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BUILD A SOLID FOUNDATION FOR YOUR STUDY BASED ON PAST RESEARCH

LEARNING OBJECTIVES

- Distinguish types of sources by author, purpose, content, and utility.
- Apply strategies for identifying and finding past research.
- Evaluate primary research articles.
- Format citations and references in APA style.
- Formulate a big picture of how to build on past research.

If you have started to think like a researcher, then likely you will start to see opportunities for research studies everywhere you turn. Watching the nightly news might make you imagine a study comparing different types of news media. Or arguing with your significant other might inspire a study idea about communication styles. Or starting a research methods course might make you wonder about what factors impact student success. You may start developing hypotheses or even begin to design and think about how you will carry out your imagined studies.

We certainly do not want to squash your enthusiasm, but as you might recall from Chapter 1, if you went directly from topic to hypothesis development or study design you would be missing one of the most important parts of the research process—finding, reading, and evaluating past research on your topic. As interesting and unique as your

ideas may be, it is almost impossible that someone else has not done research on them or a similar topic. Reading and evaluating past research will help you build a solid foundation for your study, and the study you end up designing after a thorough review of the research literature will be much stronger than one designed without this work.

TYPES OF SOURCES

In this section, we will outline different types of sources based on author, purpose, and content. Understanding distinguishing features of sources will help you discern the quality and utility of different works. You will then have the opportunity to test your understanding by completing Practice 2.1 (see p. 36).

Primary Versus Secondary Sources

Generally speaking, a primary source is the one closest to the original source of information, whereas a secondary source is at least one step removed from the original source of information. What constitutes the original source of information varies by discipline. In the humanities disciplines such as English and history, the information under study is a historical event or creative work. A primary source in these disciplines is a firsthand account of a historical event or an original creative manuscript.

On the other hand, the original source of information in the social and behavioral sciences is a research study. To a social or behavioral scientist, a **primary research source** is a report of an original research study. The word “original” can be a little misleading here. In an original research study the ideas, hypotheses, or method are not necessarily brand new. On the contrary, all of these should be firmly rooted in past research. In an original research study the data may not even be new. The authors may have either collected new, or **primary data**, for the study or used **secondary data** that others had collected for another purpose. The original components of a primary research study are the data analysis and interpretation.

A **secondary research source** is a review or discussion of previous research that does not include a report on an original research study. We will use these more specific social and behavioral scientist definitions of primary and secondary sources in this chapter.

Primary research source: The authors report the results of an original research study that they conducted. The data in the study may be primary or secondary, but the way the data are analyzed and interpreted is new.

Primary data: The authors collect new data for a study.

Secondary data: The authors analyze data that had been previously collected by others.

Secondary research source: The authors review research but do not report results of an original study.

Scholarly Versus Popular Sources

A **scholarly work** can be a primary or secondary source and must meet all of the following criteria:

- The goal of the work is to advance knowledge and scientific study in the field.
- The author(s) have expertise in the field.
- The work is written for an audience with knowledge in the field, as opposed to the general public.
- The work builds on other sources that meet the above criteria for scholarly works, and these sources are clearly cited.

Scholarly works can also be understood in contrast to popular works. **Popular works** are those that serve to educate or entertain a general audience that includes those without specialized training or expertise in the field. Examples of popular sources include *Wikipedia* and other websites, online blogs, educational pamphlets or fact sheets, some books including textbooks, and articles in newspapers or magazines—including *Psychology Today* and *Scientific American*. Popular works may be written by experts in the field or by journalists or others without specialized knowledge or training in an area. Popular works may refer to and cite scholarly sources, or the work might be the personal opinion of the author. Popular works may even be primary sources when the work includes results of surveys and opinion polls the authors analyzed, but the results may be questionable if the goal of the work is to entertain or to support the opinion of the author.

Popular sources can provide basic information on a topic, offer support that a topic is relevant and timely, and give you some ideas for research topics and questions. However, when developing a research study, you will want to build primarily upon scholarly sources.

Scholarly works: Works designed to advance knowledge in a field, written by someone with expertise in that field for others with knowledge of the field, that cite and build upon other scholarly sources.

Popular works: Works designed to entertain or educate and that were written for those who do not necessarily have any knowledge in the topic area.

Scholarly Sources: Articles in Academic Journals

Academic journals publish only scholarly work, but you should not assume that an article in an academic journal is a primary source. On the contrary, journal articles can be either primary or secondary sources. In fact, several high-quality journals, such as *Psychological Bulletin*, only publish secondary research articles.

There are thousands of journals devoted to publishing scholarly work in the social and behavioral sciences. However, most articles that are submitted for publication in academic

journals are not published. There are several reasons for this. First, each academic journal has its own focus or specialty area (e.g., *Cognitive Psychology*, *American Journal of Sociology*, *Journal of Teacher Education*, *Child Development*, *Law and Human Behavior*, *Journal of Computer-Mediated Communication*) and editors publish only articles that align with their journal's content and scope. Second, although you might access most of your articles online, the majority of academic journals are also available as bound print media and therefore have limited space. Finally, most journals employ a **peer review** process in order to ensure that they publish only articles that are of high quality and help to advance scholarship in the field.

Peer review: Process in which scholarly works are evaluated by other experts in the field.

Peer Review Process

Remember that scholarly works are written by those who have expertise in the topic area. The peer review process, then, involves evaluation of the work by other experts in the field. The journal editor, who is a leading expert in the field, makes the initial decision on whether a submitted article is an appropriate fit for the journal and of high enough quality to warrant further examination. If so, the editor sends the article to at least two other experts to review. These reviewers make recommendations to the editor to accept or reject the article, or as is more likely the case, to withhold the final decision until after the author of the article has made some recommended revisions and resubmitted the article. Almost all the articles that are eventually published have gone through several revisions based on the critique and advice of experts in the field.

Why is any of this information relevant to you? One reason is it provides some insight into the process and progress of science that we discussed in Chapter 1. The importance of review and revision will also be relevant as you begin writing your own papers (and you might take some solace in the fact that it is not just students whose works are so vigorously critiqued). In more practical and immediate terms, understanding the journal review process can give you one way to evaluate the quality of an article. Generally speaking, articles published in academic journals represent the best work in the field. However, the presence and rigor of the peer review process varies depending on the journal.

As you become more familiar with the academic journals in your discipline, you will realize that some journals are more selective than others. Journals published by a discipline's professional organization tend to be the most rigorous. For example, in 2017, 70% of the manuscripts submitted for publication to a journal published by the American Psychological Association were rejected (APA, 2018). Information on the review process is provided on the journal's website, and you will likely be able to find the journal's rejection or acceptance rate online as well.

Primary Sources in Academic Journals

Recall that a primary source in the social sciences is a report of an original research study. When such a source is published in an academic journal, it is referred to as a **primary research article** (or empirical journal article). What is sometimes confusing to students is that a primary research article typically provides a summary of past research, just as secondary sources do. The difference is that a primary research article will also include details about the method and results of at least one study that the article author(s) conducted. Some primary research articles report the method and results of multiple related studies.

Because primary research articles are firsthand accounts of a study that have been reviewed and accepted by experts in the field, they are considered the best sources of information on a topic. Still, remember that the quality of the peer review process may vary. Additionally, there is a possibility of **publication bias**, which occurs when an article is evaluated based on how interesting the results are rather than the study's rationale and design. **Preregistration** is a process to avoid this bias in which authors submit their hypotheses and plan before data collection or analysis. The peer review then prioritizes the merits of the study rather than the outcome. It is a relatively new and uncommon process in the social sciences, but the number of journals employing this process is growing (Chambers, 2019).

