CHAPTER THREE

Reading Research Articles

Although some kinds of reading are intended to be a passive experience, reading professional articles, especially research reports, should be anything but passive. One way to be an active reader is to annotate or mark your copy of the article: underline, circle phrases, highlight, or jot comments in the margin—whatever helps you keep track of important information and connect the various parts of the study. Some people prefer to make notes in a file on their laptop—fine, whatever works for you.

I annotate right on my paper copy of articles. I write something like "n = 54" in the margin so I can quickly locate the **sample** size. I underline important definitions, outcomes, or findings. I circle abbreviations that will be used in the report and the parts of a table that are most important to me or unexpected. I put question marks where a statement does not fit with what was said earlier or does not make sense. Of course, it is possible to overannotate and in so doing produce clutter. However, if you annotate selectively, you will be able to find important information easily when you return to the article at a later time.

In this chapter, I make suggestions about how to read reports of individual studies. At this point in your learning, the goals in reading a research article about a study are to identify: (1) why the study was done, (2) how it was conducted, and (3) what was found. After you are comfortable reading research articles, you will add the goals of: (4) determining whether the study was soundly conducted , and (5) relevant to the care of patients to whom your agency or unit provides care (see text box).

GOALS IN READING A RESEARCH REPORT

1. Determine the purpose of the study
2. Understand how the study was done
3. Understand what was found
4. Appraise the credibility of the findings
5. Determine if the findings are relevant to the care of your patients

The emphasis in this chapter and in all of Part I of the book is on goals 1, 2, and 3 in the text box, although goals 4 and 5 may pop into your thinking as you read. For instance, you will undoubtedly note whether the patient groups that were studied are similar to a patient you have taken care of. You may make a mental note about this for now; however, serious consideration of the applicability of the study to a particular patient group is on hold until later in the book.

In reading this chapter, you may see a few terms that are unfamiliar to you. For now, just look them up in the glossary to get a sense of what they mean. Most of them are explained in full as you proceed through the first part of the text.

Starting Point

Is this a report of an original research study? This seems like it should be an easy question to answer, but at times it is not. Some articles read like research articles, but they are in fact other kinds of reports. When you see tables with numbers and percentages, you may think you are reading a research study, but the article may just be providing numerical data to describe a clinical program. Such data is anecdotal and naturally occurring with no control over its quality or the conditions under which it was collected. As you will learn, it takes more than numerical data to call an evaluation report "research."

Most often, the author of a research article will refer to the study early in the report, but sometimes you have to read quite far into an article to determine that it has the essential elements of a study. The essential elements of a research study include the following:

- A specified research question, **hypothesis,** or purpose
- Specified, systematic methods of data collection and analysis

- Results of data analysis
- Findings (interpreted **results**)
- Conclusions

If all these elements are present, then the likelihood that you are reading a research study report is very high. Remember, however, that there are many types of research methods and designs, and the essential elements of each type look quite different. Most quantitative studies address specific research questions or hypotheses, whereas qualitative studies may have a broad aim or purpose. Quantitative studies report results with tables, graphs, and statistics, whereas the findings of qualitative studies consist of extended quotes, narratives, descriptions, or themes. Qualitative studies often have small sample sizes (e.g., N = 6); some quantitative studies use a very large number of participants (e.g., N = 3,200). In short, research articles are diverse but should include at a minimum a clear purpose statement, a description of methods used to collect and analyze data, results and/or findings, and conclusions.

Format of Study Reports

Research reports of original studies are organized in a very logical way, and the formats used are similar from one journal to another. This standardization can help you as a reader because you will learn where to expect, and later locate, various kinds of information about the study. The following is a brief orientation to the format of research reports.

Title and Abstract

The title tells the reader what the study examined and often the patient group of interest. These are your first clues as to whether the report is likely to be of interest to you. However, titles can be misleading because a phrase or term used in the title may be different from the one used in your practice setting.

Abstracts almost always precede the main body of the article. An abstract provides a brief summary of the study—typically 300 words or less. Note the section headings used in the abstract because they are useful in beginning to organize your thinking about the study. The abstract distills the main points of the study, and after reading it you should know whether the study is of interest.

