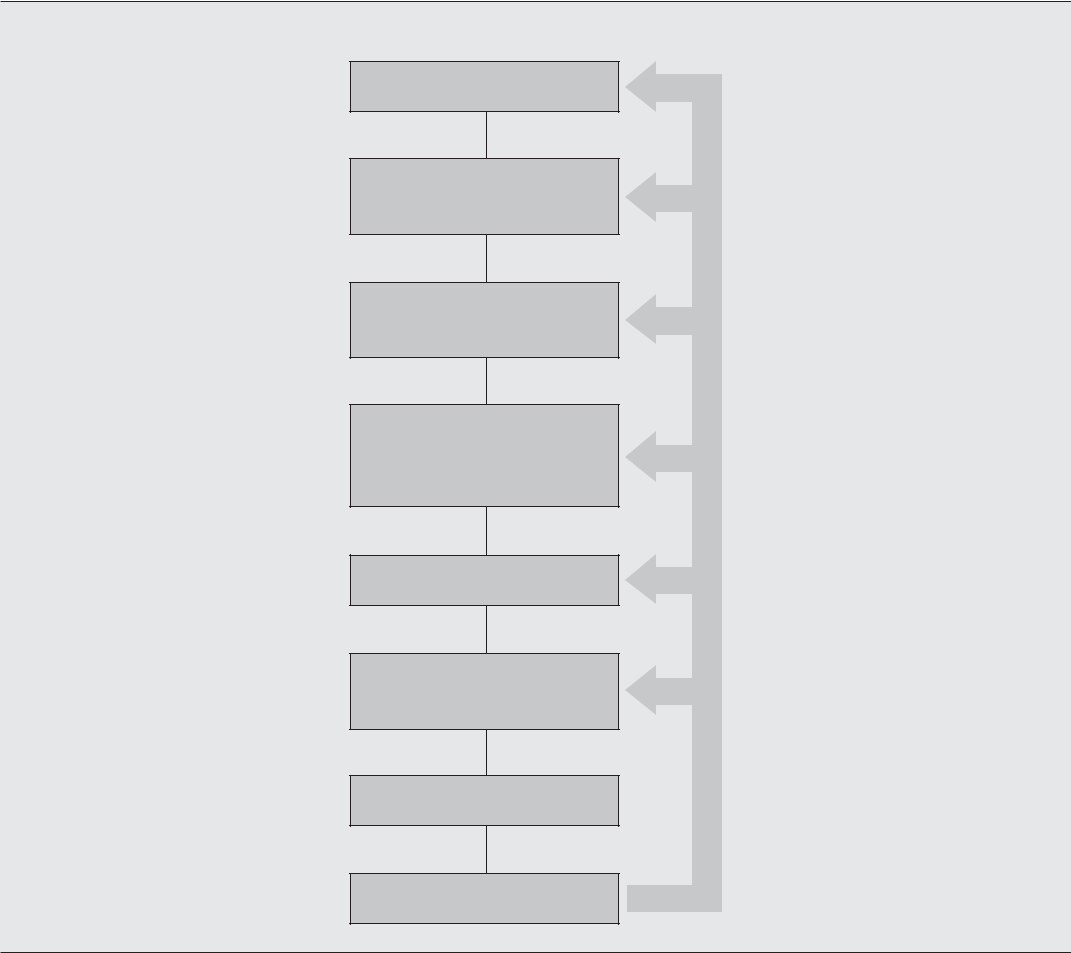
1. Part One *The Research Process*

measured or observed, and what procedures are required to test the observations or mea-surements. Answering a research question or hypothesis requires a conceptualization of the research problem and a logical develop-ment of the procedural steps. These steps are discussed in greater detail in the following sections of this chapter.

**RESEARCH** [**PROCEDURES**](#page8)

The scientific evaluation of any problem must follow a sequence of steps to increase the probability that it will produce rel-evant data. Researchers who do not follow



a prescribed set of steps do not subscribe to the scientific method of inquiry and sim-ply increase the amount of error present in a study. This chapter describes the process of scientific research—from identifying and developing a topic for investigation to rep-licating the results. The first section briefly introduces the steps in the development of a research topic.

Objective, rigorous observation and anal-ysis characterize the scientific method. To meet this goal, researchers must follow the prescribed steps shown in Figure 1.2. This research model is appropriate to all areas of scientific research.

**Figure 1.2** Steps in the Development of a Research Project

Selection of problem

Review of existing

research and theory

Statement of hypothesis

or research question

Determination of

appropriate methodology

and research design

Data collection

Analysis and

interpretation of data

Presentation of results

Replication

**Selecting a Research Topic**

Not all researchers are concerned with selecting a topic to study; some are able to choose and concentrate on a research area that is interesting to them. Many research-ers come to be identified with studies of specific types, such as those concerning chil-dren and media violence, newspaper reader-ship, advertising, or communications law. These researchers investigate small pieces of a puzzle to obtain a broad picture of their research area. In addition, some researchers become identified with specific *approaches* to research, such as focus groups or histori-cal analysis. In the private sector, researchers generally do not have the flexibility to select topics or questions to investigate. Instead, they conduct studies to answer questions raised by management, or they address the problems and questions for which they are hired, as is the case with full-service research companies.

Although some private sector researchers are occasionally limited in selecting a topic, they are usually given total control over how the question should be addressed (that is, which methodology should be used). The goal of private sector researchers in every research study is to develop a method that is fast, inexpensive, reliable, and valid. If all these criteria are met, the researcher has per-formed a valuable task.

Selecting a topic is a concern for many beginning researchers, however, especially those writing term papers, theses, and dis-sertations. The problem is knowing where to start. Fortunately, many sources are avail-able for research topics; academic journals, periodicals, newsweeklies, and everyday en-counters provide a wealth of ideas. This sec-tion highlights some primary sources.

**Professional Journals**

Academic communication journals, such as the *Journal of Broadcasting and Electronic* *Media, Journalism and Mass Communication*

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*Quarterly*, and others listed in this section, areexcellent sources of information. Although academic journals tend to publish research that is 12 to 24 months old (due to review procedures and the backlog of articles), the articles may provide ideas for research top-ics. Most authors conclude their research by discussing problems they encountered during the study and suggesting topics that need fur-ther investigation. In addition, some journal editors build issues around specific research themes, which often can help in formulat-ing research plans. Many high-quality jour-nals cover various aspects of research; some specialize in mass media, and others include media research occasionally. The journals listed here provide a starting point in using academic journals for research ideas.

