Enjoying Research?

A ‘How-To’ Manual on Needs Assessment

Produced by: Diane Abby-Livingston and David S. Abbey
Produced for: the Recreation branch of the Ministry of Tourism and Recreation
1982

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2 Statistics Booklet, A Companion to…

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for the Recreation Branch
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Pat Fillmore and Pat Cupples handled the editorial work and illustrations respectively. Our thanks to them both for putting some of the fun into the pages of this book

Nearly three dozen additional readers, from universities, colleges, field offices of the ministry, municipal offices and volunteer groups read and commented on an earlier draft of this manual. Their efforts have resulted in what we trust is an enjoyable and useful document.

Diane Abbey-Livingston
David S. Abbey

Toronto. 1982.

Preface

This manual was developed because people from community groups, agencies, and organizations have been asking each other and government consultants (or help in determining such things as what programs to offer, what groups to serve, what new services to offer, and how to better serve their members. Another reason is that funding agencies and boards of directors increasingly demand facts and figures to demonstrate that programs are relevant and serving needs. So, people are having to do more research than they ever have before.

The Ministry of Culture and Recreation, based on its contact with many organizations throughout the province, commissioned a study to see what research tools are needed. People in the community asked for 'how to do if printed information.

Many people think research is something very fancy that can only be done by a privileged few. We don't believe this is true. You actually do research every day. When you plan meals or a vacation, you think about what will be needed, what information you require the costs and time involved in different alternatives, etc. This is informal research. A car mechanic is doing needs-assessment research when he test drives your car, and a doctor is doing the same thing when he gives you a check-up.

Research is really planning and problem-solving in relation to collecting information. We have set up this manual using planning steps similar to those you use when you plan programs. We have tried to keep the jargon and mathematics to a minimum and have used many examples that have actually occurred in organizations and communities. In addition we have built in exercises so you can check your understanding of the ideas we present

This manual can be used in several ways. You may want to read it as you would a text-book. it has been designed so that there is a logical flow from beginning to end. However, you don't have to read through. Each chapter can stand on its own. So, another way to use this is to consult the table of contents and then go to the chapter that is most likely to answer your particular question. At the beginning of each chapter, there is a point form outline of what is in the chapter to help you locate specific pieces of information. Although each chapter can be used by itself, we suggest you read chapters 1 and 2, as they provide the backbone of this type of research. You can also just browse through. We've tried to make the material enjoyable as well as practical.

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CHAPTER
1 Needs Assessment: What is it and Why Do it

WHAT is NEEDS-ASSESSMENT RESEARCH?

This manual deals with one type of social research called 'needs assessment'. There are many other forms of research used in the fields of recreation, leisure and multiculturalism. Some of the other ways of doing research include: population studies, environmental studies, experimental programs, pilot projects, etc. in this manual we will focus on several approaches to studying people's needs. The results of these studies are used to help with the planning and the on-going evaluation of many different types of programs. Here are five types of needs assessment which are the most common and which are dealt with in the rest of this manual.

1. What do people want?

This type of needs-assessment research focuses on finding out what people want or need. At the community level, the focus might be on what kind of programs different groups would like to see offered by a Recreation Department. Or it may be on what a museum can do to encourage more people to visit, or on what services can be made available to support fitness among young mothers in the community.

Within an organization, the focus of needs assessment might be on finding out the training needs of staff and volunteers, or what programs and services are wanted by club members, or what co-ordination among departments is needed

At an individual level, needs assessment might be a fitness test, an individual interview about career needs, or a counseling session.

2. What are people's attitudes?

This type of needs assessment tries to measure people's opinions and attitudes. The research focuses on how people feel, not on what they want.

For example, if you are building a senior citizens' centre, you would use the first type of needs assessment to ask seniors what programs they want, when they want them, and what fees they would pay.

You would use this second type of research to assess how seniors feel about coming to a special building called Senior Centre, or how they feel about being in age-restricted programs.

3. What groups need services?

In this type of needs-assessment research, the focus is on finding out which groups are not receiving the services they need.

Your organization might become aware that there has been a change in population in the community. New groups may have arrived. A profile of the population, compared to your attendance or participation records, may indicate that certain groups are not being served by your organization.

For example, in the 1960s, many agencies realized that not enough resources were available for teenagers. In the 1970s, as our population matured, agencies were asking whether they should then be serving seniors, middle-aged women moving out of housewife roles, and newly-arrived immigrant groups.

4. Which alternatives will be most relevant?

A fourth type of needs assessment deals with finding out which of several alternatives will be most effective.

Consider the situation of an agency that has many client groups asking for service. The resources of the agency may not allow it to serve all who call at its doors in the face of scarce resources, the agency faces the tough decisions of choosing which groups will be served among the many who need service

5. What should be changed to make this program more effective?

A fifth type of needs-assessment research emerges when people are engaged in on-going evaluation. Sometimes the line separating needs assessment from evaluation is a thin one. For example, when groups evaluate their committee meetings, they often ask such questions as 'How effective do you think we have been?'; 'How satisfied are you with the decisions we made?' in addition to these evaluation-type questions, people are often asked for their ideas and feelings about what should be changed and what is needed to improve the situation.

These five basic types of needs-assessment research are not always clearly defined. in fact, many needs-assessment projects will require information drawn from each type. For example, an agency in a community might want to find out what people want, their attitudes toward the agency's current services, and which alternatives they prefer.

WHY DO NEEDS-ASSESSMENT RESEARCH?

Needs-assessment research produces information about people's ideas, attitudes, and preferences When we ask 'Why collect this information?', we are asking about the purpose of the research activity. The purpose lies in how the information will be used.
The major purposes for gathering information about needs are:

1. To develop long and short range plans

In order to plan, organizations need to know about their client groups, the demand for programs, the feasibility of charging for service costs and alternative programs. Needs-assessment research can potentially provide this information.

2. To help define and solve problems

Research methods can be used to identify and define problems. Sometimes problems are defined by analyzing records, observing operations, or by asking people directly. Other times when problems are already clearly defined, research methods are used to identify different solutions or to select a suitable solution from many possible ones.

3. To help decision makers and planners set priorities

Decision-makers and funders are often faced with having more plans than they can afford. To distinguish between programs that are necessary, and those that are good but not necessary, they need to know the extent of different community demands, and the impact of providing different programs. Needs-assessment research can help to provide this information.

4. To prove you know what you are doing

Needs-assessment research can provide the background for accountability. The public and funding agencies want to know that your budgets were prepared based on realistic costs and that expenditures have been monitored. This is financial accountability. At a psychological level, you are also accountable to show that your plans have been carefully considered and related to the needs of those who will be served by those plans. Sometimes when changes occur in organizations, the staff does not know why. They wonder whether the changes are based on information or whim. Doing a needs assessment, and reporting the results to those concerned can demonstrate your ideas, for planning

5. To surface public opinion

The previous four purposes of needs-assessment research focus on how the information (the product or outcomes of your research) can be used. Research also has by-products: the very act of asking people for information can have an impact separate from the information itself. For example, Royal Commission hearings across Canada raised the public's awareness of such issues as drug use, abortion, and environmental pollution. An organization can use different research methods not only to collect information but also to raise awareness and try to influence public opinion. (One more reason why people should understand enough about research to be able to check how well studies are done!)

6. To develop community support and stimulate action

Organizations can use specific needs-assessment methods: (a) to find out what people want and (b) to involve them in taking action to get what they want.

For example, an organization might hold a town hall meeting to consider priorities for recreation facilities for the next ten years, and to establish a planning committee. Or, an organization might hold a meeting of its members and clients to collect information on their immediate needs and to plan a course of action.

There are two specific models of using research to stimulate action. There's in action research model* where people are deliberately involved in collecting information about themselves, analyzing the information, and then acting on it This means that people are actively engaged in problem solving about their own situations in a community or an organization. The researcher's role is to help people develop their own information gathering tools, then to gather the information and finally to facilitate their problem solving.*

The second model of using research to stimulate action is called the survey feedback model. In this method, people are not necessarily involved in collecting the information about their own situations or problems: rather they are involved in reacting to information that has been collected and in proposing and implementing solutions. In this second model, the researcher's role is to design and to conduct interviews or surveys and then to design ways to feed the information back and engage people in problem solving.

Both action research and survey feedback models are often called 'participatory research' ** methods. If you are thinking of using participatory research or someone is recommending participatory research, we strongly suggest you clarify what is really meant by the term.

*Schatzman. L . and Strauss. A. Field research. Strategies for a Natural Sociology. Englewood Cliffs. New jersey. Prentice-Hall. 1973.

**Arnstein. S. R. 'A ladder of participation' American institute of Planners Vol. 34. No 4. July. 1969. pp 216-224.

Participating means different things to different people. Here are some examples of the different meanings it can have. Consider the situation of a recreation department wanting to decide on the programs for a new centre:

- to some people, simply voting 'Yes' or 'No' to proposed programs means they are participating.
- to others, participation is happening only if they hear the results of the vote and then have a chance to mobilize others to influence a final decision.
- for still others, participation means taking part in the decision-making discussions and directly influencing the decision-makers.