Primary research article (or empirical journal article): Report of the method and results of an original research study that is published in an academic journal.

Publication bias: The results of a study impact whether an article is accepted or rejected for publication.

Preregistration: A process to avoid publication bias in which authors submit hypotheses and plans prior to conducting a study.

Secondary Sources in Academic Journals

Recall that a secondary source in the social sciences is a review or discussion of previous research that does not include information about a new and original research study. The most common types of secondary sources found in academic journals are literature reviews and meta-analyses.

A **literature review** summarizes the findings of many primary research articles but does not report the method or results of an original study. A **meta-analysis** is a more statistically sophisticated version of a literature review in that a meta-analysis uses the statistical results and sample sizes of past studies to synthesize results. Like a literature review, it does not report the method or results of a new study and is therefore considered a

Literature review: Review of past research without a report of original research.

Meta-analysis: A type of review in which the statistical results of past research are synthesized but no original data were collected or analyzed.

secondary source. Both literature reviews and meta-analyses identify common findings in past research as well as inconsistencies or gaps. As such, reading a recently published literature review or meta-analysis is very useful in helping you understand what research has already been conducted and what research should be conducted in the future. Moreover, they provide an excellent resource to help you identify past research in a topic area.

Although useful, the information provided in a review of past research should not be used in lieu of reading the original sources. Whereas a primary research article describes the method and results of a study in anywhere from one page to upwards of 20 pages, a review or meta-analysis may summarize the study in as little as one sentence. The authors of reviews and meta-analyses select only the information that is most relevant to their own article. Consequently, the summary will provide an incomplete, and in rare cases even incorrect, picture of the actual study.

Once in a while you will run across a commentary in an academic journal. **Commentaries** are brief responses about a published article that usually involve a critique of a study or review. They can be very interesting to read if you have read the research article that is the topic of commentary. In this case, you might use the commentary as a source for your study or to generate research questions.

Commentaries: Critique or comments about a published research article.

Other Scholarly Sources

Conference Papers or Posters

Professional conferences provide a forum for researchers to present their scholarly work (both primary and secondary) in the form of a paper or poster presentation. It can take a year or more for a research article to be published in an academic journal, whereas the works presented at conferences are recent or even in progress. Therefore, these types of scholarly work often represent cutting-edge research. Some professional organizations post the full papers and posters from their conferences online, and some researchers provide the work to conference attendees. More typically, only the titles and summaries are available and you would need to contact the authors directly to obtain the full work. Aside from being relatively hard to come by, the conference review process is not as rigorous as the review process for an academic journal. Consequently, these works should not be the main sources for your study.

Unpublished Manuscripts

Unpublished manuscripts include articles that have been accepted for publication in an academic journal but are not yet published (in press), are currently under review for publication, have not been submitted for publication, or were rejected from an academic journal. It used to be very difficult even to know that such articles existed, but nowadays such manuscripts are often available online. An article that is in press has gone through

the review process and can be used and evaluated just as published articles. However, you should be cautious of using other unpublished manuscripts that you find online, paying special attention to the quality of the work.

Scholarly Books

Scholarly books are written by experts in the field and are typically published by professional organizations or universities. One important indicator of a scholarly book is that the content is based on past research that is clearly cited. You should also check to make sure the authors do not make sweeping generalizations based on research evidence and do not seem to use research only when it supports their personal opinion. A book can be a primary source if it also describes a new original research study or program of studies. The time lag from implementation to publication of studies within scholarly books is often lengthy, and you should be aware that more recent work on a topic can probably be found in journal articles.

Theses and Dissertations

Theses and dissertations are part of the graduate school requirements for a master's degree and doctorate, respectively. Most often they are original research studies and thus primary sources, but some are reviews or meta-analyses. The full manuscripts are book length, and they are typically available only via interlibrary loan from the library of the university where the work was completed. Consequently, they require time to obtain and read. Although the review process for a thesis or dissertation is usually quite involved (as any graduate student will tell you), in general it is not as rigorous as the journal review process.

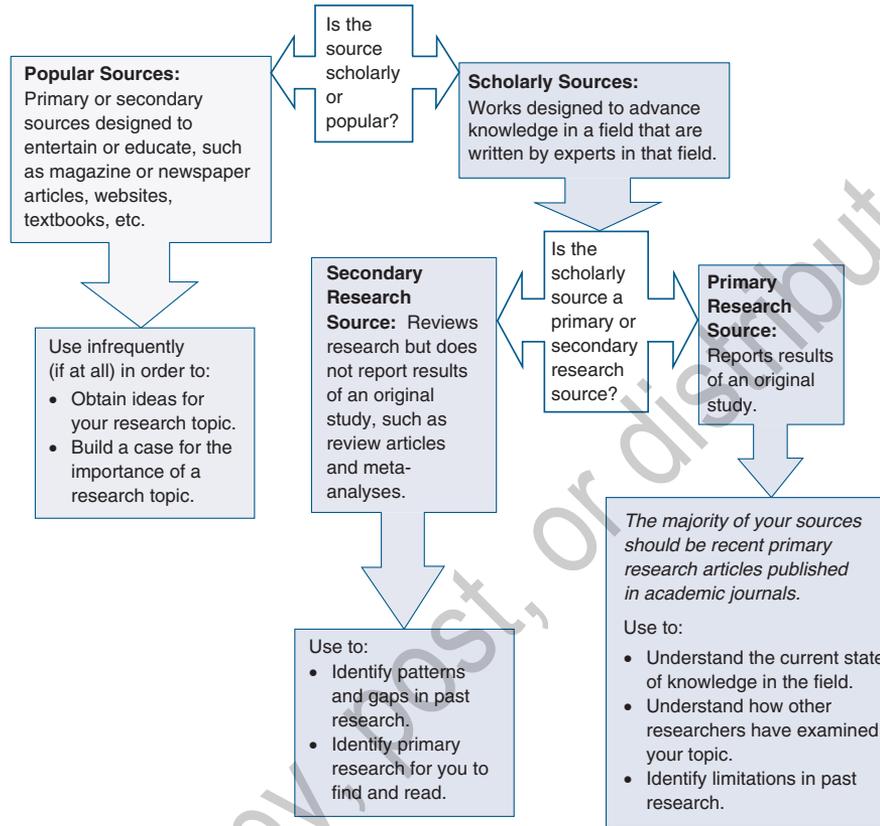
Undergraduate Research

There are forums available for undergraduate students to share their original research, including research conferences (e.g., National Conferences of Undergraduate Research [NCUR], Undergraduate Research Conference [URC]) and undergraduate research journals (e.g., *Journal of Undergraduate Research and Scholarly Excellence*, *URC Undergraduate Research Journal*, *The Undergraduate Research Journal of Psychology*). The review process for undergraduate research is much less rigorous than for other research, as it should be. Reading these works can give you some great ideas and inspiration, but be judicious in using them as sources for a research study.

Abstracts

Abstracts are one-paragraph summaries of scholarly works. They are not complete works, but rather part of a conference presentation or research article. We mention them here because abstracts are very easy to find online and are very brief. Consequently, students are often tempted to use them as sources. Beware that reading the abstract of a work is not sufficient! Rather, if you find an abstract that interests you, you will need to find and read the full text of the work in order to understand the research the abstract summarizes. Never cite a work when you have read only the abstract.

