Chapter 2: Research Procedures

Definition

This chapter describes the processes involved in identifying and developing a topic for research investigation. It was suggested that researchers consider several sources for potential ideas, including a critical analysis of everyday situations. The steps in developing a topic for investigation naturally become easier with experience; beginning researchers need to pay particular attention to material already available. They should not attempt to tackle broad research questions, but should try to isolate a smaller, more practical subtopic for study. They should develop an appropriate method of analysis and then proceed, through data analysis and interpretation, to a clear and concise presentation of results.

The chapter stresses that the results of a single survey or other research approach only provide indications of what may or may not exist. Before researchers can claim support for a research question or hypothesis, the study must be replicated a number of times to eliminate dependence on extraneous factors.

While conducting research studies, investigators must be constantly aware of potential sources of error that may create spurious results. Phenomena that affect an experiment in this way are sources of breakdowns in internal validity. If and only, if differing and rival hypotheses are ruled out can researchers validly say that the treatment was influential in creating differences between the experimental and control groups. A good explanation of research results rules out intervening variables; every plausible rival explanation should be considered. However, even when this is accomplished, the results of one study can be considered only as indications of what may or may not exist. Support for a theory or hypothesis can be made only after the completion of several studies that produce similar results.

In addition, for a study to have substantive worth to the understanding of mass media, the results must be generalizable to subjects and groups other than those involved in the experiment. External validity can be best achieved through randomization of subject selection.

The scientific evaluation of any problem must follow a sequence of steps to increase the chances of producing relevant data. Researchers who do not follow a prescribed set of steps do not subscribe to the scientific method of inquiry and simply increase the amount of error present in the study. This chapter describes the process of scientific research, from identifying and developing a topic for investigation to replication of results. The first section briefly

introduces the steps in the development of a research topic.

Objective, rigorous observation and analysis are characteristic of the scientific method. To meet this goal, researchers must follow the prescribed steps shown in Figure 2.1. This research model is appropriate to all areas of scientific research.