We could write a book about 'participatory research' because there are several models each with special considerations and special issues for the researcher. This manual is not specifically about participatory research. This manual focuses on research in which the researcher is responsible for collecting information and presenting the information to people who have requested it or who are interested in it. However many chapters contain information that is relevant to participatory research.

Now that we have outlined the major reasons why needs-assessment research is done, and the purposes for which it is used, let us assume you are thinking about doing needs-assessment research. Before you begin. it is useful to remember what sometimes happens to research.

A lot of it sits on the shelf or lands in waste-paper baskets. if you know why this happens, you may be able to avoid a similar fate for your own research efforts.

WHY RESEARCH IS OFTEN IGNORED OR REJECTED

First, a lot of research is reported in research jargon. The decision-makers and program people can't understand the words, let alone how the research relates to what they are doing.

Second, often the findings are not clearly linked to the problems and issues in a community or the findings don't give any suggestions for fixing the problem For example, some research tells us that a certain percent of the population will not visit *a* museum or art gallery because they think these places are only for highly educated people. Other research tells us that people who've had bad sports experiences during their teens are not likely to be physically active as adults. Other research says vandalism is highest in times of recession, and that the incidence is highest in lower socio-economic neighborhoods. When decision-makers see such research results, many say 'So what?', and ask how this type of information can be related to action. What alternatives should museums try? How can fitness counselors reach such a population? How can an agency minimize vandalism?

Some research does state clearly what the research findings mean for programs and suggests alternatives for decision makers to consider. Other researchers do use their findings to involve the decision-makers in the problem-solving process. Unfortunately, it doesn't happen as often as it should.

Even clear, understandable, practical research can end up on the shelf. Why? People may reject research results that they haven't asked for; or the research data may arrive at a time when the organization cannot make changes. or the organization may simply be unwilling to engage in a planning or problem-solving process.

Occasionally, needs-assessment research that has been requested, and does provide clear information, is also rejected. More than one organization has been known to ignore or to reject problems they asked their own staff to identify. Although there are many reasons this can happen, the most common one is as follows: decision makers ask for or agree to a needs assessment without really thinking about the information that might be gathered. Since they don't anticipate the results or what changes might be suggested, they are often taken by surprise.

Careful researchers often provide decision makers with a way to consider the potential impact of collecting information. They give decision makers a range of imaginary results and ask what would they do if the actual information collected was similar to these imaginary ones.

What happens when research is ignored or rejected?

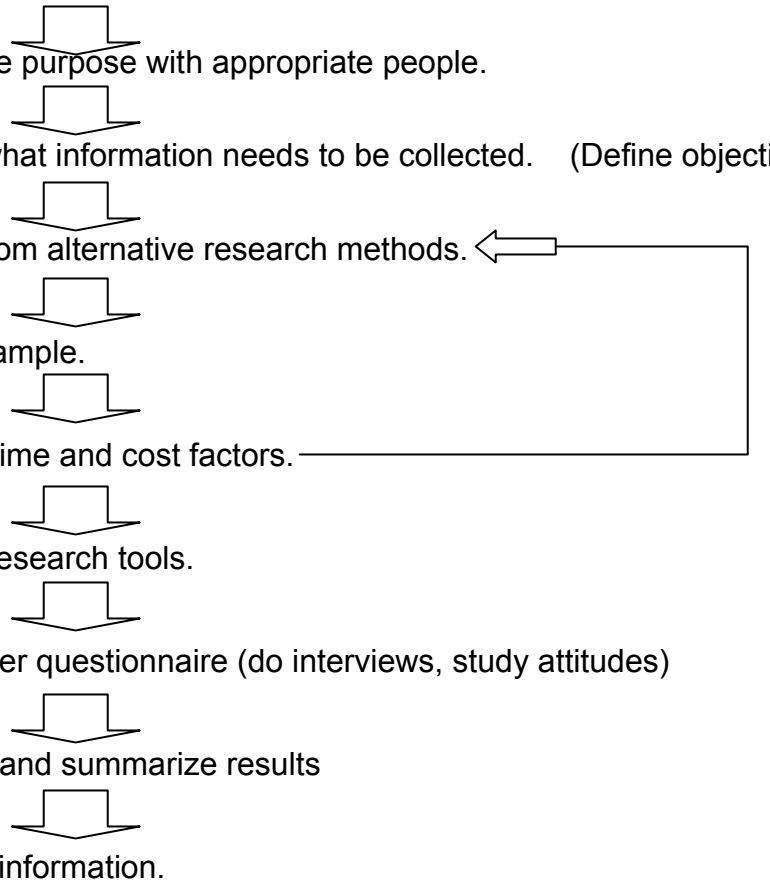
One side effect of conducting research can be that expectations or hopes are raised. Asking people what they need or want can make them think they will get it. If no action is taken, or if people aren't told why the research hasn't been used, they can become angry, frustrated, puzzled, and disappointed. Such comments as 'Why bother, they won't listen anyhow' or 'Nobody cares what we think' arise from this kind of experience. The end result is a generally negative attitude toward the organization, the decision-makers, and the researchers involved.

Another possible side effect of ignoring research is that people may begin to question the effectiveness of the organization. They suspect that systematic information-gathering and rational problem-solving is not taking place. Some say 'it's who you know' that matters. While some of these views may reflect reality, the consequence is that people start refusing to give information and stop engaging in effective planning and problem-solving.

In addition to the impact on people's attitudes, the cost to organizations and communities of ignoring or rejecting research is enormous. Problems do not get defined or solved. Plans are made that cannot work. Facilities are built that the community cannot maintain. Associations undertake changes that their membership will not support. Organizations develop policies and procedures that burden staff time rather than help them to succeed.

Fortunately, these situations don't happen too often. To make sure it doesn't happen to you. We recommend the following steps in planning your research.

1. Identify the purposes and receivers of the research results.
2. Refine the purpose with appropriate people.
3. Identify what information needs to be collected. (Define objectives)
4. Select from alternative research methods.
5. Select sample.
6. Review time and cost factors.
7. Design research tools.
8. Administer questionnaire (do interviews, study attitudes)
9. Analyze and summarize results
10. Present information.



These steps correspond pretty closely to the planning steps you go through in planning any program:

What is the purpose of the program (Steps 1 and 2 in research)

What are alternative ways to conduct the program (step 4)

Review time and costs (step 6)

Plan the details of the program (step 7)

Do the program (step 8)

Selecting a Sample, Analyzing Results, and presenting information are the only steps that you would not ordinarily take in planning your own programs.

To plan the details of a program (Step 7) you usually want to know what the program is supposed to achieve (Step 1). Without knowing the purpose, you might—but only if you were lucky—achieve something that the sponsors and participants felt was worthwhile. Program planners know there is a temptation to jump into planning the details of a program before fully examining why it should happen, what it is to achieve, and who it is for. The temptation is to jump into how, before why and what are clarified. As a result we have duplication of services: good programs offered by several agencies with too few users to be economical; or interesting but not important programs. We also waste a lot of time and energy on ineffective or unnecessary programs.

When you think about what kind of saw to buy (Step 4) you want to know whether it's for pruning the hedge or taking down trees (Step 1).

In doing research you need to know the purpose (Step 1) before deciding on the method (Step 4). It simply doesn't make sense to decide to do a survey, or to conduct a group interview, or to design a questionnaire without a very clear idea of what you want to achieve by doing any research—regardless of the method you choose. Purpose comes before action.

The next chapter focuses on identifying and refining the purposes of your research.

Chapter Two
Defining the Purposes of Your Research

INTRODUCTION

IDENTIFY THE PURPOSES OF THE RESEARCH

REFINE THE PURPOSES WITH APPROPRIATE PEOPLE

CHAPTER
2 Defining the Purposes of Your Research

INTRODUCTION

This is a very short but important chapter. The key to getting research results used is to plan the research so that the information you collect is geared to action. This means you must have a clear understanding of how the research results will be used, who the decision-makers are. and what decisions can be considered Only then will you know what information to collect, what methods to use. and how to present your results.

Step one
IDENTIFY THE PURPOSES OF THE RESEARCH

Here are questions researchers should ask themselves. The questions will identify who the researcher needs to talk to in order to check the purposes and possible outcomes of the research before it ever begins:

1. Who is asking for the research and how do they want to use it?

2. By whom will the research be used? (These may either be the same people as identified in the previous question or a different group.)

3. Who else could be affected by the research?

4. Who will have the authority to make decisions? What is their attitude toward the research?

5. What will the consequences be if the people identified by questions 1, 2, 3, and 4 are not consulted before the research is carried out?

6. How shall we consult with people?

In the following table we have prepared a guide to help you identify people you need to talk with about the purposes of your research. For each of four basic questions listed on the left of the table you should answer:

- What could happen if they were not consulted?
- Can/should we consult them? If 'yes', how?