FIGURE 2.1 Types of Sources



PRACTICE 2.1

Article Comparison

All these articles focus on factors impacting academic success. Answer the following for each article:

1. Is the article a primary or secondary research source?
2. Is the article a scholarly or popular source?
3. How might the article be useful in taking a scientific approach to the topic?

Article 1

Harackiewicz, J. M., & Priniski, S. J. (2018). Improving student outcomes in higher education: The science of targeted interventions. *Annual Review of Psychology, 69*(1), 409–435. <https://doi.org/10.1146/annurev-psych-122216-011725>

Excerpt: "...we evaluate the current state of the literature on targeted interventions in higher education with an eye to emerging theoretical and conceptual questions about intervention science. We review three types of interventions, which focus on the value students perceive in academic tasks, their framing of academic challenges, and their personal values" (p. 409).

Article 2

Travis, J., Kaszycki, A., Geden, M., & Bunde, J. (2020). Some stress is good stress: The challenge-hindrane framework, academic self-efficacy, and academic outcomes. *Journal of Educational Psychology*, 112(8), 1632-1643. <https://doi-org/10.1037/edu0000478>

Excerpt: "...stressors perceived as goal-relevant and manageable (i.e., challenging) are thought to increase motivation, performance, and well being, while stressors viewed as goal-relevant but unmanageable (i.e., hindering) are believed to hamper performance and occasion maladaptive behaviors....The current study used a longitudinal design and multiple academic outcomes to explore the challenge-hindrane distinction in a large, diverse student sample" (p. 1632).

Article 3

Moody, J. (2019, August 7). *How to get good grades in college*. U.S. News & World Report. <https://www.usnews.com/education/best-colleges/articles/2019-08-07/how-to-get-good-grades-in-college>

Excerpt: "Students who get good grades do all the basics: Go to class, do the homework and ask for help.... Good grades can open many doors in college: scholarships, acceptance into certain majors and better chances of getting into graduate school" (para. 1).

See Appendix A to check your answers.

STRATEGIES TO IDENTIFY AND FIND PAST RESEARCH

Searching Library Databases by Topic

Searching online databases through your college or university library system is the most efficient and effective way to identify past research on a topic. These databases are catalogs of articles published in academic journals, chapters in scholarly books, dissertations, and other scholarly sources. Some databases also catalog some popular sources, such as newspaper articles, so be careful not to assume that all the work you identify through a database is scholarly.

A search of one of the library databases will yield a list of the titles of sources that meet the search criteria and other basic information such as the author(s), source (e.g., name

of journal), and year published. By clicking on any of the titles in the list, you can view a more detailed record including a brief summary (the abstract) and a list of keywords associated with the source. Most databases also provide a link to the full text for at least some of the sources listed.

Identify the Appropriate Databases to Search

Choose one or more databases to search based on your discipline, your topic, and whether or not the database is available via your college or university library website. Table 2.1 lists databases commonly used in the social and behavioral science fields. In psychology, for example, PsycINFO is the most comprehensive database and will help you identify research articles relevant to your topic. It covers psychology as well as related disciplines such as anthropology, education, and sociology. PsycARTICLES is a psychology-specific database that provides the full text of journals published by the American Psychological Association. PsycARTICLES can be useful when you need to narrow your search to only high-quality psychology articles that are available at a click of a button. However, PsycINFO is the preferred database because it covers those articles available in PsycARTICLES as well as many others.

Even if you are studying a particular discipline, you may find the databases for other areas quite useful. For example, a psychology student may end up doing a study related to sports, and therefore might want to use both PsycINFO and SPORTDiscus. Likewise, a student in sociology focusing on health issues might find using both SocINDEX and MEDLINE to be a good way to identify relevant research articles. There are also databases that span a wide range of disciplines, as shown in Table 2.1.

Conducting the Database Search

Keyword Searches. Identifying the appropriate keywords for your database search is a critical step. We recommend that you take some time to brainstorm some words and phrases associated with your topic, try them out, and then make adjustments as necessary to obtain lists of sources relevant to your topic.

Sometimes you will hit on some good keywords right away, other times you will get too few or too many results. Too few hits are obviously a problem, but you do not want too many hits either because it will be too tedious to look through them all in order to identify those that are relevant to your topic. Finding the right keywords is like finding the key that unlocks past research, and sometimes it simply takes trial and error (along with time and patience) to hit on the right words.

Following are some strategies to identify appropriate keywords and phrases:

1. It may sound obvious, but if a keyword yields zero results, check first to be sure you spelled the word correctly. Unlike Google or other online searches,

the library database will not ask you if you meant to type something else nor will it automatically complete words or correct errors.

2. If available in the search engine, try the thesaurus function to get keyword ideas. You might also use a print or online thesaurus.
3. If your topic is discussed in one of your textbooks, see what terms they use and try them.
4. If you are able to identify a few relevant sources, check what keywords are listed for them.
5. Try broadening your terms if you are getting too few results. For example, instead of searching for the keywords “social science students’ academic success,” try just “academic success.”
6. Try narrowing your terms if you are getting too many results that are not related to your topic. For example, instead of searching for the keyword “academic success,” try “college academic success,” “academic motivation,” and “academic determination.”

TABLE 2.1 ■ Databases Used in the Social and Behavioral Sciences

Database	Field(s)	Is the Full Text Available for the Sources Listed in the Database?
Academic Search Premier	Multidiscipline	Some
AnthroSource	Anthropology	Some
Communication and Mass Media Complete	Communications	Some
Criminal Justice Periodical Index	Criminal Justice	Some
EconLit	Economics	Some
ERIC	Education Studies	Some
JSTOR	Multidiscipline	Some
MasterFILE Premier	Multidiscipline	Some
MEDLINE	Health and Medicine	Some
Project MUSE	Multidiscipline	All
PsycARTICLES	Psychology	All
PsycINFO	Psychology and related fields	Some
Social Sciences Citation Index	Social Sciences	None
Social Sciences Full Text	Social Sciences	All
SocINDEX	Sociology	Some
SPORTDiscus	Sports Studies	Some

Start Broad. When you are just beginning to search for articles on your topic, you will want to keep your search broad. Use keywords associated with your topic, but also search for research on related topics. For example, if you are interested in factors related to academic success for college students who major in the social sciences, do not start with such a specific search. Instead, you might find it helpful to identify research about factors related to academic success for younger students as well as those in other academic disciplines.

There are several reasons why you will want to keep your initial searches broad:

1. To identify the keywords that lead to the results that are most relevant and interesting to you. Once you identify these keywords you can use them as you narrow your search.
2. To give you a sense of the research done in your topic. You will not read all of the research you find during these initial, broad searches, but reading the titles and some of the abstracts will give you an idea of what types of studies are out there. You may also want to file away some studies that are not directly related to your topic but might help you build a broader context for your study.
3. To help you fine-tune your topic. Skimming over the titles and abstracts, you may find that there are other important variables related to your topic that you had not considered before. Or, you might find an interesting article that entices you to veer off in a direction different than you had initially planned. Or, you might realize that there are many studies similar to the way you initially conceptualized your study, and therefore you need to delve a bit deeper in order to create a unique study.

Narrowing Your Search. Next you will want to narrow your search to identify those articles that are most directly related to your revised topic that you will find and read now. For example, you could limit your search to articles that are English only (unless you are bilingual) and published in a peer-reviewed journal. You might also limit your search to only those articles published recently (e.g., within the past 10 years). This does not mean that you can use only new studies to create your study and write your paper. However, the foundation for your study should be recent research, with older studies providing a broader context for your study such as a historical or a theoretical perspective. You certainly do not want to base your study only on old articles.