In addition to academic journals, profes-sional trade publications offer a wealth of information relevant to mass media research. These include *Broadcasting & Cable, Advertis-ing Age, Media Week,* and *Editor & Publisher.* Other excellent sources for identifying current topics in mass media are weekly newsletters such as *Media Industry Newsletter,* and several publications from Paul Kagan and Associates. (Virtually all of these publications are available on the Internet.)

Research abstracts, located in most college and university libraries, are also valuable sources for research topics. These volumes contain summaries of research articles pub-lished in nearly every academic journal. Of particular interest to media researchers are *Communication Abstracts, PsycINFO, Socio-logical Abstracts,* and *Dissertation Abstracts.*

**Magazines and Periodicals**

Although some educators feel that publica-tions other than professional journals con-tain only “watered down” articles written for the public, these articles tend to eliminate tedious technical jargon and are often good sources for identifying problems and hy-potheses. In addition, more and more articles

1. Part One *The Research Process*

written by highly trained communications professionals appear in weekly and monthly publications such as *Time* and *Newsweek.* These sources often provide interesting per-spectives on complex problems in commu-nication and many times raise interesting questions that media researchers can pursue. For a current list of mass media journals, search the Internet for *“media journals.”*

**Research Summaries**

Professional research organizations periodi-cally publish summaries that provide a close look at the major research areas in various fields. These summaries are often useful for obtaining information about research topics because they survey a wide variety of studies. Good examples of summary research (also known as “meta-research”) in communica-tion are *Television and Human Behavior* by George Comstock and others (1978), *Media* *Effects and Society* by Perse (2001), and *Mile-stones in Mass Communication Research* byShearon Lowery and Melvin DeFleur (1995).

**The Internet**

The Internet brings the world to a researcher’s fingertips and must be considered whenever the goal is to find a topic to investigate. Search engines make it easy to find information on al-most any topic. For example, assume that you have an interest in satellite television. A search for *“satellite television”* on Google produces several million matches, although not all may be relevant to your specific research. That’s a lot of material to consider, but suppose you wonder about remote controls for satellite television (*“satellite television” “remote con-trols”*). This search produces far fewer items,many of which provide an interesting history about the development of remote controls for television.

A great exercise on the Internet is to search for broad categories. For example, to see the variety of questions that can be answered,

search for *“What was the first,” “How is,”* *“How does,” “Why is,”* or *“Why does.”* Inaddition, conduct a search for *“research topic* *ideas.”* You’ll find an incredible list of itemsto use for preliminary information.

**Everyday Situations**

Each day people are confronted with various types of communication via radio, television, newspapers, magazines, movies, personal discussions, and so on. These are excellent sources for researchers who take an active role in analyzing them. With this in mind, consider the following questions:

1. Why do advertisers use specific types of messages in the mass media?
2. Why are *Entertainment Tonight,* *Jeopardy,* and *Wheel of Fortune* sopopular?
3. Why do so many TV commercials use only video to deliver a message when many people don’t always watch TV— they just listen?
4. How effective are billboards in com-municating information about prod-ucts and services?
5. What types of people listen to radio talk shows?
6. How many commercials in a row can people watch on television or hear on the radio before the commercials lose their effect?
7. Why do commercials on radio and television always sound louder than the regular programming?
8. What is the appeal of “reality” pro-grams on TV?
9. How many people listen to the music channels on cable or satellite TV?
10. Why is eBay so popular?
11. Does anyone really watch the Weather Channel*?*

These and other questions may become a research idea. Significant studies based on questions arising from everyday encounters with the media and other forms of mass communication have covered investigations of television violence, the layout of news-paper advertisements, advisory warnings on television programs, and approaches to public relations campaigns. Pay attention to things around you and to conversations with others; these contacts can produce a wealth of questions to investigate.

**Archive Data**

**Data archives**,such as the Inter-UniversityConsortium for Political and Social Research (ICPSR) at the University of Michigan, the Simmons Target Group Index (TGI), the Gallup and Roper organizations, and the col-lections of Arbitron and Nielsen ratings data (see Chapter 15), are valuable sources of ideas for researchers. Historical data may be used to investigate questions different from those that the data were originally intended to address. For example, ratings books pro-vide information about audience size and composition for a particular period in time, but other researchers may use the data for historical tracking, prediction of audiences in the future, changes in the popularity of types of stations and programs, and the re-lationship between audience ratings and advertising revenue generated by individual stations or an entire market. This process, known as **secondary analysis**, is a marvelous research approach because it saves time and resources.

Secondary analysis provides an opportu-nity for researchers to evaluate otherwise un-available data. Becker (1981, p. 240) defines secondary analysis as:

[the] reuse of social science data after they have been put aside by the researcher who gathered them. The reuse of the data can be by the original researcher or someone

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uninvolved in any way in the initial research project. The research questions examined in the secondary analysis can be related to the original research endeavor or quite distinct from it.

**Advantages of Secondary Analysis**

Ideally, every researcher should conduct a research project of some magnitude to learn about design, data collection, and analysis. Unfortunately, this ideal situation does not exist—research is too expensive. In addition, because survey methodology has become so complex, it is rare to find one researcher who is an expert in all phases of large studies.

Secondary analysis is one research alter-native that overcomes some of these prob-lems. Using available data is inexpensive. There are no questionnaires or measurement instruments to construct and validate; inter-viewers and other personnel do not need to be paid; and there are no costs for subjects and special equipment. The only expenses entailed in secondary analysis are those for duplicating materials (some organizations provide their data free of charge) and usu-ally some fee to cover postage and handling. Data archives are valuable sources for em-pirical data. In many cases, archive data provide researchers with information that can be used to address significant media problems and questions.