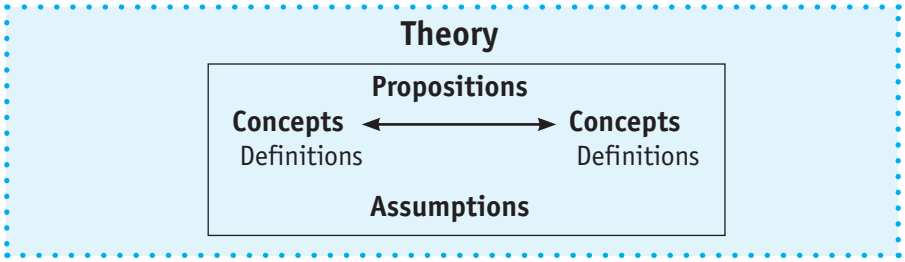
Let us assume that you have decided to read the whole study. Rather than read straight through the first time, you might want to read the

introduction and then jump to the discussion section. The discussion summarizes the important findings and places them in the context of findings from earlier studies. Having read the introduction and the discussion, you should have a sense for the context of the study—and be ready to read the article from start to finish in its entirety.

Introduction

In the introduction of a research report, the researcher presents his view of the current state of knowledge regarding the issue or problem being investigated; this includes what is known and what the gaps in knowledge are. Study purposes are often set forth in the introduction section. Mark them in some way because they are important and you will want to refer to them.

Theoretical Frameworks In the introduction section of a research report, there may be a discussion of a theory that has been used to organize thinking about the issue and that serves as a conceptual context for the study. A **theory** is made up of assumptions, concepts, definitions, and/or propositions that provide a cohesive, although often tentative, explanation of how a phenomenon in the physical, psychological, or social world works. Propositions are suggested linkages among the concepts of the theory that have not yet been proven.



To make the preceding paragraph a bit more rooted in the real world, consider the following illustration. The *theory of community empowerment* was developed to provide direction for improving health in communities (Persily & Hildebrandt, 2008). Consider two propositions from this theory:

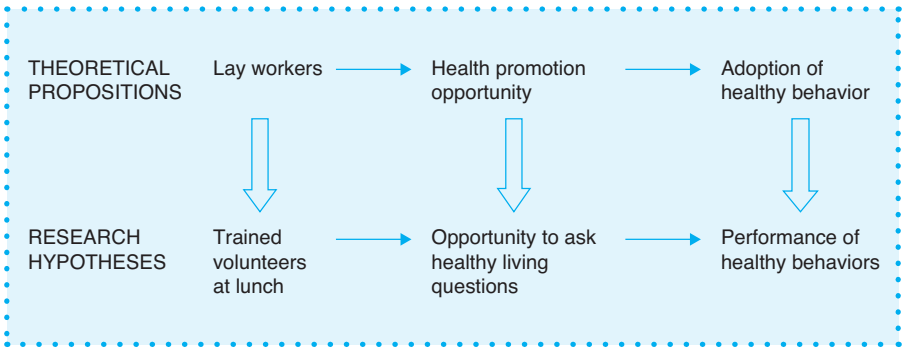
1. Involving lay workers in a community health promotion program extends access to health promotion opportunities.
2. Access to health promotion information leads to adoption of healthy behaviors.

Lay workers, access, health promotion opportunities, and *adoption of healthy behaviors* are concepts of the theory.

A researcher conducting a study about improving the health of elders living in their own homes might use the *theory of community empowerment* as a source of ideas for the study. By translating the two theoretical propositions into more concrete terms, the following two study hypotheses are formed:

1. Trained volunteers who collect healthy living questions from elders once a month at the weekly senior lunch and deliver answers the following week will increase access to health promotion information.
2. Health promotion information of personal interest will produce changes in health-related behaviors.

The questions submitted are given to a nurse practitioner who answers them via video recording shown at the next week's lunch. Adoption of new health behavior outcomes will then be measured at 3-month intervals for 1 year. Thus, the theory has served the research by bringing into a trial program a component that otherwise might not have been included and by providing a knowledge context for the findings. At the same time, the study acts as a test of the theory because the study has translated the abstractions of the theory into concrete realities that can be examined. If the study hypotheses are supported, the theory is supported because the hypotheses represent the theory.



Not all study reports stipulate a theoretical framework; many researchers, particularly those testing physiological hypotheses, do not locate their studies within a theoretical framework; instead, they locate their study in a review of what is known from previously conducted research and what is still not known with certainty.

Clearly, much more could be said about the relationship between theory and research; however, doing so would be a diversion from the topic of this chapter, which is how research articles are formatted.

Study Purposes A reason for doing a study may be stated as a purpose statement, aims, objectives, research questions, or as hypotheses that will be tested by the study. Purpose words and phrases you will encounter in nursing study reports include:

- Acquire insights about . . .
- Understand
- Explore
- Examine
- Describe
- Compare
- Examine the relationship/association between
- Predict
- Test the hypothesis that . . .

