. Errors can be both grammatical and typographical in nature, but also include identifying problems with the narrative flow of your paper [i.e., the logical sequence of thoughts and ideas], issues with concise writing, and finding any word processing errors [e.g., different font types, indented paragraphs, line spacing, uneven margins, etc.].

Strategies for Proofreading your Paper

Before You Proofread

- **Be sure you've revised the larger aspects of the text**. Don't make corrections at the sentence and word level [the act of editing] if you still need to work on the overall focus, development, and organization of the paper or you need to re-arrange or change specific sections [the act of revising].
- **Set your paper aside for a while between writing and proofreading**. Give yourself a day or so between the writing of your paper and proofreading it. This will help you identify mistakes more easily. This is also a reason why you shouldn't wait until the last minute to draft your paper because it won't provide the time needed between writing and proofreading.
- **Eliminate unnecessary words before looking for mistakes**. Throughout your paper, you should try to avoid using inflated diction if a simpler phrase works equally well. Simple, precise language is easier to proofread than overly complex sentence constructions and vocabulary.
- **Know what to look for**. Make a mental note of the mistakes you need to watch for based on comments from your professor on previous drafts of the paper or that you have received about papers written in other classes. This will help you to identify repeated patterns of mistakes more readily.

NOTE: **Do not confuse the act of revising your paper with the act of editing it.** Editing is intended to tighten up language so that your paper is easier to read and understand. This should be the focus when you proofread. If your professor asks you to revise your paper, the implication is that there is something within the text that needs to be changed, improved, or re-organized in some significant way. If the reason for a revision is not specified, always ask for clarification.

Strategies to Help Identify Errors

1. **Work from a printout, not a computer screen**. Besides sparing your eyes the strain of glaring at the computer, proofreading from a printout allows you to easily skip around to where errors might have been repeated throughout the paper [e.g., misspelled name of a person].
2. **Read out loud**. This is especially helpful for spotting run-on sentences, but you'll also hear other problems that you may not have identified while reading the text out loud. This will also helps you play the role of the reader, thereby, encouraging you to understand the paper as your audience might.
3. **Use a ruler or blank sheet of paper to cover up the lines below the one you're reading**. This technique keeps you from skipping over possible mistakes. This also helps you deliberately pace yourself as you read through your paper.
4. **Circle or highlight every punctuation mark in your paper**. This forces you to pay attention to each mark you used and to question its purpose in each sentence or paragraph. This is a particularly helpful strategy if you tend to misuse or overuse a punctuation mark, such as a comma or semi-colon.

5. **Use the search function of the computer to find mistakes**. Using the search [find] feature of your word processor can help you identify common errors faster. For example, if you overuse a phrase or use the same qualifier over and over again, you can do a search for those words or phrases and in each instance make a decision about whether to remove it or use a synonym.
6. **If you tend to make many mistakes, check separately for each kind of error**, moving from the most to the least important, and following whatever technique works best for you to identify that kind of mistake. For instance, read through once [backwards, sentence by sentence] to check for fragments; read through again [forward] to be sure subjects and verbs agree, and again [perhaps using a computer search for "this," "it," and "they"] to trace pronouns to antecedents.
7. **End with using a computer spell checker or reading backwards word by word**. Remember that a spell checker won't catch mistakes with homonyms [e.g., "they're," "their," "there"] or certain typos [like "he" when you meant to write "the"]. The spell-checker function is not a substitute for carefully reviewing the text for spelling errors.
8. **Leave yourself enough time**. Since many errors are made and overlooked by speeding through writing and proofreading, setting aside the time to carefully review your writing will help you catch errors you might otherwise miss. Always read through your writing slowly. If you read through the paper at a normal speed, you won't give your eyes sufficient time to spot errors.
9. **Ask a friend to read your paper**. Offer to proofread a friend's paper if they will review yours. Having another set of eyes look over your writing will often spot errors that you would have otherwise missed.