Although novice researchers can learn much from developing questionnaires and conducting a research project using a small and often unrepresentative sample of sub-jects, this type of analysis rarely produces results that are externally valid. (External validity is discussed later in this chapter.) Instead of conducting a small study that has limited value to other situations, these people can benefit from using previously collected data. Researchers then have more time to understand and analyze the data

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(Tukey, 1969). All too often researchers col-lect data that are quickly analyzed for publi-cation or reported to management and never touched again. It is difficult to completely analyze all data from any research study in just one analysis, yet researchers in both the academic and private sectors are guilty of ig-noring data gathered earlier.

Many years ago, Tukey (1969, p. 89) ar-gued for data reanalysis, especially for grad-uate students, but his statement applies to all researchers:

There is merit in having a Ph.D. thesis encompass all the admitted steps of the research process. Once we recognize that research is a continuing, more or less cyclic process, however, we see that we can seg-ment it in many places. Why should not at least a fair proportion of theses start with a careful analysis of previously collected and presumably already lightly analyzed data, a process usefully spread out over consid-erable time? Instant data analysis is—and will remain—an illusion.

Arguments for secondary analysis come from a variety of researchers (Glenn, 1972; Hyman, 1972; Tukey, 1969; Hinds, Vogel, & Clarke-Steffen, 1997). While secondary analysis provides excellent opportunities to produce valuable knowledge, the procedure is not universally accepted—an unfortunate myopic perspective that limits the advance-ment of knowledge.

**Disadvantages of Secondary Analysis**

Researchers who use secondary analysis are limited in the types of hypotheses or research questions that can be investigated. The data already exist, and because there is no way to go back for more informa-tion, researchers must keep their analyses within the boundaries of the data originally collected.

In addition, there is no guarantee that the data are good. It may be that the data were poorly collected, inaccurate, fabricated, or flawed. Many studies do not include in-formation about research design, sampling procedures, weighting of subjects’ responses, or other peculiarities. Although individual researchers in mass media have made their data more readily available, not all follow ad-equate scientific procedures. This drawback may seriously affect a secondary analysis.

Despite the criticisms of using secondary analysis, the methodology is an acceptable research approach, and detailed justifications for using it should no longer be required.

[**DETERMINING TOPIC RELEVANCE**](#page8)

Once a basic research idea has been chosen or assigned, the next step is to ensure that the topic has merit. This is accomplished by answering eight basic questions.

**Question 1: Is the Topic Too Broad?**

Most research studies concentrate on one small area of a field; researchers do not at-tempt to analyze an entire field in one study. However, beginning researchers frequently choose topics that are too broad to cover in one study—for example, “the effects of tele-vision violence on children” or “the effects of mass media information on voters in a presi-dential election.” To avoid this problem, re-searchers usually write down their proposed title as a visual starting point and attempt to dissect the topic into a series of questions.

For example, a University of Colorado master’s degree student was interested in why viewers like the television shows they watch and how viewers’ analyses of pro-grams compare to analyses by paid TV crit-ics. This is a broad topic. First of all, what types of programs will be analyzed? After a great deal of thought about the questions

involved, the student settled on the topic of “program element importance” in television soap operas. She asked viewers to identify what is important to them when they watch a soap opera, and she developed a “model” for a successful program.

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children between the ages of three and seven years.” One final consideration is to review available literature to determine if the topic has been previously investigated. Were there any problems in previous studies? What methods were used to answer the research questions? What conclusions were drawn?

**Question 2: Can the Problem Really Be Investigated?**

Aside from being too broad, a topic might prove unsuitable for investigation simply because the question being asked has no an-swer or at least cannot be answered with the facilities and information available. For ex-ample, a researcher who wants to know how people who have no television set react to everyday interpersonal communication situ-ations must consider the problem of finding subjects without a TV set in the home. A few such subjects may exist in remote parts of the country, but the question is virtually unan-swerable due to the current market satura-tion of television. Thus, the researcher must attempt to reanalyze the original idea to con-form with practical considerations. A. S. Tan (1977) solved this particular dilemma by choosing to investigate what people do when their television sets are turned off for a period of time. He persuaded subjects not to watch television for one week and to record their use of other media, their interactions with their family and friends, and so on. (Subjects involved in these types of media-deprivation studies usually cheat and use the medium be-fore the end of the project.)

Another point to consider is whether all the terms of the proposed study can be de-fined. Remember that all measured variables must have operational definitions. A re-searcher interested in examining youngsters’ use of the media must develop a working definition of the word *youngsters* to avoid confusion.

Problems can be eliminated if an opera-tional definition is stated: “Youngsters are

**Question 3: Can the Data Be Analyzed?**

A topic does not lend itself to productive re-search if it requires collecting data that cannot be measured in a reliable and valid fashion. In other words, a researcher who wants to measure the effects of not watching televi-sion should consider whether the information about the subjects’ behavior will be adequate and reliable, whether the subjects will answer truthfully, what value the data will have once gathered, and so forth. Researchers also need to have enough data to make the study worth-while. It would be unacceptable to analyze only 10 subjects in the “television turn-off” example because the results could not be gen-eralized to the entire population. (A sample of 10 may be used for a **pilot study**—a test of the research procedures.)

Another consideration is the researcher’s previous experience with the statistical method selected to analyze the data; that is, does the re-searcher really understand the proposed statis-tical analysis? Researchers need to know how the statistics work and how to interpret the results. All too often researchers design studies that involve advanced statistical procedures they have never used. This tactic usually cre-ates errors in computation and interpretation. Research methods and statistics should not be selected because they happen to be popular or because a research director suggests a given method, but because they are appropriate for a given study and are understood by the per-son conducting the analysis. A common error made by beginning researchers—selecting a statistical method without understanding

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what the method produces—is called the **Law** **of the Instrument**.

It is much wiser to use simple frequencies and percentages and understand the results than to try to use a misunderstood high-level statistic and end up confused.

**Question 4: Is the Problem Significant?**

It is important to determine if a study has merit *before the research is started*; that is, to determine if the study has practical or theoretical value. The first question to ask is this: Will the results add knowledge to in-formation already available in the field? The goal of research is to help further the under-standing of the problems and questions in a field of study. If a study does not do this, it has little value beyond the experience the researcher acquires from conducting it. Of course, not all research has to produce earth-shattering results. Many researchers waste valuable time trying to address monumental questions when in fact the smaller problems or questions are more important.