IDENTIFYING THE PEOPLE YOU NEED TO TALK TO

	What would happen if they were not consulted?	Can/should we consult them? If 'yes', how?
1. Who is asking for the research? (a)		
(b)		
(c)		
(d)		
2. Who do we want to use the research results? (a)		
(b)		
(c)		
(d)		
3. Who win be affected by the research? (a)		
(b)		
(c)		
(d)		
4. Who has the authority to make decisions based on the research? (a)		
(b)		

Answers to these questions will always help you to see your research in a broader context (the 'big picture') than when you started. The moral is research is never done in a vacuum: if it is worth doing. It is important to many people in many ways. Knowing why it is important is a large part of understanding the purpose of the research.

Step two

REFINE THE PURPOSES WITH APPROPRIATE PEOPLE

The second step in the planning process is to refine the purpose of the research. If at all possible, involve some of the people who will be using the research results. Consult with representatives of the decision-making group and. if it seems appropriate, with clients or members of the organization.

Review with them the purpose and potential uses of the research results by asking such questions as:

1. Will current conditions in the organization or community support using research results?

2. What decisions are key people considering?

3. What other alternatives could be considered at this point in time?
   - Could a new service or program be considered?
   - Could some parts of program X be expanded or changed?
   - Could new methods or procedures be used?

4. What kind of information is needed to make each of the above decisions?

5. What conditions would stop key people from using the results of the research?

6. Have any similar studies been done? How well were they done? What were the results and how were they used?

One result of following this procedure is that a number of different, and possibly contradictory, views may be obtained. For example, a Recreation Director may ask for research about the demand for a community's summer parks program. In interviews with summer staff, you may discover they would see any such research as an attempt to evaluate them, their teaching, and their leadership skills. Finally, you might discover that program managers in the Director's office may see such research as questioning their program-planning skills.

It would be rare if such a range of perceptions did not exist. Knowing that these individuals see the research differently. It is important to work with them so that they understand clearly what research can be undertaken and why. In return they can tell you what kinds of information they feel will best help, where you might get that information, and what specific information they would be most interested in receiving when the research is completed.

In discussions with the Director, summer staff, and program managers, you will also be able to ask about other individuals or groups who need to be approached as part of the study. Some of these people will be 'concerned citizens'; others will be volunteers or members of agencies who might be affected by changes in the Department's programs.

The number of potential audiences for the research report tends to snowball as you begin your inquiry. Which information you use to decide on the purposes of the research is frequently a matter of judgment. One of the best bases for this judgment is: which purposes are repeated by different groups of people?

Another way to make this judgment is by having the researcher provide each audience for the research with the other's opinions about what the purposes should be, and then recording their reactions. Then the final decision is a matter of negotiation and compromise with whomever is sponsoring the project.

Sometimes, to make decision-makers aware of the kind of information research can provide, researchers will make up possible research results and ask the decision-makers to react. For example, the researchers might predict a range of outcomes. 'Suppose the research shows that 80% of the staff want procedure X changed', or 'Suppose 30% of the staff oppose the program you are considering', and ask decision-makers if they would be able and willing to respond to such results.

Providing imaginary results serves several purposes. It helps decision-maker consider (a) what information they could get. (CO the issues the information could raise, (c) the impact of doing research, and (d) what conditions or results would cause the research to be ignored. It also enables the researchers to assess whether or not there is a strong commitment to using the research information.

Sometimes research stops here. In answering these questions, people may discover that what they wanted the research to achieve can best be achieved in other ways.

If the decision-makers are not available for consultation on these questions, researchers should ask themselves the same questions.

In some cases, research does proceed although decision-makers have not made a commitment to use the results. We've already noted what often happens when studies are ignored. On the other hand, sometimes such research studies can also be the impetus to change.

What is important is that researchers consider intended outcomes, potential side effects, and whether the information will be used. Only then can they consciously choose whether or not to do the research.

Chapter Three
Identifying What Information Needs to Be Collected

INTRODUCTION

WHAT ARE SOME DIFFERENT TYPES OF INFORMATION?

WHAT IS A RESEARCH PLAN?

STEPS IN PREPARING A RESEARCH PLAN

ASSESSING LEARNING OR TRAINING NEEDS

SUMMARY

CHAPTER
3 Identifying What Information Needs to Be Collected

INTRODUCTION

Chapter 2 outlined the first two steps in conducting research. The focus was on how research would be used and by whom. This was called identifying and refining the purposes of the research. Chapter 3 focuses on a way to identify what specific information will be required to fulfill the purposes of a research project.

First we will describe different types of information that can be collected. Then we will explain what a research plan is and the steps you can take to define one. Finally, we will discuss the planning of research to assess training and learning needs.

WHAT ARE SOME DIFFERENT TYPES OF INFORMATION?

When people say they are planning an 'assessment of needs', they may actually be doing three different types of research, or some combination of all three. This happens because the terms 'needs' can mean different things. The three most common meanings are:

- What people NEED. Need. In this context means the gap that exists between what experts say is necessary and what people actually have available * A doctor may notice I lack a certain vitamin and say that I need to eat certain foods or take certain pills. Through research, a city may conclude that a family of four requires a certain amount of money to survive. The need then is the difference between what people currently have and the standard for survival. When researchers talk about needs assessment they often mean finding out what people require to meet some standard established by some experts. Sometimes the standard is established by looking at what some other individual or community has. If you have less than they do. You may be said to need more than you have.

- What people WANT. My doctor may tell me to eat spinach but I may not want to. in fitness research, needs are determined by measuring muscle strength, weight, lung capacity, heart rate. etc. We all know that although someone might need a fitness program, they might not want one. Similarly I might need to drink milk but want a soft drink instead.

* Hewitt. L. & Brusegard. D. (Eds.). Selected Papers from the Social indicators Conference. Edmonton. Canada. May 29-31. 1975. Edmonton Alberta Bureau of Statistics. 1977.

- What people PREFER. Preferences can be different from wants and needs. Often a preference is a sub-category of wants. I want a soft drink and I prefer Coke.

If planning decisions will be based on needs-assessment research, it's important to know whether the information collected represents needs, wants, or preferences. There are many examples of plans going down the drain because people assumed needs and wants would be the same. In England, a long time ago, health officials decided people 'needed' bathtubs to take a bath. People did not want bathtubs, they preferred showers, so they used the bathtubs as indoor storage bins for coal and wood. Closer to home, we know that people can say a program is needed for the community but members of that community may not want to attend or participate in that program. So, if a decision is made based on a need only, planners run the risk of providing a program that no one wants. if planners offer a program because people want it, that doesn't mean that people will go—they may want it to be available but prefer to attend some other program that is offered at the same time. So, before you plan what questions you will ask, you need to clarify whether you want information about needs, wants or preferences.

Later in this chapter, when we provide sample research situations, we will indicate whether information about wants, needs or preferences is required.

You can collect information about people's

1. Attitudes
2. Behaviour
3. Feelings
4. Beliefs
5. Social characteristics

Attitudes are a combination of feelings, beliefs and behaviors.

As you look at the purposes of your research, ask yourself:

Will information about people's attitudes help us plan, or solve the problem? Will it be important to know what people believe and fee) about something—a program, a change, an idea, an object? (We will give you step-by-step instructions on research about attitudes in Chapter 9. For now, we just want you to identify whether you need such information, and to note that getting information about attitudes requires different methods than getting information solely about behavior or about beliefs.)

Will information about what people are doing or have been doing—their behavior—be important? Will it help us in our planning or problem solving? Sometimes you can get such information from records (eg. registrations, or attendance at a program); other times, you observe people to see what they do, or you ask them to report on what they do. While these methods provide information about behavior, they won't necessarily provide information about attitudes. For example, you could not say with accuracy that because people attend a program, they have a positive attitude toward it. They may have been sent there, or they may simply enjoy meeting people. Similarly, if you watch a meeting and identify who participates and how often, you cannot necessarily conclude that the quiet people did not have strong feelings. So, the methods for gathering information about behavior will not necessarily give you information about attitudes, although behavior is one component of attitude.

Will it be important to have information about what people think? This category includes what people believe to be true or correct, the knowledge they have, their ideas about what they want, and their preferences. As you can imagine, people's thoughts can be very different from their behavior, and from how they feel.

Will you need information about the respondent's social characteristics? Would it be useful to have such information as sex, age, education, occupation, source of income, etc. often such questions are asked even when the information is not necessary. This type of information should be collected when (a) it's important to describe who gave the research information and (b) you want to see if behavior, attitudes, or thoughts differ among groups who have different characteristics.

When you construct questions for surveys or interviews, you will refer back to the purpose of your research to make sure the questions you ask will produce the type of information you want. With some of your questions it may become difficult to separate information about people's thoughts or beliefs from information about their attitudes. For example, if your questionnaire asked: 'How do you think volunteers could help our agency?' The answers could reflect the thoughts and/or opinions and/or feelings of the respondents. Don't worry if each question you construct won't fit neatly into one category. Some may not. However, you should know before you conduct your research which questions will give you mixed information. Then you will be able to construct other questions to give you exactly the type of information you want.