Other ways to narrow your search are to combine or add keywords. You might use “and” to combine the keywords that led to the most relevant results. You might also try finding a recent review or meta-analysis to provide you with an overview of your topic by using “review” or “meta-analysis” as keywords (e.g., “academic success and review” or “... and meta-analysis”). You might combine your topic keywords with other behaviors and traits associated with your topic (e.g., “academic success and motivation”) or with keywords

relating to the population you are most interested in examining (e.g., “academic success and social science majors”). If you know you will have to do an experiment on a topic, it is a good idea to read at least one article that describes an experiment, thus you can try using “experiment” as another keyword (e.g., “academic success and experiment”). Keep in mind that this does not mean that all the studies you use must be with the same type of sample or the same type of study design, but it will be good to find at least a few examples to build on. In Application 2.1, we provide an example of a search on the topic of academic success.

More Search Strategies

Use One Source to Find Others

If you have at least one research article related to your topic, you can use the reference section of the article to find additional sources. Many of the library databases will allow you to click on a link that will give you a list of the references. If that is not an option, obtain the full text of the article and manually browse the paper and reference section to identify sources relevant to your topic.

With just one research article, you can also find more recent articles that cited it. This is an especially good strategy because it will show you how others have used the article to build a case for their research. Some databases have a “times cited in this database” link that will take you to a list of all the articles within your chosen database that referenced the article. If that is not an option, you can go to the Social Sciences Citation Index to find articles that cite the work.

APPLICATION 2.1

Database Search for Factors Impacting Academic Success

Initial Searches

First we would list keywords associated with academic success.

Our initial keyword list: academic success, academic achievement, GPA, persistence in college, college success, college achievement

We would conduct databases searches using these keywords to see what types of results we obtain and make modifications if necessary.

These initial, broad searches will help us identify the keyword searches that are most successful, identify new keywords, and consider factors we may not have thought of previously. The results for these searches will likely overlap quite a bit in that we may see some of the same articles again and again.

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Narrowing the Search

Once we have identified some of the best keywords and also focused our topic, we will want to narrow our database search. First off, we will limit our search to only those articles we will actually be able to read (those in English). We will also limit our search to those published in a peer-reviewed journal during the last 10 years. Then we can use these limits as we further narrow our search by combining effective keywords (e.g., “college students” and “self-efficacy” and “academic achievement”).

At this point we want to find a few of the most recent and relevant articles to read. As we develop our study and write our research paper, we will want to read some of those we found in our broader searches. We will likely need to make additional, more targeted searches when we advance in the process. For now, however, we have accomplished our goal of obtaining some basic ideas of the research literature and identifying those that we want to find and read right now.

If you were to examine the reference sections of several articles on your topic, you might notice that some references are used in most of the articles. These are the influential works in the topic area that you will want to find and read. Paying attention to these works will help identify some classic research on the topic and the older articles (more than 10 years) that still have an impact today—and that you will want to read and cite for your study.

Search by Author

As you begin finding relevant articles, you may notice certain authors cited in many articles and you may notice several articles on your topic by the same author. Researchers typically develop an area of specialization and author several articles on the same subject. If you find a few names that keep popping up, try doing a library search by the author’s name. The author’s affiliation, or the institution where he or she worked at the time the article was published, is usually provided by the library database. You could go to the institution’s website and search for the author’s name to see if he or she provides a list of recent publications. In some cases, it may be appropriate to e-mail an author and ask for recent publications, and you may even obtain some manuscripts that are in press or under review. At early stages of the search process, contacting the author directly is not worthwhile to you, and may be needlessly burdensome for the author. However, it can be very useful as you fine-tune your study.

Search Relevant Journals

Just as you will notice the same references and authors appearing in your searches, you will find the journals that publish articles on your topic. If you are in the early stages of the research process, it may be worthwhile to do a database search by the journal and limit your search to the last few years. You can scan through the list of titles to see if

there are any relevant articles. You might even visit a university library that carries the hard copies of the recent issues of the journal and physically flip through the last year or so of the journal. This is a great way to generate ideas for research at the early phases, and you often come upon articles that strike your interest that you might not have found otherwise.

What About Internet Searches?

Finding articles via Google or another search engine might provide some ideas and inspiration early in the research process. But once you have narrowed down your topic you should avoid these types of searches altogether. The way you word your search and your search history will likely bias the search results. You are unlikely to find many scholarly sources doing a basic Web search, and worse, some articles may be formatted to look scholarly but are actually not published in reputable journals. Although it seems easy and familiar, web searches will often just waste your time.

Stick with your library databases as your go-to method of identifying relevant research on your topic. But there are a few specific websites that can augment your library searches. Google Scholar can be useful in finding the full text of a specific article you have identified via your library database but that is not available to download through your library. The open access movement has increased the availability of free and online scholarly books and articles. You can find these using indexes such as the Directory of Open Access Journals (DOAJ).

Find the Full Text of a Source

Most databases will provide links to the full text for at least some of the sources they list (see Table 2.1), and the links available will depend on your college or university's library subscription. This is of course the easiest way to find the full text—you do a search in a database and click on the full-text link and poof, like magic, a PDF or HTML document will appear. It is so easy that it is tempting to only use those databases that always provide the full text (such as PsycARTICLES or ProjectMUSE) or to set limits in other databases so that the only results you receive are those that have full-text links. Not surprisingly, these limits will reduce the number of articles you find and can skew your perspective on the literature.

What do you do if an article is not available with a click of a button doing a database search? You could try finding the article online by doing a search in Google Scholar or by going to the author's website if available. If neither applies, you might see if a nearby college or university has the article available and make the trek there. Interlibrary loan is another option, although it can take anywhere from a few days to a few weeks to obtain

FIGURE 2.2 The Search Process

Source: Eva K. McGuire

an article through interlibrary loan. Check with your college or university library about their interlibrary loan policy. If the article is an essential one and you have exhausted all the other means of obtaining the full text, you could contact the author directly to request the article.

Does searching for and finding relevant articles seem like a lot of work? It most definitely is and it should take you a fair bit of time, especially at first. Then once you identify good sources, the process continues as you read and evaluate them (see Figure 2.2). Luckily, with practice the process will get easier.

READING AND EVALUATING PRIMARY RESEARCH ARTICLES

Format of Unpublished Manuscripts Versus Published Research Articles

Unpublished manuscripts, including student papers, look much different from the articles published in academic journals. When you write your own research papers, your professors will ask you to adhere to a specific style such as APA. Although established by the American Psychological Association, APA style is not restricted to psychology. In fact, most of the social science disciplines adhere to APA Style. The most recent version of APA Style is detailed in the seventh edition of the *Publication Manual of the American Psychological Association* (2020), and a condensed APA guide appears in Appendix B. In this appendix, you will see an example of a paper we wrote in its unpublished, manuscript form and in its final, published form.

The primary research articles published in academic journals will vary in length, writing style, the way references are cited, and the headings they use or do not use to organize the article. Many journals use APA format, although others use Modern Language Association (MLA) format or develop their own hybrid format. However, the overall flow and organization of primary research articles will be strikingly similar. Once you understand the basic format, you will know what to

expect while reading the article and you will have a good idea of where to look for certain information.

Remember:

- Primary research articles that you read in academic journals will have a very different appearance from the research papers you will write.
- The content and flow of published articles can serve as a model for your own writing, but you should format the paper according to the guidelines of your discipline (such as those outlined in APA's *Publication Manual*).