A second question is: What is the real purpose of the study? This question is impor-tant because it helps focus ideas. Is the study intended for a class paper, a thesis, a journal article, or a management decision? Each of these projects requires different amounts of background information, levels of explana-tion, and details about the results generated. For example, applied researchers must con-sider whether any useful action based on the data will be possible, as well as whether the study will answer the question(s) posed by management.

**Question 5: Can the Results of the Study Be Generalized?**

If a research project is to have practical value beyond the immediate analysis, it must have **external validity**; that is, it must

be possible to generalize the results to other situations. For example, a study of the ef-fects of a small-town public relations cam-paign might be appropriate if plans are made to analyze such effects in several small towns, or if it is a case study not intended for generalization; however, such an analy-sis has little external validity and cannot be related to other situations.

**Question 6: What Costs and Time Are Involved in the Analysis?**

In many cases, the cost of a research study solely determines if the study is feasible. A researcher may have an excellent idea, but if costs would be prohibitive, the project is abandoned. A cost analysis must be completed early on. It does not make sense to develop the specific designs and the data-gathering in-strument for a project that will be canceled because of lack of funds. Sophisticated re-search is particularly expensive; the cost of one project can easily exceed $50,000.

A carefully itemized list of all materials, equipment, and other facilities required is necessary before beginning a research project. If the costs seem prohibitive, the re-searcher must determine whether the same goal can be achieved if costs are shaved in some areas. Another possibility to consider is financial aid from graduate schools, fund-ing agencies, local governments, or other groups that subsidize research projects. In general, private sector researchers are not severely constrained by expenses; however, they must adhere to budget specifications set by management.

Time is also an important consideration in research planning. Research studies must be designed so that they can be completed in the time available. Many studies fail be-cause the researchers do not allot enough time for each research step, and in many cases, the pressure of deadlines creates problems

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**A CLOSER LOOK**

**Occam or Ockham?**

In previous editions of this book, the authors used the spelling “Occam” in the name of the fourteenth-century English philosopher. How-ever, following the self-correcting aspect of the Scientific Method, the authors investigated

the question. After learning that William was from the town in England spelled “Ockham,” it was decided to use the spelling of his birth-place and no longer use “Occam.”

in producing reliable and valid results (for example, failure to provide alternatives if the correct sample of people cannot be found).

**Question 7: Is the Planned Approach Appropriate to the Project?**

The best research idea may be needlessly hin-dered by a poorly planned approach. For ex-ample, a researcher might want to measure changes in television viewing habits that may accompany an increase in time spent on the Internet. The researcher could mail question-naires to a large sample to determine how their television habits have changed during the past several months. However, the costs of printing and mailing questionnaires, plus follow-up letters and possibly phone calls to increase the response rate, might prove prohibitive.

Could the study be planned differently to eliminate some of the expense? Possibly, depending on its purpose and the types of questions planned. For example, the re-searcher could collect the data by telephone interviews or even via email to eliminate printing and postage costs.

Although some questions might need reworking to fit the telephone or email methods, the essential information could be collected. A close look at every study is required to plan the best approach. Every procedure in a research study should be con-sidered from the standpoint of the **parsimony**

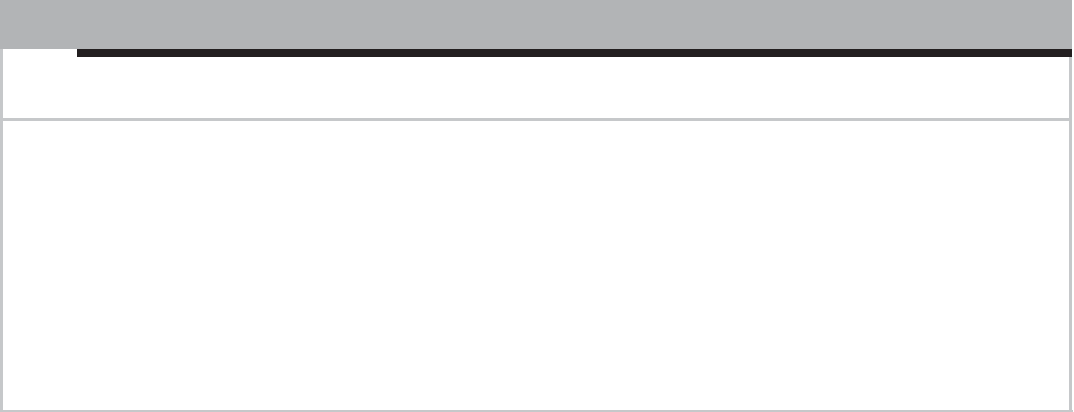
**principle,** or **Ockham’s razor**. The principle,attributed to fourteenth-century philosopher William of Ockham (also spelled Occam), states that a person should not increase, be-yond what is necessary, the number of entities required to explain anything or make more assumptions than the minimum needed. Ap-plying this principle to media research says that *the simplest research approach is always* *the best.*

**Question 8: Is There Any Potential Harm to the Subjects?**

Researchers must carefully analyze whether their project may cause physical or psycho-logical harm to the subjects under evaluation. Will respondents be frightened in any way? Will they be required to answer embarrass-ing questions or perform embarrassing acts that may create adverse reactions? Is there a chance that exposure to the research con-ditions will have lasting effects? Before the start of most public sector research projects involving humans, subjects are given detailed statements explaining the exact procedures involved in the research to ensure that they will not be injured in any way. These state-ments protect unsuspecting subjects from exposure to harmful research methods.

Underlying the eight steps in the research topic selection process is the necessity for va-lidity (discussed later in this chapter). In other

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**A CLOSER LOOK**

**Ockham’s Razor**

Although Ockham’s razor is mentioned only yourself, “Is this the easiest way to approach

briefly here, it is an enormously important the problem?” In most cases, you’ll find the

concept to remember and is mentioned sev- difficulty is that you’re making the problem

eral times in this book. It is important in re- too complex. The same situation often occurs

search and in every facet of people’s lives. If in your everyday life. Always look for the

you are stumped with a sampling problem, a simplest approach to any problem you en-

questionnaire design problem, a data analy- counter. It will always be the best approach

sis problem, or a report problem, always ask to follow.

words, are all the steps (from the initial idea to data analysis and interpretation) the cor-rect ones to follow in trying to answer the question(s)?