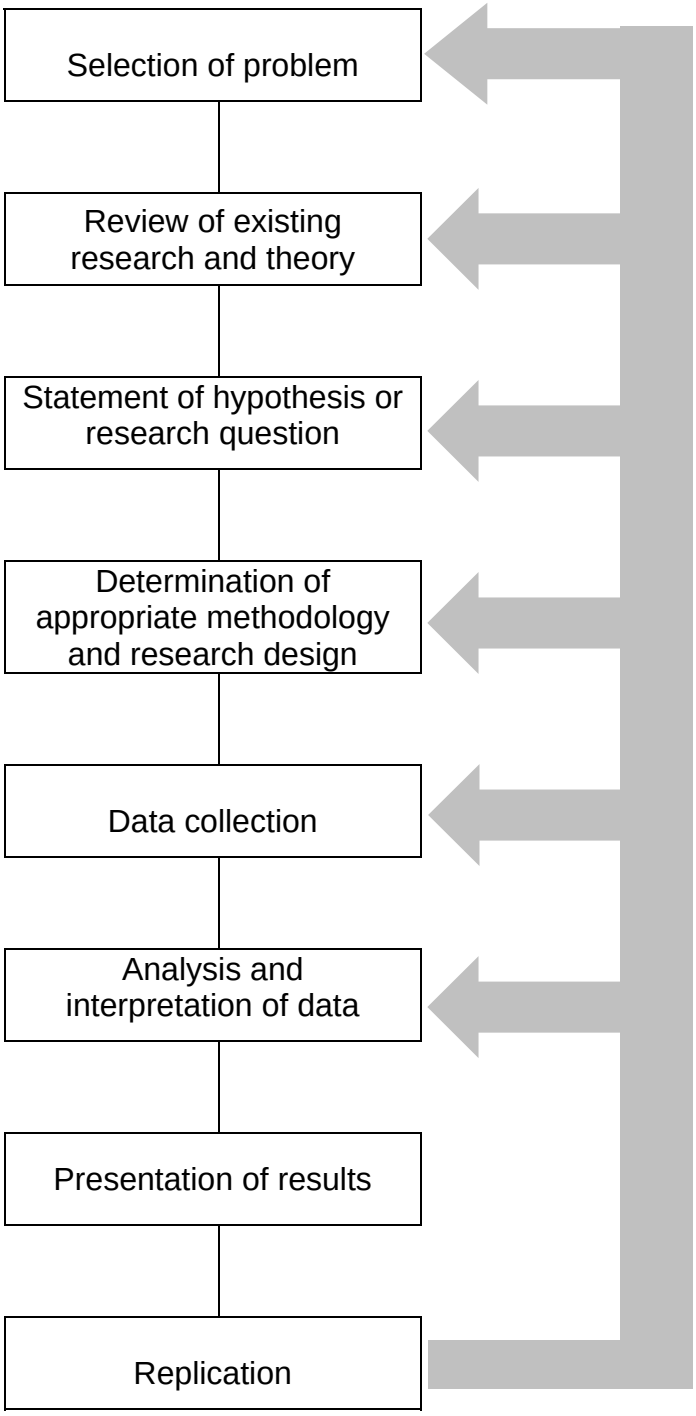

Figure 2.1: Steps in the development of a research project

Selecting a Research Topic

2.1 Selecting a Research Topic

Selecting a research topic is not a concern for all researchers; in fact, only a few investigators in communications fields are fortunate enough to be able to choose and concentrate on a research area interesting to them. Many come to be identified with studies of specific types, such as focus group methodology, magazine advertising, or communications and the law. These researchers investigate small pieces of a puzzle in communications to obtain a broad picture of their research area.

In the private sector, researchers generally do not have the flexibility of selecting topics or questions to investigate. Instead, they conduct studies to answer questions raised by management or they address the problems/questions for which they are hired, as is the case with full-service research companies.

Although some private sector researchers are limited in the amount of input they can contribute to topic selection, they usually are given total control over how the question should be answered; that is, what research methodology should be used. The goal of private sector researchers is to develop a method that is fast, inexpensive, reliable, and valid. If all these criteria are met, the researcher has performed a valuable task.

However, selecting a topic is a concern for many beginning researchers, especially those writing term papers, theses, and dissertations. The problem knows where to start. Fortunately, there are virtually unlimited sources available in searching for a research topic; academic journals, periodicals, and newsweeklies, and everyday encounters can provide a wealth of ideas. Although academic journals tend to publish research that is 12 to 24 months old (due to review procedures and backlog of articles),

The articles may provide ideas for research topics. Most authors conclude their research by discussing problems encountered during the study and suggesting topics that need further investigation. In addition, some journal editors build issues around individual research themes, which often can help in formulating research plans.

In addition to academic journals, professional trade publications offer a wealth of information relevant to mass media research. Research abstracts, located in most college and university libraries, are also valuable sources for research topics. These volumes contain summaries of research articles published in nearly every academic journal.

Sources of Research Topics

2.2 Sources of Research Topics

2.2.1 Magazines and Periodicals

1. Magazines and Periodicals

Many educators feel that publications other than professional journals contain only "watered-down" articles written for the general public. To some extent this is true, but these articles tend to eliminate the tedious technical jargon and are often good sources for problems and hypotheses. In addition, more and more articles written by highly trained professionals are appearing in weekly and monthly publications. These sources often provide interesting perspectives on complex problems and many times raise interesting questions that researchers can pursue.

2.2.2 Research Summaries

Research Summaries

Professional research organizations irregularly publish summaries that provide a close look at the major areas of research in various fields. These summaries are often useful for obtaining information about research topics, since they survey a wide variety of studies.

2.2.3 Everyday Situations

3. Everyday Situations

Each day we are confronted with various types of communication via broadcasting and print, interpersonal communication, public relations campaigns, and so forth. These confrontations can be excellent sources of research topics for the researchers who take an active role in analyzing them. What types of messages are produced? Why are they produced in a specific way? What effects are expected from the various types of communication? These and other questions may help develop 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, layout of newspaper advertisements, advisory warnings on television programs, and approaches to public relations campaigns.

2.2.4 Archive Data

4. Archive Data

Data archives, such as the Inter-University Consortium for Political Research (ICPR) at the University of Michigan, the Simmons Target Group Index (TGI), the Galiup and Roper organizations, and the collections of Arbitron, Nielsen, and Birch media ratings data (Chapter 14), are valuable sources of ideas for researchers. The historical data are used by researchers to investigate questions different from those which the data were originally intended to address. For example, ratings books provide 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, the changes in popularity of types of stations and/or programs,

and the relationship between audience ratings and advertising revenue generated by individual stations or an entire market. This process, known as secondary analysis, has become a major research approach because of the time and resource savings it affords.

Secondary analysis provides an opportunity for researchers to evaluate otherwise unavailable data. Secondary analysis may be defined 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 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.

5. Advantages of Secondary Analysis

2.2.5 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. Modern research is simply too expensive. In addition, because survey methodology has become so complex, it is rare to find one researcher, or even a small group of researchers, who are experts in all phases of large studies.