Individualize the Act of Proofreading

In addition to following the suggestions above, **individualizing your proofreading process to match weaknesses in your writing will help you proofread more efficiently and effectively**. For example, I still tend to make subject-verb agreement errors. Accept the fact that you likely won't be able to check for everything, so be introspective about what your typical problem areas are and look for each type of error individually. Here's how:

- **Think about what errors you typically make**. Review instructors' comments about your writing and/or set up an appointment review your paper with a staff member in the Writing Center.
- **Learn how to fix those errors**. Talk with your professor about helping you understand why you make the errors you do make so that you can learn how to avoid them.
- **Use specific strategies**. Develop strategies you are most comfortable with to find and correct your particular errors in usage, sentence structure, spelling, and punctuation.
- **Where you proofread is important!** Effective and efficient proofreading requires extended focus and concentration. If you are easily distracted by external activity or noise, proofread in a quiet corner of the library rather than at a table in Starbucks.
- **Proofread in several short blocks of time**. Avoid trying to proofread you entire paper all at once, otherwise, it will be difficult to maintain your concentration. A good strategy is to start your proofreading each time at the beginning of your paper. It will take longer to make corrections, but you'll be amazed at how many mistakes you find in text that you have already reviewed.

In general, verb tense should be in the following format, although variations can occur within the text depending on the narrative style of your paper. Note that references to prior research mentioned anywhere in your paper should always be stated in the past tense.

1. Abstract--past tense [a summary description of what I did]
2. Introduction--present tense [I am describing the study to you now]
3. Literature Review--past tense [the studies you are reviewing have already been written]
4. Methodology--past tense [the way that you gathered and synthesized data has already happened, otherwise, how could you write your paper?]

5. Results--past tense [the findings have already been discovered]
6. Discussion--present tense [I am talking to you now about how I interpreted the findings]
7. Conclusion--present tense [I am summarizing the study for you now]

Common Grammatical Errors

Avoid These Common Grammar Mistakes!

Cartoonist Doug Larson once observed: "If the English language made any sense, a catastrophe would be an apostrophe with fur" [The Quotations Page]. Given the rules and the multiple exceptions to every rule that characterizes the English language, there are many sites on the web that discuss how to avoid mistakes in grammar and word usage. Here are a few that I have found particularly helpful:

- **English Grammar**
- **Guide to Grammar and Writing**
- **Lingua Franca Column**, Chronicle of Higher Education
- **Online Course Lady Writing Laboratory Blog**
- **Plain Language.gov**

Listed below are the most common mistakes made and, thus, the ones you should focus on locating and removing while proofreading your research paper.

1. **Affect / effect** -- welcome to what I consider to be the most confusing aspect in the English language. "Effect" is most often a noun and generally means "a result." However, "effect" can be used as a verb that essentially means "to bring about," or "to accomplish." The word "affect" is almost always a verb and generally means "to influence." However, affect can be used as a noun when you're talking about the mood that someone appears to have. [Ugh!]
2. **Apostrophes** -- the position of an apostrophe depends upon whether the noun is singular or plural. For singluar words, add an "s" to the end, even if the final letter is an "s." For contractions, replace missing letters with an apostrophe; but remember that it is where the letters no longer are, which is not always where the words are joined [e.g., "is not" and "isn't"]. Note that contractions are rarely used in scholarly writing.
3. **Capitalization** -- a person's title is capitalized when it precedes the name and, thus, is seen as part of the name [e.g., President Zachary Taylor]; once the title occurs, further references to the person holding the title appear in lowercase [e.g., the president]. For groups or organizations, the name is capitalized when it is the full name [e.g., the United States Department of Justice]; further references should be written in lowercase [e.g., the department]. In general, the use of capital letters should be minimized as much as possible.
4. **Colorless verbs and bland adjectives** -- passive voice, use of the to be verb, is a lost opportunity to use a more interesting and accurate verb when you can. Adjectives can also be used very specifically to add to the sentence. Try to avoid generic or bland adjectives and be specific. Use adjectives that add to the meaning of the sentence.
5. **Comma splices** -- a comma splice is the incorrect use of a comma to connect two independent clauses (an independent clause is a phrase that is grammatically and conceptually complete: that is, it can stand on its own as a sentence). To correct the comma splice, you can: replace the comma with a period, forming two sentences; replace the comma with a semicolon; or, join the two clauses with a conjunction such as "and," "because," "but," etc.
6. **Compared with vs. compared to** -- compare *to* is to point out or imply resemblances between objects regarded as essentially of a different order; compare *with* is mainly to point out differences between objects regarded as essentially of the same order [e.g., life has been compared to a journey; Congress may be compared with the British Parliament].