Suppose that after you carefully select a research project and convince yourself that it is something you want to do, someone con-fronts you with this reaction: “It’s a good idea, but it can’t be done. The topic is too broad, the problem cannot really be investigated, the data cannot be analyzed, the problem is not significant, the results cannot be generalized, it will cost too much, and the approach is wrong.” How should you respond? First, con-sider the criticisms carefully to make sure that you have not overlooked anything. If you are convinced you’re on the right track and no harm will come to any subject or respondent, go ahead with the project. It is better to do the study and find nothing than to back off because of someone’s misguided criticism.

**Literature Review**

Researchers who conduct studies under the guidelines of scientific research never begin a research project without first consulting avail-able literature to learn what has been done, how it was done, and what results were found. Experienced researchers consider the literature review to be one of the most important steps in the research process. It allows them to learn

from (and eventually add to) previous research and saves time, effort, and money. Failing to conduct a literature review is as detrimental to a project as failing to address any of the other steps in the research process.

Before they attempt any project, research-ers should ask these questions:

1. What type of research has been done in the area?
2. What has been found in previous studies?
3. What suggestions do other researchers make for further study?
4. What has not been investigated?
5. How can the proposed study add to our knowledge of the area?
6. What research methods were used in previous studies?

Answers to these questions will usually help define a specific hypothesis or research question.

**STATING** [**A HYPOTHESIS OR**](#page8) **RESEARCH** [**QUESTION**](#page8)

After identifying a general research area and reviewing the existing literature, the researcher must state the problem as a workable hypothesis or research question.

A **hypothesis** is *a formal statement regard-ing the relationship between variables and is tested directly*. The predicted relationshipbetween the variables is either true or false. On the other hand, a **research question** is *a* *formally stated question intended to provide indications about something; it is not lim-ited to investigating relationships between variables*. Research questions are appropri-ate when a researcher is unsure about the nature of the problem under investigation. Although the intent is merely to gather pre-liminary data, testable hypotheses are often developed from information gathered during the research question phase of a study.

Singer and Singer (1981) provide an ex-ample of how a topic is narrowed, devel-oped, and stated in simple terms. Interested in whether television material enhances or inhibits a child’s capacity for symbolic be-havior, Singer and Singer reviewed available literature and then narrowed their study to three basic research questions:

1. Does television content enrich a child’s imaginative capacities by of-fering materials and ideas for make-believe play?
2. Does television lead to distortions of reality for children?
3. Can intervention and mediation by an adult while a child views a pro-gram, or immediately afterward, evoke changes in make-believe play or stimulate make-believe play?

The information collected from this type of study could provide data to create test-able hypotheses. For example, Singer and Singer might have collected enough valuable information from their preliminary study to test these hypotheses:

1. The amount of time a child spends in make-believe play is directly related to the amount of time spent viewing make-believe play on television.

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1. A child’s level of distortion of real-ity is directly related to the amount and types of television programs the child views.
2. Parental discussions with children about make-believe play before, during, and after a child watches television programs involving make-believe play increase the child’s time involved in make-believe play.

The difference between the two sets of statements is that the research questions pose only general areas of investigation, whereas the hypotheses are testable statements about the relationship(s) between the variables. The only intent in the research question phase is to gather information to help the researchers define and test hypotheses in later projects.

**DATA** [**ANALYSIS AND**](#page8)[**INTERPRETATION**](#page8)

The time and effort required for data analy-sis and interpretation depend on the study’s purpose and the methodology used. Analy-sis and interpretation may take from several days to several months. In many private sec-tor research studies involving only a single question, data analysis and interpretation may be completed in a few minutes. For ex-ample, a radio station may be interested in finding out its listeners’ perceptions of the morning show team. After a survey is con-ducted, that question may be answered by summarizing only one or two items on the questionnaire. The summary may then deter-mine the fate of the morning show team.

Every research study must be carefully planned and performed according to specific guidelines. When the analysis is completed, the researcher must step back and consider what has been discovered. The researcher must ask two questions: Are the results in-ternally and externally valid? Are the results accurate?

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For example, here is an excerpt from the conclusion drawn by Singer and Singer (1981, p. 385):

Television by its very nature is a medium that emphasizes those very elements that are generally found in imagination: vi-sual fluidity, time and space flexibility and make-believe. . . . Very little effort has emerged from producers or educators to develop age-specific programming. . . . It is evident that more research for the develop-ment of programming and adult mediation is urgently needed.

Researchers must determine through analysis whether their work is both inter-nally and externally valid. This chapter has touched briefly on the concept of external validity: An externally valid study is one whose results can be generalized to the pop-ulation. To assess **internal validity**, on the other hand, one asks: Does the study really investigate the proposed research question?

**INTERNAL** [**VALIDITY**](#page8)

Control over research conditions is neces-sary to enable researchers *to rule out plau-sible but incorrect explanations of results*.For example, if a researcher is interested in verifying that “*y* is a function of *x*,” or *y* 5 f(*x*), control over the research conditions is necessary to eliminate the possibility of find-ing that y 5 f(*b*), where *b* is an **extraneous** **variable**.Any such variable that creates apossible but incorrect explanation of re-sults is called an **artifact** (also referred to as

1. **confounding variable**). The presence of anartifact indicates a lack of internal validity; that is, the study has failed to investigate its hypothesis.

For example, suppose that researchers discover through a study that children who view television for extended periods have lower grade point averages in school than

children who watch only a limited amount of television. Could an artifact have created this finding? It may be that children who view fewer hours of television also receive paren-tal help with their school work; parental help (the artifact), not hours of television viewed, may be the reason for the difference in grade point averages between the two groups.

Artifacts in research may arise from sev-eral sources. Those most frequently encoun-tered are described next. Researchers should be familiar with these sources to achieve in-ternal validity in the experiments they con-duct (Campbell & Stanley, 1963; Cook & Campbell, 1979).