Secondary analysis is one research alternative that solves some of these problems. There is almost no expense involved in using available data. There are no questionnaires or measurement instruments to construct and validate salaries for interviewers and other personnel are nonexistent, 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 computer time. Data archives are valuable sources for empirical data. In many cases, archive data provide researchers with information that can be used to help answer significant media problems and questions,

Secondary analysis has a bad connotation for some researchers, especially those who are unfamiliar with its potential. Although researchers can derive some benefits from developing questionnaires and conducting a research project using a small and often unrepresentative sample of subjects, this type of analysis rarely produces results that are externally valid. The argument here is that in lieu of conducting a small study that has limited (if any) value to other situations, researchers would benefit from using data that have been previously collected.

Another advantage of secondary analysis is that data allow researchers more time to further understand what has been collected. All too often research is conducted and after a cursory analysis of the data for publication or report to management, the data are set aside, never to be touched again. It is difficult to completely analyze all data

from any research study in just one or two studies, yet this procedure is followed in both the academic and private sectors.

Arguments for secondary analysis come from a variety of researchers It is clear that the research method provides excellent opportunities to produce valuable knowledge. The procedure, however, is not free from criticism.

6. Disadvantages of Secondary Analysis

2.2.6 Disadvantages of Secondary Analysis

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

Researchers conducting secondary analysis studies also may face the problems of using data that were poorly collected, inaccurate, or flawed. Many studies do not include information about the research design, sampling procedures, weighting of subjects' responses, or other peculiarities. Perhaps it is suspected that some of the data were fabricated. Large research firms tend to explain their procedures in detail.

Although individual researchers in mass media have begun to make their data more readily available, not all follow adequate scientific procedures. This may seriously affect a secondary analysis.

Before selecting a secondary analysis approach, researchers need to consider the advantages and disadvantages. However, with the increased use of secondary analysis, some of the problems associated with research explanations and data storage are being solved.

Determining Topic Relevance

2.3 Determining Topic Relevance

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

Question 1: Is the Topic Too Broad?

Most research studies concentrate on one small area of a field; few researchers attempt to analyze an entire field in one study. There is a tendency, however, for researchers to choose topics that, while valuable, are too broad to cover in one study — for example, "the effects of television violence on children," or "the effects of mass media information on voters in a president's trial election."

To avoid this problem, researchers usually write down their proposed title as a visual starting point and attempt to dissect the topic into small questions.

Question 2: Can the Problem Really Be Investigated?

Aside from considerations of broadness, a topic might prove unsuitable for investigation simply because the question being asked has no answer, or at least cannot be answered with the facilities and information available. For example, a researcher who wants to know how people who have no television receiver react to everyday interpersonal communication situations must consider the problems of finding subjects without at least one television set in the home. Some may exist in remote parts of the country, but the question is basically unanswerable due to the current saturation of television. Thus the researcher must attempt to reanalyze the original idea in conformity with practical considerations.

Another point to consider is whether all terms of the proposed study are definable. Remember that all measurable variables must be operationally defined. A researcher who is interested in examining youngsters' use of the media needs to come up with a working definition of the word *youngsters to* avoid confusion. Potential problems can be eliminated if an operational definition is stated: "Youngsters are children between the ages of 3 and 7 years."

One final consideration is to review available literature to determine whether the topic has been investigated. Were there any problems in previous studies? What methods were used to answer the research questions? What conclusions were drawn?

Question 3: Are the Data Susceptible to Analysis?

A topic does not lend itself to productive research if it requires collecting data that cannot be measured reliably and validly. In other words, a researcher who wants to measure the effects of not watching television 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 worthwhile. It would be inadequate to analyze only 10 subjects in the "television turn-off" example, since the results could not be generalized with regard to the entire population.

Another consideration is the researcher's previous experience with the statistical method selected to analyze the data. That is, does he or she really understand the proposed statistical analysis? Researchers need to know how the statistics work and how to interpret the results. All too often researchers design studies involving

advanced statistical procedures that they have never used. This tactic invariably creates 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 rather because they are appropriate for a given study and are understood by the person conducting the analysis. A common error made by beginning researchers is to select a statistical method without understanding what the statistic actually produces. Using a statistical method without understanding what the method produces is called the *law of the instrument.* It is much wiser to do simple frequencies and percentages and understand the results than to try to use a high-level statistic and end up totally confused.

Question 4: Is the Problem Significant?

Before a study is conducted, the researcher must determine whether it has merit, that is, whether the results will have practical or theoretical value. **The first question to ask is: Will the results add knowledge to the information already available in the field?** The goal of all research is to help further the understanding of the problems and questions in the field of study; if a study does not do this, it has little value beyond the experience the researcher acquires from conducting it. This does not mean that all research has to be earth-shattering. Many investigators, however, waste valuable time trying to develop monumental projects when in fact the smaller problems are of more concern.