7. **Confusing singular possessive and plural nouns** — singular possessive nouns always take an apostrophe, with few exceptions, and plural nouns never take an apostrophe. Omitting an apostrophe or adding one where it does not belong makes the sentence unclear.
8. **Coordinating conjunctions** -- words, such as "but," "and," "yet," join grammatically similar elements [i.e., two nouns, two verbs, two modifiers, two independent clauses]. Be sure that the elements they join are equal in importance and in structure.
9. **Dangling participle** -- a participial phrase at the beginning of a sentence must refer to the grammatical subject of the sentence.
10. **Dropped commas around clauses**—place commas around words, phrases, or clauses that interrupt a sentence. Do not use commas around restrictive clauses, which provide essential information about the subject of the sentence.
11. **The Existential "this"** -- always include a referent with "this," such as "this theory..." or "this approach to understanding the...." With no referent, "this" can confuse the reader.
12. **The Existential "it"** -- the "existential it" gives no reference for what "it" is. Be specific!
13. **Its / it's**--"its" is the possessive form of "it." "It's" is the contraction of "it is" or "it has." They are not interchangeable and the latter should be avoided in scholarly writing.
14. **Fewer / Less** -- if you can count it, then use the word fewer; if you cannot count it, use the word less.
15. **Interrupting clause** — this clause or phrase interrupts a sentence, such as, "however." Place a comma on either side of the interrupting clause. An interrupting clause should generally be avoided in academic writing.
16. **Know your non-restrictive clauses** — this clause or phrase modifies the subject of the sentence, but it is not essential to understanding the sentence. The word "which" is the relative pronoun usually used to introduce the nonrestrictive clause.
17. **Know your restrictive clauses** — this clause limits the meaning of the nouns it modifies. The restrictive clause introduces information that is essential to understanding the meaning of the sentence. The word "that" is the relative pronoun normally used to introduce this clause. Without this clause or phrase, the meaning of the sentence changes.
18. **Literally** -- this word means that exactly what you say is true, no metaphors or analogies. Be aware of this if you are using "literally" to describe something. The term literally should never be applied to subjective expressions [i.e., "literally the most comfortable meeting"] or to imprecise measuerments [i.e., "literally dozens of protesters"].
19. **Lonely quotes** — unlike in journalistic writing, quotes in scholarly writing cannot stand on their own as a sentence. Integrate them into a paragraph.
20. **Misuse and abuse of semicolons** — semicolons are used to separate two related independent clauses or to separate items in a list that contains commas. Do not abuse semicolons by using them often; they are best used sparingly.
21. **Overuse of unspecific determinates** -- words such as "super" [as in super strong] or "very" [as in very strong], are unspecific determinates. How many/much is "very"? How incredibly awesome is super? If you ask ten people how cold, "very cold" is, you would get ten different answers. Academic writing should be precise, so eliminate as many unspecific determinants as possible.
22. **Semicolon usage** -- a semicolon is most often used to separate two complete but closely related clauses. Consider the semicolon as marking a shorter pause than a period but a longer pause than a comma (this is easy to remember since a semicolon is the combination of a period and a comma). In the same way, semicolons are also used to separate complicated lists of three or more items.
23. **Sentence fragments** — these occur when a dependent clause is punctuated as a complete sentence. Dependent clauses must be used together with an independent clause.
24. **Singular words that sound plural** -- when using words like "each," "every," "everybody," "nobody," or "anybody" in a sentence, we're likely thinking about more than one person or thing. But all these words are grammatically singular: they refer to just one person or thing at a time. And unfortunately, if you change the verb to correct the grammar, you create a pedantic phrase like "he or she" or "his or her."
25. **Split Infinitive** -- an infinitive is the form of a verb that begins with "to." Splitting an infinitive means placing another word or words between the "to" and the infinitive verb. This is considered incorrect