1. *History.* Various events that occurduring a study may affect the subjects’ atti-tudes, opinions, and behavior. For example, to analyze an oil company’s public relations campaign for a new product, researchers first pretest subjects’ attitudes toward the company. The subjects are next exposed to an experimental promotional campaign (the experimental treatment); then a posttest is administered to determine whether changes in attitude occur because of the campaign. Suppose the results indicate that the public relations campaign was a complete failure, that the subjects display a poor perception of the oil company in the posttest. Before the results are reported, the researchers must determine whether an intervening variable could have caused the poor perception. An investigation discloses that during the pe-riod between tests, subjects learned from a television news story that a tanker owned by the oil company spilled millions of gallons of crude oil into the North Atlantic. News of the oil spill—not the public relations campaign—may have acted as an artifact to create the poor perception. The potential to confound a study is compounded as the time increases between a pretest and a posttest.

The effects of history in a study can be devastating, as was shown during the late

1970s and early 1980s, when several broad-cast companies and other private businesses perceived a need to develop Subscription Television (STV) in various markets through-out the country where cable television pen-etration was thought to be very low. An STV service allows a household, using a special antenna, to receive pay television services similar to Home Box Office or Showtime. Several cities became prime targets for STV because both Arbitron and A. C. Nielsen re-ported low cable penetration. Research con-ducted in these cities supported the Arbitron and Nielsen data. In addition, the research found that people who did not have access to cable television were receptive to the idea of STV. However, it was discovered later that even as some studies were being con-ducted, cable companies in the target areas were expanding rapidly and had wired many previously nonwired neighborhoods. What were once prime targets for STV soon be-came accessible to cable television. The ma-jor problem was that researchers attempting to determine the feasibility of STV failed to consider historical changes (wiring of the cities) that could affect the results of their research. The result was that many compa-nies lost millions of dollars and STV quickly faded away.

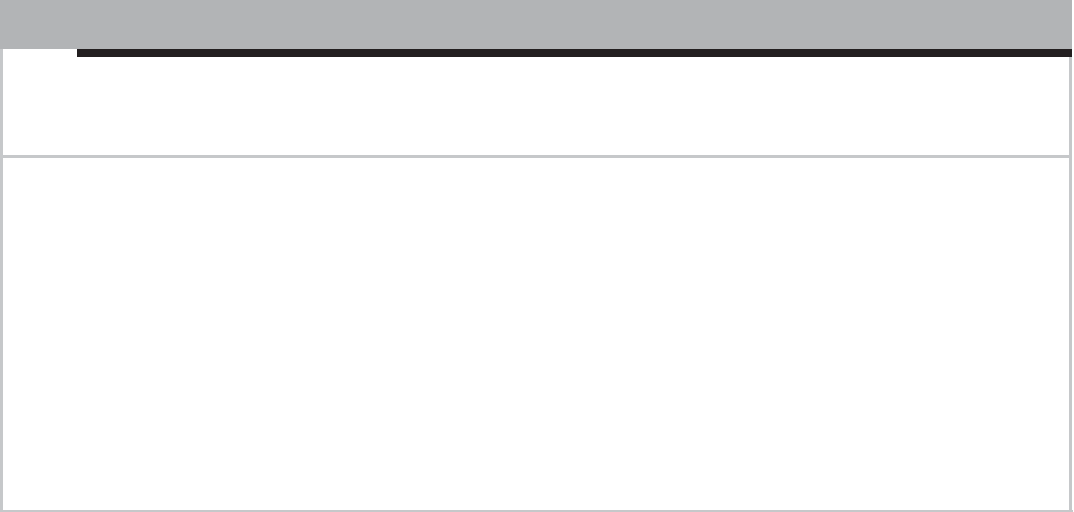
1. *Maturation*. Subjects’ biological andpsychological characteristics change during the course of a study. Growing hungry or tired, or becoming older may influence how subjects respond in a research study. An example of how maturation can affect a re-search project was seen in the early 1980s, when radio stations around the country began to test their music playlist in audito-rium sessions (see Chapter 14). Some un-skilled research companies tested as many as 800 songs in one session and wondered why the songs after about 600 tested differently from the others. With only a few studies, it was discovered that the respondents were physically and emotionally drained once

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they reached 600 songs (about 100 minutes of testing time), and they merely wrote down any number just to complete the project.

Technology and experience have changed the approach in auditorium music testing. In several studies during 2001, the senior au-thor of this book tested a variety of audito-rium music testing methods and found that, among other things, if a professional produc-tion company is used to produce consistent hooks (song segments), and sufficient breaks are given for the respondents, it is possible to test as many as 600 songs in one session without compromising the data.

1. *Testing*. Testing itself may be an arti-fact, particularly when subjects are given similar pretests and posttests. A pretest may sensitize subjects to the material and improve their posttest scores regardless of the type of experimental treatment given to them. This is especially true when the same test is used for both situations. Subjects learn how to answer questions and to anticipate research-ers’ demands. To guard against the effects of testing, different pretests and posttests are required. Or, instead of administering a pretest, subjects can be tested for similarity (homogeneity) by means of a variable or set of variables that differs from the experimen-tal variable. The pretest is not the only way to establish a **point of prior equivalency** (the point at which the groups were equal before the experiment) between groups—it also can be accomplished through sampling (random-ization and matching). For further discussion on controlling confounding variables within the context of an experiment, see Chapter 9.
2. *Instrumentation*. Also known as**instrument decay**, this term refers to thedeterioration of research instruments or methods over the course of a study. Equip-ment may wear out, observers may become more casual in recording their observations, and interviewers who memorize frequently asked questions might fail to present them in the proper order. Some college entrance
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**A CLOSER LOOK**

**Data Analysis—The Wimmer-Dominick Data Analysis Principle**

One thing beginning researchers always find in- Here’s a real example. In a recent research

teresting is the ability of seasoned researchers to study using rating scales from 1 to 10, a few

look at data and say something like, “This looks responses had mean scores above 10. The

wrong.” The beginners wonder how the veteran data looked wrong and, of course, they were

knows that. The reason the veteran researcher because it’s impossible to have a mean greater

knows that something is wrong is based on ex- than 10 on a 1–10 scale. Experience in re-perience, a process we refer to as the Wimmer- search will allow you to locate these types of Dominick Data Analysis Principle, which states: errors. Trust your judgment—if something looks *If something looks wrong in a research study, it* wrong, it probably is wrong. *probably is*.

tests, such as the SAT and ACT, are targets of debate by many researchers and statisti-cians. The complaints mainly address the concern that the current tests do not ad-equately measure knowledge of today, but rather what was once considered necessary and important.