Organization of Primary Research Articles

Most published primary research articles will be organized in this order: Title, Authors and Affiliation, Abstract, Introduction, Method, Results, Discussion, and References. Depending on the journal, some of these sections may or may not be labeled, some may go by different names, and some sections may be combined. Although most primary research articles will have these (or similar) sections, do not assume that having one or more of these sections ensures that the article is a primary source. A primary research article usually contains all these sections, but secondary sources may also. All scholarly works will have a title, list of authors, and a list of references, and most will have an abstract. The excerpts from the two scholarly works back in Practice 2.1 are from the articles' abstracts, but you might recall that only the second article was a primary source. Meta-analyses and some review articles will contain a method section describing the selection criteria for the sources they used, and many will have a discussion or conclusions section. Remember that what makes a primary research article unique is that it describes one or more studies that the authors conducted, and you will need to find evidence that a study was conducted within the article's abstract or method to verify that the article is a primary one.

The following sections describe the key parts of a published primary research article and explain what types of information you will find in each. We also provide some tips for reading and evaluating the sections. The best way to understand how to read and evaluate primary research articles is to have the full text of at least one in front of you. Here, we use examples from an article about improving college students' academic outcomes.

- *Title:* Choose your own intervention: Using choice to enhance the effectiveness of a utility-value intervention
- *Authors:* Rosenzweig et al., with “et al.” indicating “and others”

- *Publication year:* 2019
- *Source:* Motivation Science

Test your library skills to see if you can find the full text of this article through your college or university library database. Search by the article's title, or part of the title, to quickly narrow down the results. If you need a hint, *Motivation Science* is published by APA and you should be able to find the full text through your library's psychology databases.

We are serious. Stop reading and go find the full text of the Rosenzweig et al. (2019) article. Doing so will help test your library skills, and furthermore we will use the article in the following sections. Go now.

OK—now that you have the article (You do have it, right?), read on about the different parts of a primary research article. Compare the description of each section to what appears in the article.

Title

The title is a brief description of the study and will usually include the key variables examined in the study. Most titles are pretty dry and straightforward. Some authors choose to let a little creativity shine through in the title; but if this happens, they also include a more direct description (usually set off by a colon). After scanning through lists and lists of titles from a library database, most students come to appreciate the utilitarian nature of titles. The title should tell you very quickly whether the article is related to your topic. See Application 2.2, which evaluates the title of the article that we asked you to find.

Authors

The authors are typically listed right after the title. If there are multiple authors, the author list is usually organized by the degree each contributed, with the first author most responsible for the work. This will be important if you decide to use and cite the article. Paying attention to the authors will also help you identify who the key players are in a certain field. As you delve into a research topic, you will start to notice that many of the authors have published multiple articles on the same topic. As you read further into the article, you may also notice that certain authors are cited by others. You can use this author information to find other relevant articles on your topic.

Abstract

The abstract is a one-paragraph summary of the entire article. In a PDF or print version of a published article, the abstract is often set off from the rest of the paper in a smaller

APPLICATION 2.2

Title from Rosenzweig et al. (2019)

Choose your own intervention: Using choice to enhance the effectiveness of a utility-value intervention

Evaluation:

The part before the colon gives the title a little bit of interest to draw a reader in. But it is the information after the colon that helps us understand the exact focus of the article. The title is not enough to tell us if the authors conducted a study, and we would need to dig a little deeper into the article to find out if this is a primary research article.

font, centered, or italicized. In an HTML version of the article, the abstract is the first paragraph. Some journals use a heading to identify the abstract, such as “Abstract,” “Overview,” or “Summary”—but others do not. Like the title, the abstract will help you determine how relevant the article is for your study, but it will provide a little more detail to help you decide if it will be worthwhile to read the full article. Remember that if you cite an article, you must read the full article and not rely solely on the brief information provided in the abstract.

Both primary and secondary sources may include an abstract, and reading the abstract will help you determine whether the source is primary. The abstract of a primary research article will give some indication that the authors conducted an original research study, by indicating the purpose of the study (or studies if multiple ones are described), the method employed, and the key results. In some cases, the abstract of a primary research article will help you determine the type of design used (descriptive, correlational, or experimental). See Application 2.3 for an evaluation of our example article.

Introduction

The Introduction section begins right after the abstract. Published articles usually begin this section without a heading. Some journals have a section labeled “Introduction” followed by a longer section called something like “Literature Review” and then a “Current Study” or “Hypotheses” section, and it might appear that the Introduction ends before the Literature Review section. However, for our purposes and to follow APA format, all these sections represent the introduction.

The purpose of the introduction is to provide the rationale for the study. Reading the introduction will give you insight into the authors’ thinking about the topic and the

APPLICATION 2.3

Abstract from Rosenzweig et al. (2019)

Be sure to have the article in front of you before you read on.

Is it a primary research source?

Yes, the abstract states that 406 students took part in the study. Identifying the exact number of participants tells us that the authors are reporting results from an original research study.

Can we identify the research design?

Most likely. The authors note that they “assigned” students to different types of interventions and briefly explain subsequent impact on academic outcomes. We should read the Method section to verify that this is an experiment.

reason they conducted the study. It will also give you a sense of some of the past research in this area.

Introductions range in length and vary in content, but most introductions follow the same general organization. Understanding this organization can help you efficiently read the introduction of a variety of studies. Moreover, you will notice that authors organize their introduction in order to build a case for their study (see Application 2.4). Reading introductions will also serve as a model when you write your own. As you read through introductions for primary research articles, take note of the following:

1. The Introduction section begins by introducing the topic and giving the reader an idea for why the topic is an important one to study.
 - The authors might identify a problem or make an observation, which can be as simple as noting the amount of research already done on the topic.
 - The beginning of the introduction allows the authors a bit more leeway in terms of creativity as well as the types of sources used. We have seen introductions that begin with a nursery rhyme or a quote from a famous person. Popular sources such as Time magazine or CNN may be used to help develop a case that a topic is important, or recent statistics from website sources may be used to identify trends or emphasize the importance of researching the topic.

2. The review of past research and theory makes up the majority of the introduction.
 - Remember that reviews are secondary sources that can provide you with a brief summary of past research but should not be used in lieu of reading the original, primary source. In other words, do not cite information from the Introduction section of a research article; instead, track down and read the primary source before citing information from it.
 - Some articles begin the review of past research and theory in the first paragraph of the introduction, citing scholarly sources as a way to introduce the importance of a topic. Other authors begin the review in the second or third paragraph. The review of past research and theory may be as little as one paragraph or as long as several pages. The review may be subdivided based on the content of the research reviewed in each subsection.
 - As the authors explain research that has been done that supports their own study, they often make note of the research that is absent, sparse, or inconsistent. In this way, the authors build a case for the need for their own study.
3. The end of the introduction focuses on the study the authors conducted.
 - The authors may explicitly state or imply how their research study improves on past research and how their study is unique. For example, they may be using a different method, studying different types of participants, comparing alternative explanations, examining different ways that one variable impacts another, or examining variables that might impact the relationship between variables.
 - The hypotheses for the study are typically near or at the very end of the Introduction section. The 7th edition of the *Publication Manual of the American Psychological Association* states that authors should specify hypotheses as preplanned or exploratory. For preplanned hypotheses, the authors should indicate which are the primary focus and which are secondary (APA, 2020). For exploratory studies, researchers sometimes state questions instead of hypotheses.