A second question is *what is the real purpose of the study?* This is important because it helps focus ideas. Is the study intended for a class paper, a thesis, a journal article, a management decision? Each of these projects has different requirements concerning background information needed, amount of explanation required, and detail of results generated. For example, applied researchers need to determine whether any useful action based on the data will prove to be feasible, as well as whether the study will answer the question(s) posed by management.

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

For a research project to have practical value — to be significant beyond the immediate analysis — it must have external validity; that is, one must be able to generalize from it to other situations. For example, a study of the effects of a small-town public relations campaign 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 analysis has little external validity.

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

In many cases the cost of a research study is the sole determinant of the feasibility of a project. A researcher may have an excellent idea, but if costs would be prohibitive, the project must be abandoned. A cost analysis must be completed very early on. It does not make sense to develop specific designs and the data-gathering instrument for a project that will be canceled because of lack of funds. Sophisticated research is particularly expensive: costs may easily exceed 50,000 LE for one project.

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 researcher 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, funding 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 provided by management.

Time is also an important consideration in research planning. Research studies must be designed in such a way that they can be completed in the amount of time available. Many studies have failed because not enough time was allotted for each research step, and in many cases, the pressure created by deadlines creates problems in producing reliable and valid results (for example, failure to provide alternatives if the correct sample of people cannot be located).


7

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

The most marvelous research idea may be greatly, and often needlessly, hindered by a poorly planned method of approach. For example, a researcher who wished to measure any change in attendance at movie theaters that may have accompanied the increase in television viewing in one city could mail questionnaires to a large number of people to determine how media habits have changed during the past few years. 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 this study be planned differently to eliminate some of the expense? Possibly, depending on the purpose of the study and the types of questions planned. The researcher could collect the data by telephone interviews to eliminate printing and postage costs. Some questions might need reworking to fit the telephone procedure, but the essential information could be collected. A close look at every study is required to plan the best approach.

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

Researchers must carefully analyze whether the project may cause any physical or psychological harm to the subjects under evaluation. For example: Will respondents be frightened in any way? Will they be required to answer embarrassing questions or perform embarrassing acts that may create adverse reactions? Is there any possibility that the exposure to the research conditions will have lasting effects? Prior to the start of most public research projects involving human subjects, detailed statements explaining the exact procedures involved in the research are required to ensure that subjects will not be injured in any way. These statements are intended to protect unsuspecting subjects from being exposed to harmful research methods.

Underlying all eight steps in the research topic selection process is validity (Chapter 3). In other words, are all of the steps (initial idea to data analysis and interpretation) the *correct* ones to follow in trying to answer the question(s)?

Reviewing the Literature

2.4 Reviewing the Literature

Researchers who conduct studies under the guidelines of scientific research never begin a research project without first consulting available literature. The review provides information about what was done, how it was done, and what results were generated. Experienced researchers consider the literature review as one of the most important steps in the research process because it not only allows them to learn from (and eventually add to) previous research data but also 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 any project is attempted, researchers ask the following 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 Research Question

2.5 Stating a Hypothesis or Research Question

After a general research area has been identified and the existing literature reviewed, the researcher must state the problem as a workable hypothesis or research question. **A hypothesis is a formal statement regarding the relationship between variables, and it is tested directly. The predicted relationship between 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, and it is not limited to investigating relationships between variables.** *Research questions are generally used in situations where a researcher is unsure about the nature of the problem under investigation. The intent is merely to gather preliminary data. However, testable hypotheses are often developed from information gathered during the research question phase of a study.*

Research and Experimental Design

2.6 Research and Experimental Design

Different research approaches are required. Some questions call for a survey methodology via telephone or mail; others are best answered through in-person interviews. Still other problems necessitate a controlled laboratory situation to eliminate extraneous variables. *The approach selected by the researcher depends on the goals and purpose of the study and how much money is available to conduct the analysis. Even projects that sound very simple may require a highly sophisticated and complex research approach.*

The terms *research design* and *experimental design* have become interchangeable to refer to the process involved in developing or planning a research project. Some researchers prefer to use *research design to* describe nonlaboratory projects, and *experimental design* only for projects conducted in a laboratory setting. In this book, the terms are used interchangeably because countless arguments can be raised about whether or not a research project is an "experiment," and the relationship between "laboratory" and "experiment." That is, must an "experiment" be conducted in a controlled laboratory situation to be called an "experiment"?