1. *Statistical regression.* Subjects whoachieve either very high or very low scores on a test tend to regress to (move toward) the sample or population mean during sub-sequent testing sessions. Often *outliers* (sub-jects whose pretest scores are far from the mean) are selected for further testing or eval-uation. Suppose, for example, that research-ers develop a series of television programs designed to teach simple mathematical con-cepts, and they select only subjects who score very low on a mathematical aptitude pretest. An experimental treatment is designed to expose these subjects to the new television series, and a posttest is given to determine whether the programs increased the subjects’ knowledge of simple math concepts. The experimental study may show that indeed, after only one or two exposures to the new programs, math scores increased. But the higher scores on the posttest may not be due

to the television programs. They may be a function of learning from the pretest, or they may be a function of **statistical regression** (or regression toward the mean). That is, regardless of whether the subjects viewed the programs, the scores in the sample may have increased merely because of statistical regression. (Statistical regression is a phe-nomenon that may occur in situations where subjects or elements are tested more than once. In subsequent testing, subjects or ele-ments that scored high or low in the first test may score lower or higher in a subsequent test, and this causes the subjects or elements to move closer to the mean of the group or items tested or measured.)

With regard to the TV math programs, the programs should be tested with a variety of subjects, not just those who score low on

1. pretest.
   1. *Experimental mortality.* All researchstudies face the possibility that subjects will drop out for one reason or another. Espe-cially in long-term studies, subjects may re-fuse to continue with the project, become ill, move away, drop out of school, or quit work. This **mortality**, or loss of subjects, is sure to have an effect on the results of a

study because most research methods and statistical analyses make assumptions about the number of subjects used. It is always bet-ter to select more subjects than are actually required—within the budget limits of the study. It is common to lose 50% or more of the subjects from one testing period to an-other (Wimmer, 1995).

1. *Sample selection*. Most research designscompare two or more groups of subjects to determine whether differences exist on the dependent measurement. These groups must be selected randomly and tested for homoge-neity to ensure that results are not due to the type of sample used (see Chapter 4).
2. *Demand characteristics*. The term**demand characteristics** is used to describesubjects’ reactions to experimental situa-tions. Orne (1969) suggests that under some circumstances subjects’ awareness of the ex-perimental purpose may be the sole deter-minant of how they behave; that is, subjects who recognize the purpose of a study may produce only “good” data for researchers.

Novice researchers quickly learn about the many variations of demand character-istics. For example, research studies seek-ing to find out about respondents’ listening and viewing habits always find subjects who report high levels of NPR and PBS listening and viewing. However, when the same sub-jects are asked to name their favorite NPR or PBS programs, many cannot recall even one. (In other words, the respondents are not telling the truth.)

**Cross-validating** questions are oftennecessary to verify subjects’ responses; by giving subjects the opportunity to answer the same question phrased in different ways, the researcher can spot discrepancies, which are generally error-producing responses. In addition, researchers can help control de-mand characteristics by disguising the real purpose of the study; however, special atten-tion is necessary when using this technique (see Chapter 4).

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Finally, most respondents who participate in research projects are eager to provide the information the researcher requests and are flattered to be asked for their opinions. Un-fortunately, this means that they will answer any type of question, even if the question is ambiguous, misleading, vague, or unin-terpretable. For example, this book’s senior author once conducted a telephone study with respondents in area code 717 in Penn-sylvania. An interviewer mistakenly called area code 714 (Orange County, California). For nearly 20 minutes, the respondent in California answered questions about radio stations with *W* call letters—stations impos-sible for her to receive on any normal radio. The problem was discovered during ques-tionnaire validation.

1. *Experimenter bias*. Rosenthal (1969)discusses a variety of ways in which a re-searcher may influence the results of a study. Bias can enter through mistakes made in observation, data recording, mathematical computations, and interpretation. Whether experimenter errors are intentional or unin-tentional, they usually support the research-er’s hypothesis and are biased (Walizer & Wienir, 1978).

Experimenter bias can also enter into any phase of a project if the researcher becomes swayed by a client’s wishes for a project’s re-sults. Such a situation can cause significant problems for researchers if they do not re-main totally objective throughout the entire project, especially when they are hired by individuals or companies to “prove a point” or to provide “supporting information” for a decision (this is usually unknown to the researcher). For example, the news direc-tor at a local television station may dislike a particular news anchor and want informa-tion to justify the dislike (to fire the anchor). A researcher is hired under the guise of find-ing out whether the audience likes or dislikes the anchor. In this case, it is easy for the news director to intentionally or unintentionally

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influence the results through conversations with the researcher in the planning stages of the study. It is possible for a researcher, either intentionally or unintentionally, to in-terpret the results in a way that supports the program director’s desire to eliminate the anchor. The researcher may have like/dislike numbers that are very close but may give the “edge” to dislike because of the news direc-tor’s influence.

Experimenter bias is a potential problem in all phases of research, and researchers must be aware of problems caused by out-side influences. Several procedures can help to reduce experimenter bias. For example, individuals who provide instructions to sub-jects and make observations should not be informed of the purpose of the study. Exper-imenters and others involved in the research should not know whether subjects belong to the experimental group or the control group (called a **double-blind experiment**), and pre-recorded audio or video information should be used whenever possible to provide uni-form instructions to subjects.

Researchers can also ask clients not to discuss the intent of a research project be-yond what type of information is desired. In the news anchor example, the program director should say only that information is desired about the like/dislike of the pro-gram and should not discuss what deci-sions will be made following the research. In cases where researchers must be told about the purpose of the project, or where the re-searcher is conducting the study indepen-dently, experimenter bias must be repressed at every phase.

1. *Evaluation apprehension*. Rosenberg’s

(1965) concept of evaluation apprehension is similar to demand characteristics, but it em-phasizes that subjects are essentially afraid of being measured or tested. They are interested in receiving only positive evaluations from the researcher and from the other subjects in-volved in the study. Most people are hesitant

to exhibit behavior that differs from the norm and tend to follow the group even though they may totally disagree with the others. The researcher’s task is to try to eliminate this pas-siveness by letting subjects know that their in-dividual responses are important.