Method

The Method section explains the method used to test the hypotheses or to help answer the research questions. The Method section will include information about the participants (or animal subjects), the measures or materials used in the study, and the procedures of the study. Reading the Method section is the best way to identify the research design of

APPLICATION 2.4

Rosenzweig et al.'s (2019) Introduction

Refer to the full text of the article

1. *The Introduction section begins by introducing the importance of the topic.*

In the first sentences, the authors identify a problem: STEM skills are important yet STEM majors are not common.

2. *The majority of the introduction involves a review of past research and theory.*

In the first paragraph, the authors introduce the expectancy value theory of motivation as the theoretical context for utility-value interventions aimed to increase student's interest and achievement in STEM courses. They also cite studies that have found such interventions to be effective.

In the second paragraph, the authors suggest that choice is key to effective interventions and put this into the theoretical context of self-determination.

In the third paragraph, the authors make the connection between utility-value interventions and choice.

3. *The Introduction ends by focusing on the current study and stating the authors' hypothesis.*

In the fourth and final paragraph of the introduction, the authors explain that their study compares a high-choice utility-value intervention to two low-choice utility-value interventions and a no-intervention control. They hypothesize that the high-choice condition will result in stronger interest and utility value, higher grades, and increased likelihood of enrolling in a subsequent course.

the study (see Application 2.5). The authors will usually divide this information among subsections in the Method section, but the exact number, names, and order of these subsections will vary based on the article.

Participants or Subjects. At minimum, you will find information about the total number of human participants or animal subjects in the Method section. Ideally, you will also find information about the characteristics of the participants such as their age, gender, and race or ethnicity. Information about the participants or subjects will help you evaluate the results of the study, and we will discuss some ways to do this later in the chapter.

Measures and Materials. Researchers operationally define their variables by selecting specific measures and materials. Measures can be evaluated in terms of their reliability and measurement validity, and we will discuss both of these in more depth in Chapter 4. Generally speaking, reliability refers to how consistent the measure is. Authors often cite past research that used or developed the measure to support the measure's reliability, or

the authors may have evaluated a measure's reliability themselves. However, some authors do not provide any information about reliability of the measures.

The basic definition of measurement validity is the extent to which a measure actually measures what the researcher says it does or the extent to which a manipulation manipulates what the researcher says it does. You can do a simple evaluation of the validity of the measure based on the types of questions or the materials used to measure or manipulate a variable.

As you progress in the research process, you will need to find ways to measure or manipulate variables in your own study. Reading the Method section will provide you with some ideas on how other researchers operationally define the variables and will help you identify measures and materials to use in your study. Some articles even provide the complete measure or materials such as a script or scenario that you can use or adapt in your study (and appropriately cite the creator of the measure or material, of course).

Procedure and Design. The Procedure section describes the steps the authors followed in the study, typically listed in sequential order. The Procedure section should contain enough information for the reader (you) to replicate the study.

The procedures will help you identify the exact research design (or designs) utilized in the study. In some cases, the authors may include a separate Design section to explain the logic behind the procedures in order to help you understand why the authors did what they did. In all cases, the design of the study should be linked with a specific hypothesis. For example, if the authors hypothesize that one variable will have an effect on (or cause a change to) another variable, then the design utilized to test the hypothesis should be experimental because that is the only design that can test causation.

APPLICATION 2.5

Identify The Research Design of Rosenzweig et al. (2019)

Recall from Chapter 1 that an experiment requires the researcher to manipulate an independent variable (IV), randomly assign participants to condition, and measure at least one dependent variable (DV).

Is there an IV?

Yes, the IV is the intervention condition. In the "Participants and Design" section the authors identify four conditions (high-choice utility-value intervention, two low-choice utility-value interventions, and a no-intervention control). The authors explain the details of these four conditions in the "Intervention and control materials" section.

(Continued)

(Continued)

Did the researchers randomly assign participants to IV condition?

Yes. The last sentence of the “Participants and Design” section states that “students were randomly assigned to one of four conditions” (p. 271).

Is there a DV?

Yes, there are four DVs described under “Measures.” Note that only the measures assessed at the end of the semester (after the IV manipulation) are DVs: utility-value, interest, grades, enrollment in subsequent biology class.

Because all three criteria for an experiment are met, we conclude that the research design of Rosenzweig et al. is indeed experimental.

Results

The Results section is typically the most technical section of the article and the most difficult to understand, especially at first. As you become more comfortable with statistics, Results sections will start to make a lot more sense. However, even if you are reading a research article for the very first time you may be surprised by how much you can understand if you try. By this point in your academic career, you should know some basic statistics such as percentages and means. If you devote some time and energy to reading the results of a study, you will gain familiarity with some of the more advanced statistics and you will see how they are used to test hypotheses, even if you cannot yet decipher what every single number or statistical notation means.

The main focus of the Results section is the results of analyses used to test the hypotheses or help answer the research questions. Take note when the authors state that a result was statistically significant and determine if the results support one of the hypotheses. We will talk more about statistical significance in Chapter 7, but for now simply know that **statistical significance testing** is used to help reduce the likelihood that the results were obtained purely by chance. Researchers do not want to report spurious patterns or relationships, but they do want to be able to identify patterns and relationships in their data that, in fact, exist.

You might also examine the means, percentages, or other numbers associated with the statistically significant result so that you have some understanding of how the authors tested the hypotheses. Tables or graphs can be very useful in summarizing these results, and you should pay special attention to these when they are available.

Statistical significance testing: A process to reduce the likelihood that the results were obtained by chance alone.

Discussion

The Discussion section (also named Conclusions in some journals) will usually begin with an explanation of the results without the technical language. It will also put the results into context—usually first stating if the results support or do not support the hypotheses and then explaining how the results fit or do not fit with past research. The Discussion section will also suggest what the larger implications and applications of the study might be, point out limitations of the study, and offer suggestions for future research that may address limitations and expand on the results of the study.

The Discussion section is a good place to get an overview of the results of the study and to generate ideas for your own research. However, do not rely on it exclusively to understand the results. The discussion is the authors' interpretation of the results, and you may come up with your own explanation based on a thorough reading of the Results section. It would be good practice to read through the results and write out some of the key conclusions, and then compare these to what the authors say. Or you might read the Discussion section first, and then try to figure out how the authors came to their conclusions based on information they provide in the Results section.

Following are three questions to consider when evaluating the results of a study. The authors may address one or more of these in their Discussion section. Even if they do not, you can consider these questions as you evaluate a research study.

1. ***Did the study have enough power?*** **Power** refers to the ability to find statistically significant patterns and relationships in the data when they exist. We will discuss power in more detail in Chapter 7, but for now simply know that the stronger the pattern or relationship and the larger the sample, the more power the study has and the greater likelihood of finding statistically significant results.

How do you use this information in evaluating the power of a study? If you have a study that did not find significant results, it is possible that a pattern or relationship does exist but there was not enough power to detect it due to a small sample size or because the way the research measured or manipulated the variables was not strong enough. If you have a study that found significant results with a relatively small sample, the pattern or relationship must have been relatively strong within that study in order for the results to meet the criteria for statistical significance. Likewise, studies with very large samples are able to detect very small patterns or relationships, and the strength of the pattern or relationship should be carefully considered when evaluating the results.

Power: The ability to find statistical significance when in fact a pattern or relationship exists. Sample size and the strength of the relationship between two or more variables are two factors that impact a study's power.