Research and experimental design are essentially blueprints, or sets of plans, for collecting information. The ideal design collects a maximum amount of information with a minimal expenditure of time and resources. Depending on the circumstances, a design may be brief or very complicated; there are no specific guidelines concerning the amount of detail required for a design. However, all designs incorporate the steps in the process of collecting and analyzing the data.

Researchers must determine how the data will be collected and analyzed before beginning a research project. Attempting to force a study to follow a particular approach or statistic after the data have been gathered only invites error. For example, a director of marketing for a large shopping mall was interested in finding out more about the customers who shopped at the mall (for example, where they lived and how often they shopped at the mall). With very little planning, she designed a simple questionnaire to collect the information. However, the respondents' possible answers, or response choices, to each of the questions were inadequate and the questionnaire inappropriately designed for any type of summary analysis. Thus, the director of marketing was stuck with thousands of useless questionnaires.

All research — from very simple surveys of only a few people to nationwide studies covering complex issues — requires a design of some type. All procedures, including variables, samples, and measurement instruments, must be selected or designed in light of their appropriate-ness to the hypotheses or research questions, and all items must be planned in advance.

There are four characteristics of research design : 1. Naturalistic setting

There are four characteristics of research design that should be noted if a study is to produce reliable and valid results:

***1. Naturalistic setting*:** For the results of any project to have external validity, *the study must be conducted under normally encountered environmental conditions. This means that subjects should be unaware of the research situation, if possible; that phenomena should not be analyzed in a single session; and that normal intervening variables, such as noise, should be included in the study. Also, long-term projects are more conducive to a naturalistic atmosphere than short-term studies.*

2. Clear cause-and-effect relationships

2. Clear cause-and-effect relationships: *The researcher must make every effort to control intervening or spurious independent/dependent variable relationships* (Chapter 3). The results of a study can be interpreted with confidence *if and only* if all confounding effects are identified.

3. Unobtrusive and valid measurements

3. Unobtrusive and valid measurements: *There should be no perceptible connection between the communication presented to subjects and the measurement instruments used. Subjects tend to answer questions differently if they can identify the purpose of the study. Also, the study should be designed to assess both immediate and long-term effects on the subjects.*

To assure the validity of the measurements used, *a sample should be large enough to allow detection of minor effects or changes* **(Chapter 4)**. Additionally, the selection of dependent variables should be based on their relevance to the study and the researcher's knowledge of the area, not on convenience.

4. Realism

4. Realism: *A research design must above all be realistic. This necessitates a careful consideration of the availability of time, money, personnel to conduct the study, and researchers who are competent in the proposed research methodology and statistical analysis.*

Once the research design has been properly developed, researchers should pretest as many phases of the project as possible. *A pretest of the questionnaire, and a check for errors in the measurement instruments) and equipment will help determine if significant problems are present. A trial run or pilot study (a small-scale version of the planned research project) is recommended, but is not always necessary or possible.* The mall marketing director in the previous example could have saved a great deal of time and money by running a pilot study using 10 or 20 mall shoppers. She would have quickly discovered that the questionnaire did not produce the desired results.

Research Suppliers and Field Services

2.7 Research Suppliers and Field Services

Most researchers do not actually conduct every phase of every project they supervise. That is, although they usually design research projects, determine the sample to be studied, and prepare the measurement instruments, the researchers generally do not actually make the telephone calls or interview respondents in shopping malls. *The researchers instead contract with a research supplier or a field service to perform these tasks.*

Research suppliers provide a variety of services. *A full-service supplier participates in the design of a study, supervises data collection, tabulates the data, and provides an analysis of the results.* The company may offer work in any field (such as mass media, medical and hospital, or banking), or the company may specialize in one type of research work. In addition, some companies can execute any type of research method — telephone surveys, one-on-one interviews, shopping center interviews (intercepts), focus groups — or may concentrate on only one method.

Field services usually specialize in conducting telephone interviews, mall intercepts, one-on-one interviews, and recruiting respondents for group administration projects and focus groups, which are called prerecruits (the company prerecruits respondents to attend a research session). Although some field services offer help in questionnaire design and data tabulation, most concentrate on telephone interviews, mall interviews, and prerecruiting.

Field services usually have focus group rooms available (with two-way mirrors to allow clients to view the session), and test kitchens for projects involving food and cooking. Some field service facilities are gorgeous and elaborate, but others look are not. Most field services lease space (or lease the right to conduct research) in shopping malls

to conduct intercepts. Some field services are actually based in shopping malls.

Hiring a research supplier or field service is a simple process. The researcher calls the company, explains the project, and is given a price quote. A contract or project confirmation letter is usually signed. In some cases, the price quote is a flat fee for the total project. However, sometimes costs are based on cost-per-interview (CPI).