1. *Causal time order*. The organizationof an experiment may create problems with data collection and interpretation. It may be that an experiment’s results are not due to the stimulus (independent) variable but rather to the effect of the dependent variable. For example, respondents in an experiment that is attempting to determine how maga-zine advertising layouts influence their pur-chasing behavior may change their opinions when they read or complete a questionnaire after viewing several ads.
2. *Diffusion or imitation of treatments.*

In situations where respondents participate at different times during one day or over several days, or where groups of respondents are studied one after another, respondents may have the opportunity to discuss the project with someone from another session and contaminate the research project. This is a special problem with focus groups when one group leaves the focus room at the same time a new group enters. (Professional field services and experienced researchers prevent this situation.)

1. *Compensation*. Sometimes individu-als who work with a control group (the one that receives no experimental treatment) may unknowingly treat the group differently because the group is “deprived” of some-thing. In this case, the control group is no longer legitimate.
2. *Compensatory rivalry.* Occasionally,subjects who know they are in a control group may work harder or perform differ-ently to outperform the experimental group.
3. *Demoralization.* Control group sub-jects may literally lose interest in a project because they are not experimental subjects. These people may give up or fail to perform

normally because they may feel demoralized or angry that they are not in the experimen-tal group.

The sources of internal invalidity are com-plex and may arise in all phases of research. For this reason, it is easy to see why the re-sults from a single study cannot be used to refute or support a theory or hypothesis. In attempting to control these artifacts, research-ers use a variety of experimental designs and try to keep strict control over the research process so that subjects and researchers do not intentionally or unintentionally influence the results. As Hyman (1954) recognized:

All scientific inquiry is subject to error, and it is far better to be aware of this, to study the sources in an attempt to reduce it, and to estimate the magnitude of such errors in our findings, than to be ignorant of the er-rors concealed in our data.

**EXTERNAL** [**VALIDITY**](#page8)

**External validity** refers to how well the re-sults of a study can be generalized across populations, settings, and time (Cook & Campbell, 1979). The external validity of a study can be severely affected by the in-teraction in an analysis of variables such as subject selection, instrumentation, and ex-perimental conditions (Campbell & Stanley, 1963). A study that lacks external validity cannot be projected to other situations; it is valid only for the sample tested.

Most procedures used to guard against external invalidity relate to sample selec-tion. Cook and Campbell (1979) make three suggestions:

1. Use random samples.
2. Use heterogeneous samples and repli-cate (repeat) the study several times.
3. Select a sample that is representa-tive of the group to which the results will be generalized.

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Using random samples rather than convenience or available samples allows researchers to gather information from a va-riety of subjects rather than from those who may share similar attitudes, opinions, and lifestyles. As discussed in Chapter 4, a ran-dom sample means that *everyone (within the* *guidelines of the project) has an equal chance of being selected for the research study.*

Several replicated research projects us-ing samples with a variety of characteris-tics (heterogeneous) allow researchers to test hypotheses and research questions and not worry that the results will apply to only one type of subject. Selecting a sample that is representative of the group to which the results will be generalized is basic common sense. For example, the results from a study of a group of high school students cannot be generalized to a group of college students.

A fourth way to increase external validity is to conduct research over a long period of time. Mass media research is often designed as short-term projects that expose subjects to an experimental treatment and then im-mediately test or measure them. In many cases, however, the immediate effects of a treatment are negligible. In advertising, for example, research studies designed to mea-sure brand awareness are generally based on only one exposure to a commercial or advertisement. It is well known that persua-sion and attitude change rarely take place af-ter only one exposure; they require multiple exposures over time. Logically, then, such measurements should be made over weeks or months to take into account the “sleeper” effect—that attitude change may be mini-mal or nonexistent in the short run and still prove significant in the end.

[**PRESENTING RESULTS**](#page8)

The format used to present results depends on the purpose of the study. Research in-tended for publication in academic journals

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follows a format prescribed by each journal; research conducted for management in the private sector tends to be reported in sim-pler terms, often excluding detailed explana-tions of sampling, methodology, and review of literature. However, all results must be presented in a clear and concise manner ap-propriate to both the research question and the individuals who will read the report. (See “Writing a Research Report” in the *Readings* section of [*www.wimmerdominick.com*.)](www.wimmerdominick.com)

**Replication**

One important point mentioned through-out this book is that the results of any single study are, by themselves, only indications of what might exist. A study provides informa-tion that says, in effect, “This is what may be the case.” For others to be relatively cer-tain of the results of any study, the research must be replicated, or repeated. Too often researchers conduct one study and report the results as if they are providing the basis for a theory or a law. The information pre-sented in this chapter, and in other chapters that deal with internal and external validity, argues that this cannot be true.

A research question or hypothesis must be investigated from many different per-spectives before any significance can be at-tributed to the results of one study. Research methods and designs must be altered to elim-inate **design-specific results**—results based on, and hence specific to, the design used. Similarly, subjects with a variety of charac-teristics should be studied from many angles to eliminate **sample-specific results**, and sta-tistical analyses need to be varied to elimi-nate **method-specific results**. In other words, every effort must be made to ensure that the results of any single study are not created by or dependent on a methodological factor; studies must be replicated.

Researchers overwhelmingly advocate the use of **replication** to establish scientific fact. Lykken (1968) and Kelly, Chase, and

Tucker (1979) identify four basic types of replication that can be used to help validate a scientific test:

1. **Literal replication** involves the exactduplication of a previous analysis, including the sampling procedures, experimental conditions, measur-ing techniques, and methods of data analysis.
2. **Operational replication** attempts toduplicate only the sampling and ex-perimental procedures of a previous analysis, to test whether the proce-dures will produce similar results.
3. **Instrumental replication** attempts toduplicate the dependent measures used in a previous study and to vary the experimental conditions of the original study.
4. **Constructive replication** tests thevalidity of methods used previously by deliberately not imitating the ear-lier study; both the manipulations and the measures differ from those used in the first study. The researcher simply begins with a statement of empirical “fact” uncovered in a pre-vious study and attempts to find the same “fact.”

Despite the obvious need to replicate research, mass media researchers generally ignore this important step, probably because many feel that replications are not as glam-orous or important as original research. The wise researcher recognizes that even though replications may lack glamour, they most certainly do not lack importance.