In the early stages of studying an issue, research is directed at acquiring understanding of the various aspects of the issue—the problems people with the condition are experiencing, forces at work, and what the condition or experience means to individuals. Generally, these early studies use qualitative research methods. The following are study purposes from qualitative studies:

- "The purpose of this study was to identify and describe clean intermittent catheterization users' issues and concerns to address self-management needs in future research and/or training programmes" (Wilde, Brasch, & Yi, 2011, p. 1254).
- "This paper is a report of a study of what fatigue means to patients with recent myocardial infarction (MI) and how they manage to deal with the consequences of this symptom" (Alsén, Brink, & Persson, 2008, p. 459).

Note how both purposes set forth issues that will be examined, but they do not get highly specific about what they are looking for because they want the study participants to highlight the important aspects of their situation and experiences.

After the condition or situation is well understood at the experiential or social process level, subsequent studies may determine the frequency with

which it occurs in different populations or measure the degree to which aspects of the condition or situation are present. Later, when several studies have been done and the situation is fairly well mapped, researchers will propose and quantitatively test associations between aspects of the situation or effectiveness of interventions directed at it. The following examples illustrate several ways of stating **quantitative research** purposes:

- "The specific research question [of this study] was 'What patient characteristics, clinical conditions, nursing unit characteristics, medical pharmacy, and nursing interventions are associated with falls during hospitalization of older adults?" (Titler, Shever, Kanak, Picone, & Qin, 2011, p. 129).
- "The purpose of this study was to compare the time needed to reach a specified temperature and the efficiency of two warming methods—warm cotton blankets and a radiant warmer—for hypothermia patients in a postanesthetic care unit (PACU) after spinal surgery" (Yang et al., 2012, p. 2).
- "The hypothesis is that the outcomes from nurse-led clinics will not be inferior to those obtained by the rheumatologist-led clinics, but at a lower cost and greater patient satisfaction" (Ndosi et al., 2011, p. 996).
- In a study of the association between depression and health-risk behaviors in high school students, two competing explanations became the hypotheses that were tested in the study: (1) Early depressive symptoms predict increases in risk behaviors over time; and (2) Early participation in health-risk behaviors predicts increases in depressive symptoms over time (Hooshmand, Willoughby, & Good, 2012).

These study purpose statements illustrate the variety of ways used to set forth quantitative study aims.

Methods

In the methods section, the author describes how the study was conducted, including information about the following:

1. The overall arrangements and logistics of the study
2. The setting or settings in which the study was conducted
3. The **institutional review board (IRB)** that gave ethical approval to the study
4. How the sample was obtained

5. The number of people in the sample
6. How data were collected
7. Any measurement **instruments** that were used (i.e., scales, questionnaires, physiologic measurements)
8. How the data was analyzed

Each of these steps will be discussed in detail specific to different research designs in later chapters. Briefly here, I will just say that the information about the sample should be sufficient to inform the reader about the likelihood that the sample is a good representation of the **target population** or provide enough profile information about the sample to let readers decide to whom the results would likely apply.

The information about how the data were obtained includes a statement about the organization that gave ethical approval to the study, procedures used to collect data, and descriptions of the measurement instruments used. For now, you should come away from reading the methods section of the reports with an understanding of the characteristics of the people who were included in the study, the sequence of steps in the study, and the data collected.

Results/Findings

In the results/findings section, the results of the data analysis are reported. Results are the outcomes of the analyses. In quantitative studies, results are shown in tables, graphs, percentages, frequencies, and statistics. There should be results related to each of the research questions, hypotheses, or aims. To illustrate, consider the following hypothetical statement that might be found in the Results section of a quantitative study: "The *t*-test comparing the functional status scores of those in intervention group A and intervention group B indicated a significant difference (mean A = 8.4; mean B = 6.1; p = .038)." This is a result statement; it reports the results of the statistical analysis.

The interpretation of a result is called a **finding**. A finding for the result statement just given would be stated something like, "The group who received nursing intervention A had a significantly higher functional level than did the group who received intervention B." Note how the findings statement interprets the statistical result but does not claim anything more than the statistical result indicated. Findings statements are usually found in the conclusions or discussion section of quantitative study reports.

To illustrate further, consider the results and findings of a hypothetical quantitative study comparing the effects of a new method for osteoporosis prevention education to standard education. A *t*-test was used to compare the scores of the two groups on an osteoporosis prevention questionnaire; the result of that test was $t = 1.99$, $p = .025$. This result indicates that the statistical calculation comparing the scores of the two groups resulted in a *t*-value of 1.99, which is statistically significant at the $p = .025$ level (I will explain *p*-values in a later chapter). The finding was this: The new educational method on average produced higher osteoporosis knowledge levels than standard education did, and there is a very low chance that this claim is wrong.