Later in this chapter we will provide many examples of the type of information required in a study. In each one we will indicate what type of information is being collected and you will be able to check your understanding of this section.

Now let's examine a fairly common research situation and identify what a research plan is.

WHAT IS A RESEARCH PLAN?

Our cartoon story is a research project; someone was asked to collect information to help others make a decision. Obviously, it was not a successful one because the group still doesn't know where to go for dinner. The researcher is frustrated and so are the others. Let's find out where things went wrong. Having read the previous chapter, we know the purpose of research should determine the specific information to be collected. So, let's first examine the purpose of this project, then look at what information was collected.

The researcher in our cartoon case study was asked to scout around and find 'a good place to eat'. The purpose of the research was to provide information so that three people could decide where to go for dinner. So far, things are clear. At least, the purpose is clear. It sounds simple but trouble developed as soon as the researcher assumed information would be adequate for decision-making.

The researcher left the room thinking 'My purpose is to find a couple of good places to eat'. However, he forgot to check out the meaning of the key word 'good'. Actually, 'good' is a very subjective, fuzzy word. To the researcher, French restaurants seemed to be 'good'. At least information about French restaurants seemed to fill the need for 'good' restaurants. However, the others who would also be using the information had very different meanings for the word 'good*. To one person, 'good' meant Italian restaurants. To the third person, any restaurant that offered meals under $8.00 was 'good'.

There was another problem in the way the researcher gathered the information. He thought recommendations from anyone would be acceptable. In fact, his friends wanted information from specific types of people. In this example, each person made assumptions that later turned out to be incorrect. It was important to define precisely what 'good' and 'find out' meant to the researcher, and to the others who were going to use the information.

Misunderstandings similar to the one shown in the cartoon happen all the time. People think they have specifically asked for something, then are sorely disappointed when they get something else. Collecting information that no one can use is a waste of time. There are many sad tales of organizations asking for research, then filing what they receive in the waste basket. As the research report goes in the basket, you will hear:

> ' Well. If we'd known they were going to ask those kinds of questions, we wouldn't have bothered. '
>
> ' Humph, this doesn't tell us anything we don't already know, so it's useless. '
>
> ' Whoever told them to interview those people? We're not going to change things just on the basis of their opinions. '

In research, one way to avoid such misunderstandings and waste of resources is to ensure, right at the beginning, that everyone understands and agrees to the specific information that will be collected and how it will be collected.

This is called a research plan. A research plan states precisely:

a) What information will be collected (focus)

b) How information will be collected (methods)

c) Who or what sources will provide the information (sample)

Because it would be too confusing to explain all three points in one chapter, we will concentrate on what information will be collected. Detailed information on methods will be covered in Chapter 4: and sampling will be discussed in Chapter 5.

A research plan defines PRECISELY what, how, and from whom information will be collected. The key word is 'precisely'. To illustrate what this word means in relation to research, look at the following example.

> Imagine a Recreation Department wants to get more volunteers. The Department decides to collect information to find out the best way to recruit. Here are some examples of what they require:
>
> Requirement 1. To find out what attracted current volunteers.
>
> Requirement 2. To identify why current volunteers were attracted to the Department and why they stay.
>
> Requirement 3. To interview two different age groups of current volunteers and find out:

a) how they heard about the volunteer jobs (thoughts and beliefs)

b) how they actually got involved (behavior)

c) how much time they give now (behavior)

d) how much time they gave initially (behavior)

e) what reasons they give for continuing to volunteer (thoughts, wants, and preferences)

f) what they know about the range of volunteer jobs available in the Department (thoughts, beliefs).

We have labeled the requirements 1, 2 and 3 so that we can compare them. Actually, they are one requirement that has been stated in three different ways.

The third is much more precise than the first because it states specifically what types of information the Department wants, who they want it from, and how it should be collected. (Of course, the Department will collect a lot more information than our sample suggests.)

The first was the initial statement made by the researcher or by the Department in the same way 'find a good place to eat' was the initial statement in our restaurant example.

To refine the initial statement and turn it into a clear research plan, each word must be translated into specific directions to the researcher. The next section will identify steps you can use to write clear research plans.

STEPS IN PREPARING A RESEARCH PLAN

After you have clarified the purpose of the research, follow the stages outlined below to develop your plan.

STEP 1 Initial Statement of one Requirement

- Get more or less fuzzy statement of the information you want.

STEP 2 Identify Alternatives

- List the various meanings or interpretations for each word or phrase.
- List the various ways the information can be collected.
- List the various samples (people or sources) you might use to provide the information.
- indicate the type (attitude, behavior, etc.) of information required.

STEP 3 Select Appropriate Meanings and Methods

- Choose the meanings or interpretations that will provide the information needed.
- Choose the methods to be used.
- Choose the sources of information.

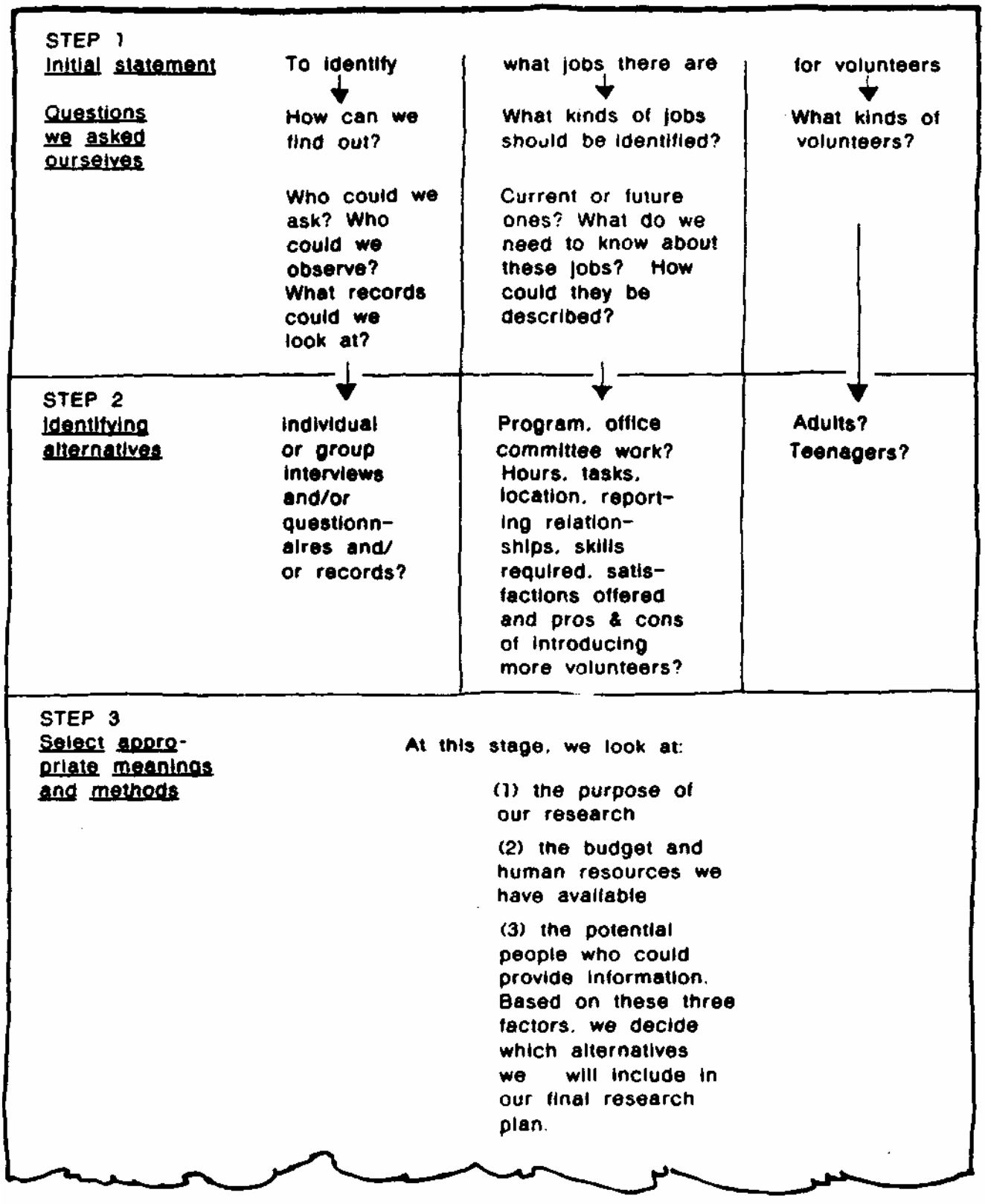
STEP 4 Final Research Plan

- Record all the decisions made in Step 3.

The first statement of a research requirement is your starting point. After that it is really important to examine alternatives. Don't jump to conclusions. Too often people decide on a survey questionnaire before they've really examined the information they need and alternative ways of getting it. It could be that a survey is more costly than other methods.