2. *If the authors hypothesized a relationship between variables, did they utilize a design and procedures that helped to demonstrate causation?* If the authors conducted a correlational study, they cannot demonstrate causation and therefore the study cannot help explain why a relationship exists. An experiment helps to demonstrate causation through random assignment, manipulation of an independent variable (IV), and measurement of a dependent variable. These basic requirements of an experiment help improve the study's **internal validity**, or the extent to which one can demonstrate that one variable (the IV) caused a change in another variable (the DV). We will discuss internal validity in more depth in later chapters.
3. *How strong is the external validity of the study?* **External validity** is the extent to which a study's results can be generalized to other samples, settings, or procedures. If the study's authors utilized first-year college students as participants, the external validity could be impacted because the results may not generalize to more advanced students or individuals who are not in college. Similarly, if the authors conducted the study in a controlled laboratory, it is not clear whether or how the results would generalize to a real-world situation. We will discuss external validity in more depth in Chapter 4.

Internal validity: The extent to which you can demonstrate a causal relationship between your IV and DV.

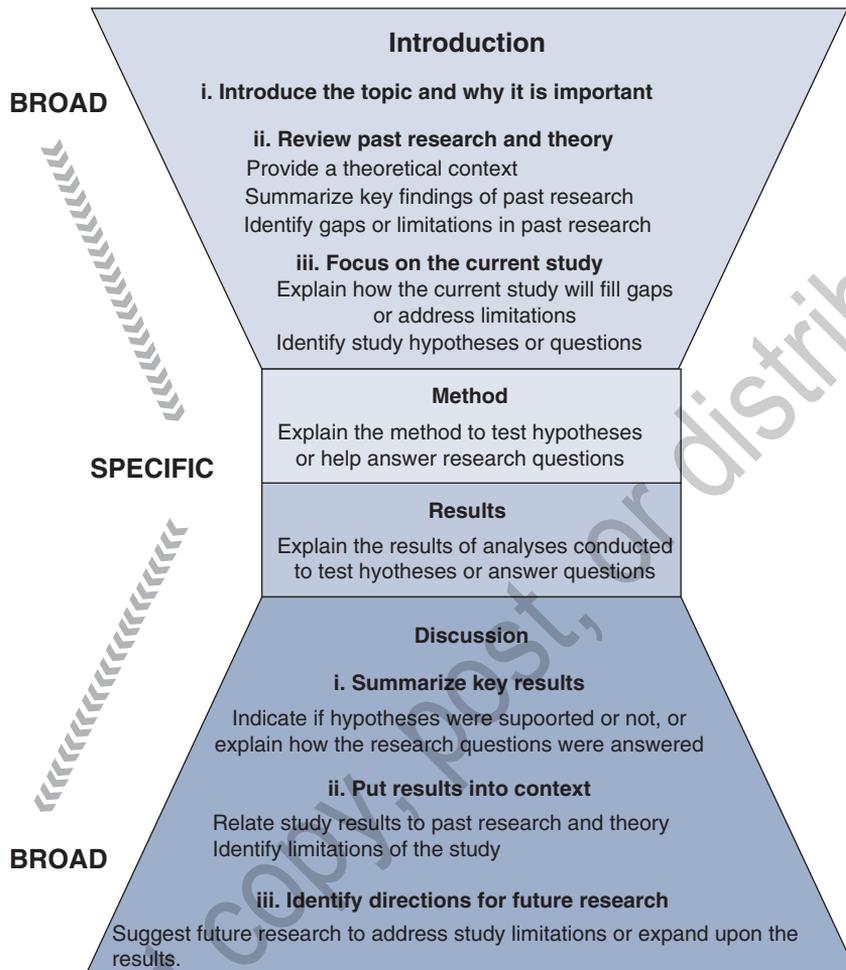
External validity: The extent to which the results of a study can be generalized to other samples, settings, or procedures.

References

All the sources cited within the article will be listed in a References section. The References section is a good place to look to identify other research on your topic. You will also notice that the number of references listed is typically quite high given the length of the article. Most of the references will be cited in the Introduction, and a few new ones may be cited in the Method and Discussion. This demonstrates the importance of building a study on past research, including past methodology, and evaluating the results within the context of past research.

Shape of a Primary Research Article

Once you gain familiarity with the way a primary research article is organized, you will notice that most share a similar shape. This shape is often described as an hourglass in that a primary research article is organized so that it starts broad, moves to the more narrow or specific, and then gets broad again. See Figure 2.3 for a depiction of this organization.

FIGURE 2.3 ■ Shape of a Primary Research Article

CREDITING SOURCES

Giving proper credit to sources is a critical part of the research process, and as such we will briefly describe how to format citations and references. A more detailed APA format guide appears in Appendix B, and for the most accurate and detailed information you should of course go to the original source—the seventh edition of the *Publication Manual of the American Psychological Association* (2020).

If you are like many students who struggle with getting the details of APA formatting just right, you might wonder why APA format matters at all. The main rationale for adhering to APA format, or any formatting style, is that the consistency helps readers quickly identify

the information they need. As you get more comfortable reading primary research articles, you will come to appreciate that you can find information such as the hypotheses, method, and results in the same place within most articles. Likewise, when you want to read more about a study cited in an article, the consistency in the reference list will help you quickly identify the information you need to find the article using your library's databases.

Ethics Tip: Accurately Credit Sources and Avoid Plagiarism

Ethics is the first and foremost concern with citing and referencing sources. It does not matter if you have perfect APA format if you fail to give credit to the correct source, provide incorrect information, or plagiarize. Following are a few tips to ensure accuracy and avoid plagiarism.

Accuracy

- Only cite and reference sources that you read.
- Just because information appears in an article, it does not mean that that article is the original (primary) source for that information—be sure you give credit to the original source.
- Take time to understand the findings of a research study so that you can accurately summarize them.

Avoid Plagiarism

- Be sure you know what plagiarism is (see Chapter 1 for a refresher).
- As you take notes, summarize and paraphrase the article in your own words. This takes more time, but it helps ensure that you understand the information before you write it down in your notes.
- If you must directly quote an article as a short cut for taking notes, be sure the direct quotes are in quotation marks along with the authors' names and page numbers from the original source—that way you will not look back at your notes and assume the words are your own.

APA Format for Citations

Citations appear in the text of a paper and are designed to identify the exact source of each piece of information in the paper. As such, be sure that the citation is proximal to the information associated with it as either part of the narrative or in parentheses. For example:

- *Narrative citation:* Moody (2019) interviewed professors and student support specialists and found that students who get good grades are the ones who attend class, do the work, and seek help when needed.
- *Paraphetical citation:* Students who get good grades are the ones who attend class, do the work, and seek help when needed (Moody, 2019).

TABLE 2.2 Guide to APA-Style In-Text Citations

Number of Authors	Citation Examples
One	Moody (2019) <i>or</i> (Moody, 2019)
Two	Harackiewicz and Priniski (2018) <i>or</i> (Harackiewicz & Priniski, 2018)
Three or more	Travis et al. (2020) <i>or</i> (Travis et al., 2020)

Narrative citations highlight the authors and their work and are useful when citing a particularly important study in the field or when specific details of the study are important. Parenthetical citations highlight specific information from the source, and as such are more common in research papers.

Citations contain only the author(s) and date. For articles with multiple authors, the person listed first is the lead author who was most responsible for the work. Therefore do not change the order of authors when you cite the source. See Table 2.2 for how to cite sources based on the number of authors. The full reference for each of these citations can be found in Practice 2.1 (see p. 36). Notice that the type of source does not impact the citation format, but it does impact the reference format.