Results → Findings → Conclusions

In qualitative research reports, data (observations, quotes) and findings (e.g., themes) are often intermingled. Generally, qualitative study reports do not have a Results section; rather, they have a findings section in which themes, narrative descriptions, or theoretical statements are presented along with examples of data that led to them. A later chapter provides more explanation of the analytical processes used by qualitative researchers.

When you first begin reading research articles, you may have a tendency to skip over the tables and figures. This is not advisable because the real meat of the results is often in them. Most authors highlight or summarize in the text what is in the tables, but others assume the reader will get the information from the tables, thus they do not restate that information. In examining tables and figures, it is important to carefully read their titles so you know exactly what you are looking at. Also, within tables, the column and row labels are critical to understanding the data provided. Reading tables is a bit like dancing with a new partner—with a bit of practice, you will quickly get good at it.

Discussion or Conclusions

In the discussion section, the researcher ties together several aspects of the study and offers possible applications of the findings. The researcher will usually open this section by stating the most important findings and placing

them in the context of what other studies on the topic or question have found. In discussing the findings, many researchers describe what they think are the clinical implications of the findings. Here, they are allowed some latitude in saying what they think the findings mean. In the osteoporosis education for high school students example just given, the researcher might say, "The findings indicate that a short educational session is effective in increasing high school students' knowledge regarding osteoporosis prevention." This conclusion statement is close to the findings. On the other hand, if the researcher said, "Short educational sessions are an effective way of increasing osteoporosis prevention behaviors in high school students," the findings statement would be beyond the results. Because the study only measured the outcome of knowledge, not behaviors, the author is adding an assumption to the results, namely, that knowledge produces behavior change—and that is a big assumption.

Authors are also expected to consider alternative explanations for their findings. This would include noting how research methods may have influenced the results, such as "The sample size may have been too small to detect a difference in the treatment groups" or "The fact that a high proportion of patients in the intervention group didn't return for follow-up may have made the outcomes of the intervention group look better than they would have been if post-data had been available from everyone in that group." At the end of this section, the authors usually comment on what they view as the limitations of the study and the implications of the findings for future research.

References

The reference list should include complete information for all citations made in the text. You might find it useful to circle in the text and in the reference list any articles that you want to obtain and read for greater understanding or because they studied a population of interest to you, for example, elderly persons living independently in the inner city. Perusal of the reference list also reveals other current work on the issue, who has done research on the issue, and which journals have published research articles about the issue.

Reading Approach

When you first read research reports, they may seem difficult to read. It is really like any new undertaking—at first it is confusing. However, the fog lifts rather quickly, the whole picture comes into focus, and the

relationships between the parts become clear. For now, you should set three simple goals for yourself. You should come away from your reading of a research report knowing:

WHY? HOW? WHAT?

- **Why was the study done—to what purpose?**
  Found in Introduction and its subsections: background, literature review, theoretical framework, purpose, and hypotheses
- **How was the study done?**
  Found in Methods and its subsections: design, setting, sample, data collection, measuring instruments, data analysis
- **What was found?**
  Found in Results, Discussion, Conclusions.

Importantly, even seasoned readers of research reports find it necessary to read a research report at least twice. The first time you may only get a general sense of why the study was done, how it was done, and what was found. During the second reading, the why, how, and what should become clear to you.

During the second read, you also may begin to notice issues that make you wonder, such as the following:

- Why did the researchers exclude persons with heart disease?
- Did they take into account patients' balance when evaluating capacity for self-care?
- Did the fact that a study was going on put the nurse participants on best behavior?

These are important observations and questions; they will become important later when you are also required to appraise the **credibility** of study findings. For now, your aim is to get a grasp of the *why*, *how*, and *what* of the study.

Wading In

Having considered how research reports are organized and having noted some difference between the formats of qualitative and quantitative study

reports, it is now time to delve into reading one of them. Your instructor may have you choose one or assign one for everyone in the class to read.

The research reports reprinted in full in subsequent chapters are considered exemplars in that they are typical or representative of a particular type of healthcare research. Most of the exemplar studies were also very well conducted, but they were not chosen because they are perfect models—all studies have warts. Rather, they were chosen because they used a research design that is widely used in healthcare research. I hope you will figuratively wade around in these studies enough to acquire a thorough understanding of them.

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