In most prerecruit research projects, field services and research suppliers are paid on a "show-basis" only. That is, they receive payment only for respondents who show, not how many are recruited. If the companies were paid on a recruiting basis, they could recruit thousands of respondents for each project. The show-basis procedure also adds incentive for the companies to make sure that those who are recruited show up for the research session.

Two important points:

Although various problems with hiring and working with research suppliers and field services are discussed in **Chapter 7**, **two important points are introduced here to help advice researchers when they begin to use these support companies.**

1. All suppliers and field services are not equal

1. All suppliers and field services are not equal. *Any person or group with any qualifications can form a research supply company or field service. There are no formal requirements, no tests to take, and no national, state, or regional licenses to acquire.* What's needed is a research shingle on the door, advertising in marketing and research trade publications, and (optional) membership in one or more of the *voluntary* research organizations.

Due to the lack of regulations in the research industry, it is the sole responsibility of the research user to determine which of hundreds of suppliers available are capable of conducting a professional, scientifically based research project. Experienced researchers develop a list of qualified companies; basically from the recommendations of other users (mass media researchers throughout the country are a very closely knit group of people who trade information almost daily).

2. The researcher must maintain close supervision over the project.

2. The researcher must maintain close supervision over the project. This is true even with the very good companies, not because their professionalism cannot be trusted, but rather, to be sure that the project is answering the questions that were posed. Because of security considerations, a research supplier may never completely understand why a particular project is being conducted, and the researcher needs to be sure that the project will provide the exact information required.

Data Analysis and Interpretation

2.8 Data Analysis and Interpretation

The time and effort required for data analysis and interpretation depends on the study's purpose and the methodology used. Analysis and interpretation may take several days to several months. In many private sector research studies involving only a single question, however, data analysis and interpretation may be completed in a few minutes. For example, a business or company may be interested in discovering the amount of interest in a new product or service. After a survey, for example, the question may be answered by summarizing only one or two items on the questionnaire that relate to demand for the product or service. In this case, interpretation is simply "go" or "no-go."

Every analysis should be carefully planned and performed according to guidelines designed for that analysis. Once the computations have been completed, the researcher must "step back" and consider what has been discovered. The results must be analyzed with reference to their external validity and the likelihood of their accuracy.

Researchers must determine through analysis whether their work is valid internally and externally. This chapter has touched briefly on the concept of external validity; an externally valid study is one whose results can be generalized to the population. To assess internal validity, on the other hand, one asks: Does the study really investigate the proposed research question?

Internal Validity

2.8.1 Internal Validity

Control over research conditions is necessary to enable researchers to rule out all plausible rival explanations of results. **Researchers are interested in verifying that "y is a function of x," or *y* = f(x). Control over the research conditions is necessary to eliminate the possibility of finding that *y = f(b),* where *b* is an extraneous variable.** Any such variable that creates a rival explanation of results is known as an artifact (also referred to as extraneous variable). The presence of an artifact indicates a lack of internal validity: the study has failed to investigate its hypothesis.

Suppose, for example, that researchers discover through a study that children who view television for extended lengths of time 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 parental 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.

Sources of internal invalidity

Sources of internal invalidity may arise from several places. Those most frequently encountered are described in the list

1. History

below. Researchers should be familiar with these sources to achieve internal validity in the experiments they conduct.

1. History: *Various events occurring during a study may affect the subjects' attitudes, opinions, and behavior.* For example, to analyze an oil company's public relations campaign for a new product, researchers first *pretest* subjects concerning their 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 occurred as a result of the campaign. Suppose the results indicate that the public relations campaign was a complete failure—that the subjects displayed a very poor perception of the oil company in the posttest. Before the results are reported, the researchers need to determine whether an intervening variable could have caused the poor perception. An investigation discloses that during the period between tests, subjects learned from a television news story that the oil company was planning to raise gasoline prices by 20%. The news of the price increase—not the public relations campaign — may have acted as an artifact that created the poor perception. **The longer the time period between a pretest and a posttest, the greater the possibility that history might confound the study.**

2. Maturity

2. Maturity: *Subjects' biological and psychological characteristics change during the course of a study.* Growing hungry or tired or becoming older may influence the manner in which subjects respond to a research study. An example of how maturation can affect a research project was seen in the early 1980s when radio stations around the country began to test their music playlist in auditorium sessions (where listeners are invited to a large hotel ballroom to rate short segments of songs. Some unskilled research companies tested up to 500 or 600 songs in one session and wondered why the songs after about the 400th one tested dramatically different from the other songs. Without a great deal of investigation, researchers discovered that the respondents were physically and emotionally drained once they reached 400 songs (about 2 hours), and merely wrote down *any* number just to complete the project.