Using the above step-by-step format, we'll give you several examples. In the first one we'll continue with our Recreation Department and its search for volunteers.

The Recreation Department recognizes that a major part of getting and keeping volunteers is knowing what jobs there are for the volunteers to do. Therefore, the second somewhat loose requirement is: 'To identify what jobs there are for volunteers.' in the chart below, we will go through the process of clarifying this. After the statement of the requirement, we put in some questions that helped us define specific meanings for each word.



In this case, to provide an example, we will make assumptions about the situation in the Department. We will assume the Department has one or two volunteers who can conduct interviews. In this case interviews are better than questionnaires because the staff have negative attitudes towards questionnaires, and they want to have direct input into any decisions about volunteers. Let's assume the Department wants to collect all the information listed under 'what jobs there are', and the pros and cons as expressed in each program area of the Department.

STEP 4
Final research plan in each program area of the Municipal Recreation Department, to ask all current staff and volunteers, via group meetings, to:

1. Identify possible volunteer jobs by listing.

a) Tasks to be done
b) Time required for each task
c) job location
d) Possible satisfaction and rewards for someone doing each job.

2. To identify pros and cons of having a volunteer in each job listed.

In this example, the Department is collecting largely thought/belief type information, although part (2) might give the Department information about attitudes toward having more volunteers, if the Department really wants to know about attitudes, they should include a specific focus on this so that the researcher does not forget to ask staff how they would feel about working with volunteers.

The information from items 1(a), 1(b), and 1(c) define the need as perceived by current staff and volunteers. An outside expert may or may not see the same needs. Notice also that there is no explicit focus on finding out about whether current staff and volunteers want more volunteers.

Our next example also deals with the Recreation Department. This time the Department is collecting information to decide on the best ways to get and place more volunteers.

See if you can provide alternative meanings for the words in the following initial requirement.

STEP 1. Initial requirement To identlfy	what parents	know about volun- teer work in the	Recreation Department
STEP 2. Identifying alternative methods & meanings			
STEP 3. Types of information			

On the next page are the responses we came up with for this sample.

Once again, we use questions to look at alternatives before we decide exactly what information we want, and how and from whom we want to collect it. Don't worry if the final plan in any of our examples is different from what you could choose. Our examples are only meant to demonstrate the principles.

STEP 1. Initial requirement To identify	what parents	know about volun-teer work in the	Recreation Departme nt
Clarifying questions How will the information be collected? From whom?	Which parents?	What types of knowledge are we interested in? What they know about specific jobs? Time commitments? Skills? Hassles & rewards?	Which part or office in the Recreation Departmen t?
STEP 2. Alternative meanings & methods a) Mail out questionnaires. and/or b)telephone survey, and/or c)house to house interview and/or d)interviews at the Recreation Department	e)All parents in community, and/or f) parents of children under 12 and/or g) parents who live within 5 miles of the Department	h) What jobs there are i) what are the time commitments j) what skills are needed k) what training & support is there l) who does volunteer m) what they know or imagine are the hassles or problems volunteering n)how they heard about the jobs	o) Program sections, and/or p) committees, and/or q) administration

STEP 3. Selecting appropriate meanings & methods	Choosing the methods, focus, and sample depends on resources available, the community size and type of residents, and other factors. In our sample situation, we will assume that there are budget limitations and very limited research time. So the Department researchers will first sample those who are easiest to reach. They decide to use names listed on registration forms and parents who can be contacted easily.
STEP 4. Final research plan	To telephone a sample of 100 parents of children between 8 and 12 years. During the interview obtain information on items (h-n). To give a questionnaire on items (h-n) to all who attend the swim meet, the gymnastic performance, and mothers-and-tots program.

This is a tricky one in terms of identifying whether the information collected represents wants, needs, or preferences. Items (h) to (m) assess what the parents know. If we compare what they know to the actual information that was available to them—if they'd known where to look—the gaps could be called needs. We can't call them wants or preferences because we don't know if the parents actually want the information they lack.

This plan will provide useful information from parents whose children are involved in the Recreation Department programs. However, the Department will not get information about parents whose children don't attend the programs. Those parents might provide different and useful information especially if the Department wants to develop an information campaign to attract new volunteers and new program users.

The next section deals with a specific type of needs assessment research. It describes what to consider when you assess training or learning needs.

ASSESSING LEARNING OR TRAINING NEEDS

Needs assessment research is often concerned with assessing the development needs of staff (or volunteers) in an organization. This is referred to as assessing learning or training needs.

There are several types of people who can be consulted in order to identify the learning needs of staff in an organization. You can ask:

- staff themselves
- supervisors of the staff
- clients of the staff
- training experts

When you ask the staff themselves what they need, the information is called Melt needs' or 'expressed needs'. You can also ask them what they want. There is a difference. A person might not want anything, but might actually need something. The researcher or decision-maker who assumes that what someone wants is what he needs, or vice-versa, might be making a big mistake. it is usually wise to ask about both needs and wants.

When you ask supervisors, clients or experts what someone else (staff) needs, the information you get is called 'ascribed needs'. Obviously, the information could be quite different depending on whether you have collected 'felt needs' or 'ascribed needs'.

The usual purpose of assessing learning needs is to help decide what types of training or resources to provide. Each of the above sources could give you information. Without knowing the agency and the situation, no one source is better than the other. Each will have its own consequences. For example. if you ask the staff what they want, chances are they would be pleased with a program designed on the basis of what they had to say. However, this positive attitude would not necessarily exist if a program was designed on the basis of supervisor's, client's, or expert's opinions of staff needs.

On the other hand, sometimes staff don't know what they want or need in certain situations, and they may respond positively to a program developed on the basis of someone else's definition of the need. Before spending time and money on training programs. it is important to know if there is a difference between ascribed needs and expressed needs and wants, and to determine which sources of information you will use.

Within each of these different areas (ascribed needs, felt needs, wants, and preferences), there is another important classification There are. broadly speaking, five types of learning needs:

1. need for knowledge
2. need for understanding
3. need for skill development
4. need for developing interest
5. need for attitude clarification or change.

To illustrate how these types of learning needs differ, let's look at the types of learning that might happen when someone uses this manual.

1. At the knowledge level of learning, you would be able to recognize or recall facts such as the steps in writing a research plan, or the different methods for conducting research, recognition and recall have different meanings. Recall means you can remember and can relate the information to someone else. Recognition is slightly different; you may not remember the exact information but you would know you had seen it. For instance, you'd probably recognize, on a map, the towns you went through to get to a certain destination, but you might not remember their names without the map Most people won't remember exactly the symbols for handwashing, machine-washing, and dry cleaning. But if you show them a label from an article of clothing, they will identify the symbols. This is recognition.

This distinction is pretty important when agencies want to find out what the public 'knows' about their services. If the agency assumes someone can remember the name and services because that person recognizes its brochure, the agency could be quite wrong. Just because someone
recognizes something doesn't mean they can remember it.

2. At the understanding level of learning, you would be able to apply what you learn to the cases and exercises in this manual.

3. At the skill development level of learning, you would be able to develop your own research plan, and construct your own research tools. When you have developed skill, you can generalize the information you understand to a broad range of situations.

4. At the interest level of learning, you would simply be more aware of research and would voluntarily pay more attention to research activities and research reports.

5. At the attitude level of learning, your thoughts, feelings, and behaviors in relation to research would have shifted. If you started with a feeling of uneasiness or even hostility, yet ended up reading this book, you have changed your attitude. Another change might be if you felt good enough to agree to work with others on research.

Let's look at how these five levels of learning relate to the problem of an agency which wants to train its Board members to recruit more volunteers. Planning the training begins with assessing the learning needs of Board members. Therefore, the initial research requirement is stated as: 'To determine the recruitment attitudes, activities and learning needs of Board members.'

Initial requirement To determine	recruitment attitudes	activities	and learning needs of	Board members
Alternative meanings & methods Questionnaire Interview Meeting	What do they think, feel about: -talking to friends -approaching strangers What do they think, feel about the print resources they can give to the public How do they behave in recruiting situations?	What recruiting have they done? (phone calls, speeches, meetings) programs, current volunteer jobs? What skills do they have in recruiting?	What do they know about the organization's purpose.	Current and past board members

Remember, to clarify your research plan, you go back to the purpose of the research. In this case the purpose is to provide information for deciding what. If any, training is needed to improve the recruitment of volunteers. Ultimately, then, the organization needs to know (a) if board members are willing to be recruiters and (b) what learning opportunities they need to become more effective recruiters.

What types of learning could they need?

- Will they need to remember what some volunteer jobs are? Yes. that information will be important to tell the potential volunteers.

- Will they need to understand which jobs will be of interest to different people? Yes. they won't want to tell prospective volunteers about every job. They would find out the interests of a prospective volunteer and tell him or her about the jobs that match this volunteer's interests.