by purists, but nowadays it is considered a matter of style rather than poor grammar. Nevertheless, in academic writing, it's best to avoid split infinitives.

26. **Subject/pronoun disagreement** — there are two types of subject/pronoun disagreements. Shifts in number refer to the shifting between singular and plural in the same sentence. Be consistent. Shifts in person occurs when the person shifts within the sentence from first to second person, from second to third person, etc.
27. **That vs. which** -- *that* clauses (called restrictive) are essential to the meaning of the sentence; *which* clauses (called nonrestrictive) merely add additional information. In general, most nonrestrictive clauses in academic writing are incorrect or superfluous. While proofreading, go on a "which" hunt and turn most of them into restrictive clauses. Also, "that" never follows a comma but "which" does.
28. **Verb Tense Agreement** -- this refers to keeping the same tense [past, present, future] throughout a clause. Do not shift from one tense to another if the time for each action or event is the same. Note that, when referring to separate actions or events, the tenses may be different.
29. **Who / whom** -- who is used as the subject of the clause it introduces; whom is used as the object of a preposition, as a direct object, or as an indirect object. A key to remembering which word to use is to simply substitute who or whom with a pronoun. If you can substitute he, she, we, or they in the clause, and it still sounds okay, then you know that who is the correct word to use. If, however, him, her, us, or them sounds more appropriate, then whom is the correct choice for the sentence.

Writing Concisely

Writing Concisely

Academic writing in the social sciences often examines abstruse topics that require in-depth analysis and explanation. As a result, a common challenge to writing college-level research papers is expressing your thoughts clearly by utilizing language that communicates essential information unambiguously. When you proofread your paper, critically review your writing style and the terminology you used throughout your paper. Pay particular attention to identifying and editing the following common categories of imprecise writing.

1. **Problems with wordiness** – the use of more words than is necessary to communicate a thought or idea.

- **Cliches** – these are phrases that have become bland and ordinary through overuse. Besides indicating lazy thinking because they are often used as a substitute for carefully thinking about what to say, cliches should not be used due to the fact that they're often embedded within a specific cultural context. For example, if you say, "The Iraqi diplomat is going out on a limb if he does not protect his country's economic interests during negotiations with the United States." Americans may know what it means to be "out on a limb" [derived from the sport of hunting–get it?], but would someone from another culture know what this refers to?
- **Intensifiers** – these include modifying words such as very, literally, radically, definitely, significantly, greatly, extremely, moderately, basically, exceptionally, obviously, really, uncommonly, etc. Intensifiers create the illusion of accentuating words but, in academic writing, intensifiers actually have the opposite effect because they do not covey anything measurable. And editing intensifiers does not imply exchanging the term "extremely large" with the word "huge"; if something is unusual or it needs highlighting, quantify its uniqueness and place it in a comparative context [e.g., instead of saying, "...an extremely large increase in hospital visitations," state as, "...a 45% increase in hospital visitations since 2010"]. If there is no data to quantify the phenomena, then describe its importance using precise language.
- **Nominalizations** – this refers to a verb, adjective, or adverb that has been converted into a noun or noun phrase. Although this practice is not grammatically incorrect, overuse of nominalizations can clutter your writing. Examples include: "take action," "draw conclusions," and "make

assumptions." These phrases can be reduced to: "act," "conclude," and "assume." Other nominalizations take the form of adding derivational suffixes to a verb, such as, --ance (deliver to deliverance) or -ize (modern to modernize). Editing the action of the sentence back into a bare infinitive verb [the most basic form of a verb] will undo the nominalization, making the sentence more succinct and easier to read.