3. Testing

3. Testing: *Testing in itself may be an artifact, 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 subjects.* This is especially true when the same test is used for both situations. Subjects learn how to answer questions and to anticipate researchers' demands. To guard against the effects of testing, different pretests and posttests are required. Or, instead of being given a pretest, subjects can be tested for similarity (homogeneity) by means of a variable or set of variables that differs from the experimental variable. The pretest is not the only way to establish a *point of prior equivalency* (the groups were equal before the experiment) between

groups—this can also be accomplished through sampling (randomization and matching).

4. Instrumentation

4. Instrumentation: *Also known as* ***instrument decay****, this term refers to the deterioration of research instruments or methods over the course of a study.* Equipment may wear out, observers may become more casual in recording their observations, and interviewers who memorize frequently asked questions may fail to present them in the proper order.

5. Experimenter Bias

5. Experimenter bias: There is a variety of ways in which a researcher 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 unintentional, they usually support the researcher's hypothesis and are considered bias.*

Experimenter bias can also enter into any phase of a research project if the researcher becomes swayed by a client's wishes for how a project will turn out. The following example describes a situation that can cause significant problems for researchers if they do not remain totally objective throughout the entire project. The example is not included here to suggest that research *always* works this way, nor is it an endorsement of the situation.

Researchers are sometimes hired by individuals or companies to "prove a point" or to have "supporting information" for a decision (this is usually unknown to the researcher). For example, the program director at a television station may have a particular dislike for a program on the station and wants to **"prove" his "theory" correct**. A researcher is hired under the premise of finding out whether the audience likes or dislikes the program. In this case, it is very easy for the program director to intentionally or unintentionally sway the results just through the conversations with the researcher in the planning stages of the study. It is possible for a researcher to intentionally or unintentionally interpret the results in order to support the program director's desire to eliminate the program. The researcher may, for instance, have like/dislike numbers that are very close, but may give the "edge" to dislike because of the program director's influence.

Experimenter bias is a potential problem in all phases of research, and those conducting the study must be aware of problems caused by outside influences. Several procedures can help to reduce experimenter bias. For example, individuals who provide instructions to subjects and make observations should not be informed of the purpose of the study; experimenters and others involved in the research should not know whether subjects belong to the experimental group or the control group (this is called a double blind experiment); and automated devices such as tape recorders should be used whenever possible to provide uniform instructions to

subjects. **(See Chapter 5 for more information about control groups.)**

Researchers can also ask clients not to discuss the intent of a research project beyond what type of information is desired. The program director should say only that information is desired about the like/dislike of the program and should not discuss what decisions will be made with the research. In cases where researchers must be told about the exact purpose of the project, or where the researcher is conducting the study independently, experimenter bias must be repressed at every phase.

6. Evaluation apprehension

6. Evaluation apprehension: Concept of evaluation apprehension is similar to demand characteristics, but it emphasizes 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 involved in the study. Most people are hesitant to exhibit behavior that differs from the norm and will tend to follow the group, even though they may totally disagree with the others. The researcher's task is to try to eliminate this passiveness by letting subjects know that their individual responses are important.

7. Causal time-order

7. Causal time-order: The organization of an experiment may in fact create problems with data collection and/or interpretation. It may be that results of an experiment are not due to the stimulus (independent) variable, but rather to the effect of the dependent variable. For example, respondents in an experiment about how advertising layouts in magazines influence their purchasing behavior may change their opinions when they read or complete a questionnaire after viewing several ads.

8. Diffusion or imitation of treatments

8. Diffusion or imitation of treatments: In situations where respondents participate at different times during one day or over several days, or groups of respondents are studied one after another, respondents may have the opportunity to discuss the project with someone else and contaminate the research project. This is a special problem with focus groups where one group often leaves the focus room while a new group enters.

9. Compensation

9. Compensation: Sometimes individuals who work with a control group (the one that receives no experimental treatment) may unknowingly treat the group differently since the group was "deprived" of something. In this case, the control group is no longer legitimate.

10. Compensatory rivalry

10. Compensatory rivalry: In some situations, subjects who know they are in a control group may work harder or perform differently to out-perform the experimental group.