- Do they need to have any skill in presenting this information? Yes.

- Do they need to want to do recruiting (attitude)? Yes. They're not likely to recruit if they don't want to, even with all the information in the world.

Based on this analysis of the situation, the specific information you want to collect is whether Board members:

- Can recall what volunteers are needed, and when.

- Understand the work done in several volunteer jobs—the satisfactions and drawbacks.

- Have skill in talking with prospective volunteers in group and individual situations.

- Have a positive attitude toward being a recruiter.

We also suggest you directly ask Board members:

- What they think they need to know.

- What they want to know about the product, or about volunteer jobs, the agency, the budget, the funding agency.

- How they feel about using the information they have.

- What skills they think they need and want

When you have collected the above information, look at what the Board members have, and want; compare it to what is needed, and then plan training sessions to fill that gap. If Board members have the recall and understanding, perhaps you should provide practice sessions in presenting the information under different circumstances. If they have skill, but not the recall and understanding, perhaps they need only print material or a briefing on current volunteer jobs. If they have the information and skill but are unwilling, then the only useful action might be a conversation to understand why, and sometimes to graciously accept 'no' as an answer.

It is a lot easier to design programs if you collect your information about learning needs in a way that also provides clues about the type of learning. Research in the adult education field indicates that there are certain activities mat work better than others for each type of learning.

Knowledge To learn facts	print materials, lectures. presentations
Understand To apply facts in given cases	case studies, problems, group discussion, debates, panels. role plays
Skill To apply facts and understanding to own situation	role play with feedback, coaching, demonstrations
Attitude To become aware of and change feelings. thoughts, and behavior	discussions, role plays, exposure

Clarifying learning and training needs does not require formal research with questionnaires or tests. You can gather the information through an informal chat over coffee. Being clear about what you want to know doesn't mean you have to use fancy methods.

In relation to learning needs, we have described the differences among felt needs, ascribed needs, wants and preferences. We have also identified four types of learning and suggested that needs assessment should attend to these types.

We suggest that whenever possible ask people:

what they think they need

what they want

how they will use what they learn

what they currently know

how they feel, act, and think in the situation in which they want to use their learnings.

SUMMARY

This chapter identified several types of information you can collect in needs assessment research. The differences between needs, wants, and preferences, as well as the differences among attitude, belief, behavior, feeling and social characteristic data were described.

We defined a research plan and demonstrated a method to go from a research requirement to specify what information needs to be collected. Finally, we discussed what you consider when you specify training and learning needs.

In the process of developing your research plan, you will make many decisions about methods, sampling procedure, and sample size, as well as about the specific information you want to collect. To keep track of all the alternatives and choices, record them on paper, index (or recipe) cards, and allow plenty of time to consider each area fully. Careful consideration at this stage will reduce the possibility of missing information or wasting time on useless information.

Remember you can rarely do a 'perfect research study'. You need to:

1. Recognize you generally want more information than you can get. (And ask yourself how much is really required.)

2. Recognize you will need to make choices among alternatives.

3. Clarify each alternative with other key people, so that the positive features and limitations of each choice can be discussed and weighed.

5. Determine a final plan that is understood and agreed to by the people who will be involved in using the information.

Chapter 4 describes different research methods and provides a checklist to help you choose the most appropriate method for your research requirements and resources.

Chapter Four
Selecting Your Research Method

INTRODUCTION

DIFFERENT RESEARCH METHODS: ADVANTAGES AND DISADVANTAGES

1. Asking people for information
2. Analysis of records and observation of people and materials

COMPARING RESEARCH METHODS

1. Types of information
2. Sampling issues
3. Time and cost factors

WHAT TO CONSIDER IN CHOOSING YOUR RESEARCH METHOD

1. What resources are available?
2. What demands do various research methods have?
3. If a survey is to be done, what type is best?

CHAPTER

Selecting Your Research Method

INTRODUCTION

In the first section of this chapter, we'll take a look at the advantages and disadvantages of such research methods as questionnaires, observations, and record analysis. We will also describe some different techniques in each of these methods.

In the second half of the chapter, we'll present information about what to consider in choosing a research method.

DIFFERENT RESEARCH METHODS: ADVANTAGES AND DISADVANTAGES

There are two basic ways of collecting information: (1) asking people direct or indirect questions, or (2) observing and analyzing existing materials. Let's look at each of them in turn.

1. Asking people for information

There are four major methods of asking people for information: telephone surveys, mailed questionnaires, interviews and focus groups.

Most people are familiar with the telephone surveys and mailed questionnaires commonly used by market research firms. Both methods have also been used in the field of leisure and recreation research to assess peoples' attitudes, preferences, wants, and reactions to government programs and policies. Both methods are appealing because they make it relatively easy to contact people of different ages, living in different parts of the community, speaking different languages.

Face-to-face interviews also have advantages. For example, in a study of needs and preferences, you can engage in personal conversations that follow a person's particular interests and concerns in detail. The great strength of the face-to-face interview is that interviewer can 'probe'. That is, after asking a general question and getting a response, the interviewer can gently question the underlying meaning and needs by simply saying something like: 'Could you say more about that?' This of course can't happen in a mail questionnaire. The interviewer can watch the expression on a respondent's face to know when to probe further: he or she can't do that in a telephone survey.

A focus group is a special kind of interview. It is frequently used to assess needs, preferences, and attitudes. In a focus group, a trained interviewer spends 1-1/2 to 2 1/2 hours with six to twelve people in a fairly free-flowing discussion about a particular topic. The interviewer's job is to make sure everyone has an opportunity to express his or her opinion and that all sides of the topic or issue are discussed. When conflict arises, as it sometimes does, the interviewer focuses on getting the basis of the conflict clear and expressed. The interviewer helps participants to understand that the group is not there to solve differences but merely to express them out loud so the researchers can hear the various viewpoints. Focus groups are usually tape recorded and then analyzed to identify the general themes of the discussion.

Often researchers will use focus groups before designing a questionnaire. It gives them an idea of what people know about a topic, and provides a sample of the kind of language people use in describing their attitudes and preferences. This information gives the researcher the number and content of alternatives that should be included as possible response categories in the questionnaire. This kind of focus group can be conducted formally with staff sitting around a table and talking, or can be done more formally by bringing in people from the community.

The strengths and limitations of these methods can best be discussed by talking about how each affects (a) the type of information you can collect, (b) the sample from whom you want to collect information, and (c) time and costs involved in each method.

But before we compare these four, we'll describe the other major methods of collecting information: analysis of records, and observation of people and materials.

2. Analysis of records and observation of people and materials

In assessing needs, you can obtain a great deal of information by looking at data that already exists. For example, sales or attendance figures, registrations, letters, etc., will reveal fluctuations or changes that suggest whether or not peoples' needs are being met. These observations might also reveal peoples' preferences for different items, days, activities, or locations. Library records can suggest the type of topics that currently interest people. Checking the nature of telephone inquiries to an organization can reveal needs that are not being met. Often, these kinds of records already exist and can provide, with little expense, strong clues to preferences, wants, and needs.

These methods, and the others mentioned in the rest of this section, are called non-reactive. UNOBTRUSIVE MEASURES.* Quite a mouthful. All it means is that the researcher doesn't directly ask for information from the people he or she wants to know about instead, the information is derived from their past behavior, or observations of their present behavior.

Another non-reactive, unobtrusive measure involves watching for the clues that people leave behind. Shades of Sherlock Holmes, Lieutenant Columbo, and Dick Tracy just as detectives piece together clues through observation—a pipe left in an ashtray or finger prints on a glass—in order to come to conclusions about what someone did: so it is with a creative researcher.

For example, a researcher was commissioned to find out the level of alcohol consumption in a 'dry' town. Since the town was not supposed to have any alcohol, people would not give him the information in an interview. So, he counted empty bottles in garbage cans for several weeks and then estimated the average consumption.

Another example involves a person who was not trained in research methods at all. The owner of an auto repair garage, who wanted to advertise on radio, decided to find out which were the most popular radio stations. His solution? He had his repairmen make a note of the position on the radio dial of each car that was brought in for repair. After several weeks, he had the information he wanted.

This garage owner should have been cautious about the information he got He should have checked it against other sources such as radio station ratings, and the results other garages had from their advertising. He should have checked because many things could have influenced the setting of the radio in each car. Further, the people who brought their cars to his garage were a select sample. They might not have represented the group he wanted to attract.

Be cautious when you use unobtrusive measures. No one measure is valid all by itself. Use several measures, or combine an unobtrusive measure with reactive measures such as questionnaires and interviews before drawing conclusions. Unobtrusive measures give you clues and the more clues the better. Using the clues, think back to what might have happened to produce such clues. That is, from the raw information of the traces people leave, you draw inferences about their thoughts, feelings, or behavior.

*Webb E. et al. Unobtrusive Measures in the Social Sciences. Chicago. Rand McNally. 1966.