- **Stock phrases** – this refers to phrases that compromise clarity in your writing by adding unnecessary complexity to the sentence; stock phrases are similar to cliches in that they are overused terms. Examples include: "has the ability to," "due to the fact that," "regardless of the fact," or "at this point in time." Stock phrases often can and should be reduced to one word. Therefore, the above phrases can be reduced to "can," "because," although," and "now."
- **Verbal phrases**– these are also phrases that contribute little or no meaning to the overall sentence. They are similar to stock phrases but can be reduced to a single action verb. Examples include: "to come to a conclusion," "to take into consideration," or "to make a determination." The above phrases can be reduced to "conclude," "consider," or "determine."

2. **Problems with redundancy** – refers to the use of words or phrases that possess the same or almost the same meaning.

- **Implied modifiers** – this refers to the meaning of a word or phrase possessing the same or very similar meaning of the modifier. These types of modifying words can be subtle and difficult to locate but eliminating them will help clarify your writing. There are two ways to edit these modifiers. For example, if you say, "The next decision of the Supreme Court is difficult to anticipate in advance." Think about the implied meaning of "anticipate in advance"; if something is happening in advance, it is inherently anticipatory. Restate the sentence using only one of those words. However, implied modifiers can also suggest an incomplete thought about the subject of the sentence. Consider the sentence, "The maritime negotiations between Japan and China remain a difficult challenge." Any type of challenge is inherently difficult. However, by inserting an explanation ["because"] within the sentence, you expand the thought more completely. Therefore, you can either say, "The maritime negotiations between Japan and China remain a challenge because it is difficult to...," or you can say, "The maritime negotiations between Japan and China remain difficult because the main challenge is...."
- **Paired synonyms** – words paired together that have the same basic meaning may sound appealing when read aloud but they are unnecessary. Examples include: each and every, peace and quiet, first and foremost, alter or change, true and accurate, true and correct, always and forever. Choose only one word from the pairing that reflects the meaning you are trying to convey or use a thesaurus to find a word that more accurately reflects your thoughts. Other word pairings are over-used catch phrases, such as, "first and foremost," "end result," "various differences," "sudden crisis," or "completely eliminate." They are redundant and re-state the obvious; choose only one word or eliminate them altogether.

3. **Problems with unclear sentence constructions**--short, declarative sentences are easier to comprehend than lengthy narratives.

- **Active voice** – some professors, particularly in the areas of business, technical, or scientific writing, may prefer that you write papers using a passive voice because they want you to convey objectivity by using an authoritative tone that focuses on the main idea or recommended action rather than the conscious intent underlying the idea or action. However, the passive voice frequently requires more words than is necessary to covey a thought or idea. Unless instructed not to do so, always write using an active voice. Here is an example: Passive–"It is believed by the state legislature that a person's picture on their drivers license must be updated every five years" [21 words]. In the active voice, the sentence would read: "The state legislature believes that a drivers license picture must updated every five years" [14 words]. Notice here as well the phrase, "a person's drivers license";

who else would own a drivers license but a person? The word "person's" is redundant and can also be deleted.

- **Combining sentences** – it is most often true that writing shorter, declarative sentences helps the reader better understand the content of each thought or idea. However, it is also the case that two or more sentences may be combined to convey the information more effectively using fewer words. Review your paper and look for paragraphs that appear wordy. This may indicate opportunities to condense sentences. Here is an example: "The BP oil spill occurred in 2010. This oil spill in the Gulf of Mexico prompted greater attention to regulating offshore drilling. Among these regulations was a rule governing procedures for capping wells." These three sentences can be combined to read: "The 2010 BP oil spill in the Gulf of Mexico prompted greater attention to regulatory procedures for capping offshore drilling wells." All of the essential information remains, but it is stated more concisely.