11. Demoralization

11. Demoralization: Control group subjects 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 experimental group.

The sources of internal invalidity are complex and may arise in all phases of research. For this reason, it is easy to see why the results from a single study cannot be used to refute or support a theory or hypothesis. **To try and control these artifacts, researchers use a variety of experimental designs and try to keep strict control over the research process so subjects and researchers will not intentionally or unintentionally influence the results.**

External Validity

2.8.2 External Validity

External validity refers to how well the results of a study can be generalized across populations, settings, and time. The external validity of a study can be severely affected by the interaction in an analysis of variables such as subject selection, instrumentation, and experimental conditions. A study that lacks external validity cannot be projected to other situations. The study is only valid for the sample tested.

Most procedures to guard against external invalidity relate to sample selection. *Here, three considerations must be taken into account:*

1. *Use random samples.*
2. *Use heterogeneous samples and replicate the study several times.*
3. *Select a sample that is representative of the group to which the results will be generalized.*

Using random samples rather than convenience or available samples allows researchers to gather information from a variety of subjects rather than those who may share similar attitudes, opinions, and lifestyles. As we will see later on, a random 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 using samples with a variety of characteristics (heterogeneous) allow researchers to test hypotheses and research questions and not worry that the results will only relate to 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: subjects are exposed to an experimental treatment and are immediately tested or measured. However, in many

cases, the immediate effects of a treatment are negligible. In advertising, for example, research studies designed to measure brand awareness are generally based on only one exposure to a commercial or advertisement. It is well known that persuasion and attitude change rarely take place after only one exposure; they require multiple exposures over time. Logically, such measurements should be made over a period of weeks or months to take into account the sleeper effect: that attitude change may be minimal or nonexistent in the short run and still prove significant in the long run.

Presenting Results

2.9 Presenting Results

The format used in presenting results depends on the purpose of the study. *Research intended for publication in academic journals follows a format prescribed by each journal; research conducted for management in the private sector tends to be reported in simpler terms, excluding detailed explanations of sampling, methodology, and review of literature.* However, **all presentations of results need to be written in a clear and concise manner appropriate to both the research question and the individuals who will read the report.**

Replication

2.10 Replication

One important point is that the results of any single study are, by themselves, only *indications of* what might exist. A study provides information that says, in effect, "This is what may be the case." To be relatively certain of the results of any study, the research must be replicated. Too often, researchers conduct one study and report the results as if they are providing the basis for a theory or law. The information presented 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 requires investigation from many different perspectives before any significance can be attributed to the results of any one study. Research methods and designs must be altered to eliminate design-specific results, that is, results that are based on, hence specific to, the design used. Similarly, subjects with a variety of characteristics should be studied from many angles to eliminate sam-pie-specific results; and statistical analyses need variation to eliminate method-specific results. In other words, all 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.

Types of replication:

1. Literal replication

Researchers overwhelmingly advocate the use of replication to establish scientific fact. **Four basic types of replication can be used to help validate a scientific test.**

- **Literal replication** *involves the exact duplication of a previous*

analysis, including the sampling procedures, experimental conditions, measuring techniques, and methods of data analysis.

2. Operational replication

- **Operational replication** *attempts to duplicate only the sampling and experimental procedures of a previous analysis, to test whether the procedures will produce similar results.*

3. Instrumental replication

- **Instrumental replication** *attempts to duplicate the dependent measures used in a previous study and to vary the experimental conditions of the original study.*

4. Constructive replication

- **Constructive replication** *tests the validity of methods used previously by deliberately avoiding the imitation of the earlier study; both the manipulations and the measures used in the first study are varied.* The researcher simply begins with a statement of empirical "fact" uncovered in a previous study and attempts to find the same "fact."

Research Hazards

2.11 Research Hazards

All researchers quickly discover that research projects do not always turn out the way they were planned. It seems that Murphy's Law — anything that can go wrong will go wrong — holds true in any type of research. It is therefore necessary to be prepared for difficulties, however minor, in conducting a research project. Planning and flexibility are essential. **Presented below is what is known as the TAT (They're Always There) laws. Although these "laws" are somewhat tongue-in-cheek, they are nonetheless representative of the problems one may expect to encounter in research studies.**

1. *A research project always takes longer than planned.*
2. *No matter how many people review a research proposal and say that it's perfect before you start, they will always have suggestions to make it better after the study is completed.*
3. *There are always errors in data entry.*
4. *The data errors that take the longest to find and correct are the most obvious.*
5. *Regardless of the amount of money requested for a research project, the final project always costs more.*
6. *A computer program never runs the first time.*
7. *A sample is always too small.*
8. *Regardless of how many times a pilot study or pretest is conducted to make sure that measurement instructions are clear, there will always be at least one subject who doesn't understand the directions.*
9. *All electronic equipment breaks down during the most crucial part of an experiment.*
10. *Subjects never tell you how they really feel or what they really think or do.*