When you speak to someone in a face-to-face interview, talk to them over the telephone, or ask them to complete a questionnaire, the fact that they answer is an indication of their willingness to participate in your research. By providing answers they consent to tell you something about their beliefs, attitudes, feelings, etc. Using unobtrusive measures, however, may raise legal and/or ethical issues. Sometimes it is possible to get agreement from people for you to make observations 'at some time in the near future (time unspecified)'.* Sometimes they will agree to have you inspect their homes, or their work place or even to accompany them on trips. When you cannot obtain consent and when you are in doubt about the ethics of using such measures — DON'T.

Observing students as they enter class or take a coffee break, will tell a lot about the climate in the classroom. By observing how people walk and sit, you can get an idea of how fit they are. Sound familiar? Of course, most people already pick up the clues. However, most people do not systematically observe what is going on, and they don't check it out. When you use observation as your research method, develop observation categories so you can record what you see and hear in a systematic way.

In Chapter 9. How to Conduct Research on Attitudes, we give you more information on how to use these observations methods. There is also a delightful book called Unobtrusive Measures: Non-Reactive Research in the Social Sciences that provides one interesting example after another. Don't let the title throw you. You will recognize and understand its examples of unobtrusive measures as readily as you do the clues in a television mystery.

COMPARING RESEARCH METHODS

Now that we have described the different types of research methods, we will compare them in terms of:

1. the type of information each method can collect
2. the issues each method raises in sampling
3. the time and costs of each method

1. Types of information

In needs-assessment research, when seeking people's preferences, we often ask them to rank or rate several alternatives, or respond to a checklist of items. It's almost impossible to do this effectively over the telephone. Respondents can't remember a long list that they can't see. This information is much easier to collect with a mailed questionnaire or an interview. Records can provide some information about people's preferences, but the data are limited to their preferences among alternatives that already exist, and have been recorded.

*Crouch. K. interpersonal communication in the reference interview. Unpublished Ph.D Dissertation Toronto. Canada: University of Toronto. 1980

Photographs, drawings, and sketches are often used in needs-assessment research. The principle is that you show a person a picture or photograph or sketch and ask them any of the following questions:

> What do you think is happening here?
>
> If this was an illustration of a story, what would the story be?
>
> What do you think led up to this scene?

The answers to these questions would give the researcher information about what people know about a situation or place, what they think and feel, and what they want Even though this information tool is described in Chapter 9 Conducting Attitude Research, it can also be used to collect many other types of information.

Obviously, these methods cannot be used in telephone surveys. They can be used in mail questionnaires with photocopied photographs and pictures. The interview situation provides the best opportunity because the respondent can talk at greater depth, and the interviewer can clarify and probe meanings.

Mail questionnaires, telephone surveys, and interviews can give researchers answers to specific questions. Focus groups rarely give specific answers, although they do provide a range of feelings and information about a topic. Interviews and focus groups can measure deeper attitudes and feelings, and can stimulate the respondent to think about his or her answers. The results of unobtrusive measures must be viewed with caution until several measures point to the same conclusions. Records also can give specific information.

So in selecting a method for your research you need to consider whether you want (a) specific vs. general information, (b) preferences, (c) attitudes, (d) opportunities to probe or clarify.

Your next consideration in choosing a research method is how many people you want information from, how easy it will be to contact them, and their attitudes toward different methods. These are called 'sampling issues'.

2. Sampling issues

One major issue in selecting a method is: will the people from whom you want to collect information be willing and able to respond to the method you prefer? Written questionnaires frighten some people because they associate print material with legal documents or government papers. Sometimes people simply may not know how to read the questions, or write the answers. Photographs, interviews, discussion, and focus groups are most appropriate for this population. On the other hand, some groups will react negatively to the use of photographs or to being asked to draw or choose pictures. Your method must match the skills, abilities, and preferences of the group you want to approach for information.

A second issue is: will you be able to contact the people you want, with the particular method you want to use? And how much time and energy will the contact take? Because almost everyone has a telephone, it would seem easiest to contact people through a telephone survey. There are several hidden problems, such as getting accurate, up-to-date lists of people and their phone numbers, and then calling back three or four times before reaching the person. Also, if you're using a telephone directory, you must be aware that your sample won't represent people with unlisted numbers and they may have different opinions and attitudes than those you do reach. In some American cities up to fifty percent of those who have telephones have unlisted numbers. A telephone survey in such a city could no. presume to represent the general population's views.

Even with correct phone numbers, it may take many call-backs before you actually reach the person you are phoning. Then, even though a person agrees to be interviewed right away (perhaps to get rid of you or avoid a further phone call), he or she might be busy with other things and not really pay attention to the questions you are asking.

The issue of getting current names and addresses also applies when you use mail questionnaires. They also have a drawback in terms of how many are actually returned. Some people have received so many questionnaires that now they automatically file them in the waste basket, or at the bottom of the pile of things that need doing—some day. In Chapter 7, Designing Questionnaires, we'll give you some suggestions for increasing the chances of people responding to mail questionnaires. Nevertheless, you need to remember that the return rate can affect the usefulness of your research.

If it's important for your research to have a specific person fill out a questionnaire and represent their own views, then a questionnaire might not be the best choice. There is no guarantee that the person to whom you send the questionnaire will be the one to fill it out.

Interviews present their own sampling drawbacks. Locating people and setting up appointments takes time. Where and when you conduct the interview can affect the nature of the information you get. If someone's husband, wife and/or children are wandering around while the interview is going on, the respondent might not be as relaxed or as open as you want him or her to be. The chief drawback, however, is that because interviews take so much longer to administer and conduct than telephone surveys or mail questionnaires, the number of people you can see (sample size) is often too small for many studies.

All methods, as you can see, have advantages and disadvantages, built-in strengths and weaknesses. More often than not you will compromise in your choice of methods. Rather than the perfect method, you will choose the methods you can afford to reach the sample you need to fulfill your research purposes.

3. Time and cost factors

Mail questionnaires may appear to take the least amount of a researcher's time. However, mail surveys, regardless of their size, do have many costs to reckon with. There are the obvious costs of paper, typists, duplication, etc. There are also the hidden costs of writing questions, testing, coding, summarizing, and writing reports. There may also be consultant and computer-time costs. You might be able to get donations of these services by approaching research firms, colleges, universities, or government departments. Even then, it takes time to contact, meet, and co-ordinate with outside experts. if you purchase the services of a consultant, you will certainly use less of his or her time if you arrive with a clear purpose and lists of people that might be interviewed.

Telephone surveys include such hidden costs as time to develop questions, test them, train interviewers, summarize results and write reports. After one national telephone survey, organizers calculated their costs. They estimated that out of every dollar spent, the actual phone calls cost forty-two cents, training and administration each cost twenty cents, and salaries cost thirty-three cents.

Telephone interviewers are paid by the hour instead of by the number of interviews because interviews take varying amounts of time, and because interviewers frequently have to place several calls before they get to speak to the person they are to interview, it takes roughly 2.2 calls to obtain a completed interview.

In one study that compared the three types of methods, the cost of face-to-face interviews was almost double that of a mail questionnaire. A telephone interview costs ten to fifteen percent more than a mail questionnaire.*

Record analysis, or observation and analysis of the clues people leave behind, is a relatively low-cost method of collecting information. Observing people involves the cost of developing observation forms, training observers, observation time, analysis and reporting time.

In Chapter 6 we provide both specific information about costing research projects and also planning sheets to help you to do it.

WHAT TO CONSIDER IN CHOOSING YOUR RESEARCH METHOD

Use the purpose of your research as your starting point. It will tell you why you're considering research, who you'll present the results to, and probably something about the methods they prefer.

Then use your research plan as your guide. it will tell you. in broad terms, who to collect information from (or about) and what kind of information you need to collect.

With that background information, choosing your methods involves asking yourself the following questions:

1. What resources are available?
2. What demands do various research methods have?
3. If a survey is to be done, what type is best?

1. What resources are available?

If you nave many volunteers who can be used to collect data, then the costs of research can be spread among them. Because you won't be paying interviewers or question coders, the direct costs will be relatively low. Can you get experts easily, if you need them? Universities, market research firms, community colleges, and government departments have people who may be able to help. You are more likely to get them when you need them if you talk to them before you actually do need them. In other words, call them in January to ask if you can call in May should you need some help.

*Dillman. D. A. Mail and telephone surveys: The Total Design Method. New York: John Wiley & Sons. 1978.

Physical resources are another factor to consider. The 'simple' problems of typing questionnaires, stuffing envelopes, collecting returns and doing follow-ups must be considered in the light of the on-going work loads of yourself, your office, and of your organization. You need to have storage space and space to sort papers Tape recorders require batteries, tapes, and a quiet place to listen. So it goes. Someone may offer free computer facilities to analyze your data Ask if that included the person-power needed to code the questionnaires, key punch the computer cards, and program the analysis. The computer is not worth anything to you if you don't have the funds or the persons to put information into it. Since computer centres are usually busy, it is wise to ask who your contact person will be, when they will be able to start, and when the job will be finished.