APA Format for References

Whereas the citation is used to credit sources of information, the references are used so that readers can look up and read the original source. References include much more detail than a citation and appear in a list at the end of the paper. You should include a reference for every source you cite. In a research paper, most of these will be journal articles and that will be our focus in this chapter. See Appendix B for guidelines on referencing other types of sources.

What to include in a reference for a journal article:

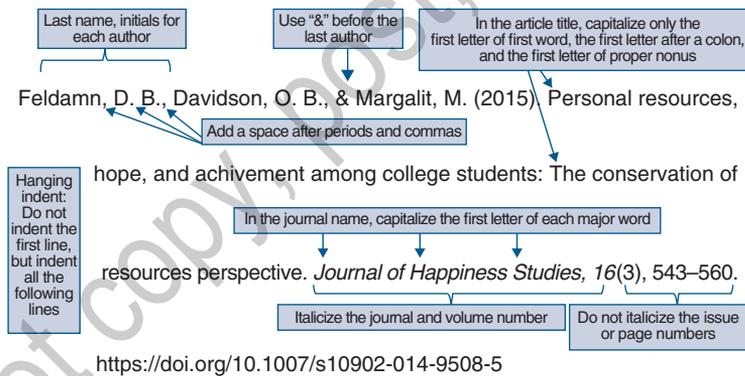
- Author(s): last name followed by a comma, initial(s) followed by a period
- Date of publication, in parentheses
- Article title
- Journal title and volume, italicized
- The issue number, in parentheses
- Page numbers of article, separated by an en dash (–)
- DOI or URL, as a hyperlink

Formatting the reference:

- Do not indent the first line of the reference, but indent all subsequent lines of that reference (this is called a “hanging indent”).
- For articles with multiple authors: Keep the order of authors the same as it appears in the article, separate the authors by commas, and use both a comma and an ampersand (&) before the last author.
- For the article title, capitalize only the first letter of the first word, the first word after a colon or other punctuation, or proper names.
- For the journal title, capitalize the first letter of all the main words (e.g., not “of” or “and”).

Look at Figure 2.4 for an example reference for a journal article, with key points noted. Then practice writing an APA-style citation and reference by completing Practice 2.2.

FIGURE 2.4 Example APA-Formatted Reference With Notation



PRACTICE 2.2

Write a Citation and Reference Using APA Format

- *Article title:* Choose Your Own Intervention: Using Choice to Enhance the Effectiveness of a Utility-Value Intervention
- *Journal title:* Motivation Science

- *Authors:* Emily Q. Rosenzweig, Judith M. Harackiewicz, Stacy J. Priniski, Cameron A. Hecht, Elizabeth A. Canning, Yoi Tibbetts, and Janet S. Hyde
- *Date:* 2019
- *Volume:* 5
- *Issue:* 3
- *Page numbers:* 269 to 276
- *doi hyperlink:* <http://dx.doi.org/10.1037/mot0000113>

1. Write a narrative and a parenthetical citation for this article that would appear in the text of a paper.
2. Write a reference for this article that would appear in the References section of a paper.

See Appendix A to check your answers.

THE BIG PICTURE: USE THE PAST TO INFORM THE PRESENT

Honoring the past is an integral part of research. Finding, reading, and evaluating past research helps to identify the current state of knowledge as well as questions to be examined by future research in order to progress scientific understanding. Following formatting conventions such as APA style helps make the process more efficient. Specific formatting styles help us to quickly identify original sources of information and to figure out where to find and read that source. When all citations are formatted the same way in a paper, we can quickly identify the original sources of information in that paper. When all the references in a reference list are formatted the same way, we can look up the citation and quickly identify information to help us find and read the original source. Using the past to inform the present, while giving proper credit to sources, is how researchers build a solid foundation for their own studies.

Once you begin to find and read primary research articles on your topic, you might find yourself overwhelmed with information. We recommend that you locate one or two recent articles that you find interesting and that include methodology that you can understand. Carefully evaluate the method and results to identify limitations that you might address or questions that the study raises, and then check the Discussion section for the limitations and future research the authors suggest. Use additional articles to

provide background information and help build the rationale for your hypotheses and method (see Application 2.6).

Following are some ways to build on a research study:

1. Replicate the study with a different sample, setting, or method. Do this if most of the past research you have read examines one type of sample, setting, or method and you have reason to believe (based on other past research) that the results may be different if conducted with another sample, in another setting, or using another method such as a different measure, manipulation, or procedure.
2. Examine the topic using a different research design. If the study was a quasi- or nonexperimental study, conduct an experiment. Do this if causation has not been consistently established by past research, or it has not been consistently established with the population you are examining. Be sure that it is both possible and ethical to conduct an experiment to help establish causation among the variables. Or, if the study is an experiment, you might follow up with a quasi- or nonexperimental study to examine some of the findings in more depth, or to test out real-world applications.
3. Conduct a similar study with a different outcome or dependent variable. Do this if you find research evidence supporting the new relationship you plan to examine.
4. Examine how another variable might impact results. Do this if you have research evidence to suggest that results may depend on another variable.

APPLICATION 2.6

Develop Study Ideas Based On Rosenzweig et al. (2019)

1. *Replicate the study with a different sample, setting, or method.*

Rosenzweig et al. (2019) focused on undergraduate students in an introductory biology course in the United States. We might conduct a similar study with students in a social science research methods course, or we might examine how the intervention works in a non-U.S. setting, or both of these.

Rosenzweig et al. examined how specific choices enhanced a utility-value intervention. We might conduct a study using different types of choices or another type of intervention.

2. *Examine the topic using a different research design.*

Rosenzweig et al. employed an experimental design and cited many previous experiments that examined the utility-value intervention. We might employ a less rigorous but more “real-world” quasi-experimental design in order to focus on external validity. Or, we might focus on the role of choice in academic outcomes using a correlational design.

3. *Conduct a similar study with a different outcome or dependent variable.*

Rosenzweig et al.’s dependent variables were utility value, interest, course grade, and future course enrollment. We might examine the dependent variables of stress and self-efficacy that are associated with academic outcomes (Travis et al., 2020).

4. *Examine how another variable might impact results.*

Rosenzweig et al. did not include first-generation, Black, or Latinx students in their study. We might consider how students’ background and race impact results.

CHAPTER RESOURCES

Key Terms

Define the following terms using your own words. You can check your answers by reviewing the chapter or by comparing them with the definitions in the glossary—but try to define them on your own first.

Commentaries 34

External validity 54

Internal validity 54

Literature review 33

Meta-analysis 33

Peer review 32

Popular works 31

Power 53

Preregistration 33

Primary data 30

Primary research article (or
empirical journal article) 33

Primary research source 30

Publication bias 33

Scholarly works 31

Secondary data 30

Secondary research source 30

Statistical significance
testing 52

Do You Understand the Chapter?

Answer these questions on your own, and then review the chapter to check your answers.

1. What is the difference between a primary and secondary source?
2. What is the difference between scholarly and popular works?

3. Why is the peer review process important?
4. Describe the different types of articles that can be found in academic journals.
5. How can you tell if a journal article is a primary source?
6. Describe scholarly sources that are not found in academic journals.
7. What databases are most applicable to your discipline and topic?
8. Explain how you would conduct a keyword search on your topic.
9. How else might you find relevant research on your topic?
10. List and briefly describe the purpose of each section in a primary research article.
11. What is the difference between a citation and a reference?
12. What are the critical components of an APA-style citation?
13. How would you format a reference for a journal article using APA-style?
14. What are some ways to build on past research?

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