Lurking behind the last questions are the issues of cost. Needs assessment doesn't have to break the bank and it won't if the research is carefully planned in line with your financial resources. However, credible research always involves some expenditure of money in direct and indirect costs. It need not be a lot, the sum will depend on your design and your needs. But if your funds are extremely limited, then even a modest mail survey may be too costly. On the other hand some kinds of research, for example those that use existing files or records, can be done with a minimum cash outlay.

2. What demands do various research methods have?

Whatever the purpose of your research, you'll need to pick a method that allows you to:

- identify the proper source of information (people, records, files, or situations)
- contact the sources of information
- ask the right questions
- record the answers in usable form
- decide on your means of presenting the information.

Mail questionnaires, telephone surveys, and interviews demand that you develop and test out the questions you are going to ask. Interviews and observations demand that people be trained to do the job. In all three methods, and even in participatory research, you'll need to develop administrative plans for contacting people, collecting, organizing, and summarizing the data.

In terms of administrative requirements, the mailed questionnaire can be done with a minimum of skilled people, and it can be conducted across long distances without increasing the costs substantially. In contrast, a telephone survey is the fastest to conduct.

We've reviewed the strengths and weaknesses of each method. We've looked at some of the unique demands and requirements of each method. Finally, in the next section, we present a summary of factors to consider when you have decided to do a survey and you are trying to choose among mail questionnaires, or telephone, or face-to-face interviews.

3. If a survey is to be done, what type is best?

	Face to Face Interviews	Telephone Survey	Mailed Questionnaires
1. Type of information			
If you have:			
● A complicated series of questions to ask	Yes	No	Sometimes
● Many open questions to ask	Yes	Possibly	Rarely
● Many alternatives to be considered or rated	Possibly	Rarely	Yes
Do you need to know:			
● Responses to very specific questions	Yes	Yes	Yes
● Deeper attitudes and feelings	Yes	Rarely	No
2. Sample			
Do you need			
● Answers from specific people who might not respond themselves (they might give the task of responding to someone else in their organization)	Yes	Yes	No
● Answers from specific people who are likely to respond	Yes	Yes	Yes
● Answers from a lot of people	No	Possibly	Yes
Do you have			
● People who will not understand print	Yes	Possibly	No
● People who will not want anyone to know what they think	Rarely	No	Yes
● People who speak other languages	Possibly	Possibly	Possibly
3. Time			
If you lack:			
● Trained interviewers or the time to train people	Never	No	Yes
● Time to code responses or people to do it for you	Never	Rarely	Rarely
● Time to think about the research you are doing	NEVER	NEVER	NEVER

Chapter Five
Selecting Your Research Sample

INTRODUCTION

HOW SAMPLE SIZE AFFECTS THE CREDIBILITY OF RESEARCH RESULTS

1. Margin of error
2. Confidence level

HOW TO CALCULATE YOUR SAMPLE SIZE

FACTORS TO CONSIDER in CHOOSING A SAMPLE

1. How will you use the research results?
2. What is your population like?
3. What are your resources?

SIX TYPES OF SAMPLES

1. Accidental sample
2. Reputational sample
3. Random sample
4. Stratified sample
5. Cluster sample
6. Quota sample

SUMAMRY

CHAPTER
5 Selecting Your Research Sample

INTRODUCTION

Where will you get your information?

You can get research information from print materials (records, files, correspondence) or from people (surveys. interviews, or observations). Whichever sources you use, you will have to decide:

- HOW MANY people or pieces of print should be included in your research. → This is called your SAMPLE SIZE
- WHICH people or print materials should be included in your sample. → This is called the SAMPLE
- HOW should they be selected. → This is called the SAMPLING METHOD or PROCEDURE

This chapter will give you basic guidelines about sample sizes and sampling procedures for different situations.

Sampling methods and sample sizes are issues that must be considered when you cannot (or do not want to) survey or observe every member of the group you are interested in studying. In the following situations, you could probably assess the needs, wants, preferences, and attitudes of everyone involved:

- members of your organization
- staff and/or volunteers in your agency or department
- your board of directors and committees
- your learning group or class

In such situations, if you can contact everyone, then you don't have to figure out who to leave in and who to leave out of your research. if this is your situation, then you don't have to be concerned with sampling. However, to help you understand any research reports you receive we recommend you read. 'How Sample Size Affects Credibility of Research Results', and 'Types of Research Samples'.

The situations listed below require attention to both sample size and sampling procedures. If you want to collect information about the attitudes, wants, needs, or preferences of any of the following, you should consider drawing a sample rather than attempting to talk to everyone:

- large groups in your community
- your neighborhood
- a group of organizations
- clients of your organization
- a whole city or town
- a provincial or national group with many members

In these cases, it is usually too costly to survey or interview everyone. Most of the research results you read in the newspapers are based on research that used samples. Do you ever question the results?

What do you believe when you hear, 'Nine out of ten doctors recommend product X'? Assume there are several thousand doctors in Ontario. It could be that only 100 were surveyed and that 90 of these supported product X is that good enough for you? On that basis, would you conclude that 90% of an. doctors recommend product X?

We're not trying to discredit commercials or surveys; the statement could represent the views of all doctors. However, we simply don't have enough information to know whether or not to believe the statement. We don't know how many doctors were surveyed. Even if an adequate number was surveyed, we don't know how they were chosen or whether they represent those who were not surveyed. If only doctors in private practice were chosen, they might not reflect the view of staff doctors in hospitals or of those in research. Or, the sample might not have the same views as long-time practitioners. We simply don't know the basis for the conclusion that 'nine out of ten recommend X'.

What conclusions can we draw?

- Percentages and numbers can mislead you.
- Sample size and method of sample selection are critical (actors in research.
- The credibility of your research depends on how many people or items were included in the study and how these were chosen.

The next section will explain how sample size affects the accuracy and credibility of research. The second section will build on this background and show you simple steps to determine the sample size you will need for your study. The last two sections will describe ways to choose a sample that is representative and will identify 6 types of samples.

HOW SAMPLE SIZE AFFECTS THE CREDIBILITY OF RESEARCH RESULTS

Let's look at the relationship between sample size and the credibility of research results in some recreation research. If you lived in a community of 25,000, how much faith would you have in research results that said, '50% of the community want an indoor swimming pool.' If these results were based on a sample of 30 people? You might have more confidence if the results were based on 200 people, and still more confidence if they were based on 2,000 people. You might place complete faith in the results if they were based on all 25,000 people. The amount of confidence you place in research results generally goes up as the size of the sample goes up.

A total group is called a POPULATION. In our example, the population of concern is 25,000 people. In the medical research recommending product X, the population would include all doctors in Ontario. Because there is rarely enough time or money to survey every member of the population, a sample is selected, and questionnaires, interviews, or observations are used to collect information. The information (research results) from the sample is used to estimate the views of the total population. The critical factor is: how much error is there when you generalize from your sample to the population?

Based on statistics and research theory, we know we can never be 100% sure that sample results accurately reflect the opinions of the total population had they all been surveyed. When 50% of our sample say they want a swimming pool, we can't be certain it means 50% of the population wants a swimming pool, in (act. using statistical tables that take into account probability theory and chance factors, we can tell what the population factors might be if the results from our sample of thirty are that 50% want a swimming pool:

When 50% of a sample of 30 people state “X” (eg. 'We want a swimming pool') the percentage of people in the whole population who want ‘X' can be as low as 32% or as high as 68%. You don't know exactly what percent of the total population support X. but you do know that between 32% and 68% of the population will support it. Sampling theory tells us you can be 95% sure of that.

1. Margin of error

When you say '32% to 68% of the population want X' that gives you a pretty wide MARGIN OF ERROR. The margin of error is the range of values that can occur when you use a sample result to estimate the population value, if you were trying to decide whether or not to build a swimming pool based on this survey, and you did so believing the 50% sample result, you could be in for some surprises.

If the actual support in the total population is only 32%. You might end up with low use and grumblings about maintenance costs. On the other hand, if the support in the total population is as high as 68%, a new swimming pool could be well used. Building a pool based on the responses from a sample of thirty people is risky and unwise because the margin of error is so large. Your margin of error would go down if you surveyed a larger sample. For example, when you obtain a result of '50% say X' from a sample of 250 people and generalize this to your population, you can be 95% sure that between 43% and 57% of the total population would say X.

* The procedures and calculations in this chapter are based on the assumption that the population data are 'normally' distributed. For a description of this see Chapter 10.

These figures are taken from statistical tables that you will be reading later in this section. For the moment, the principles you need to know are:

The word POPULATION refers to all the people you are interested in (eg. all citizens, or all seniors, or all staff). The word SAMPLE refers to the people who are actually surveyed, interviewed, or observed.

The accuracy of the results you get from a research sample is related to the size of the sample.

The results from a sample are used to estimate the population results. They are rarely identical.

For different sample sizes, statistical tables will give you the population estimates in the form of a range from the lowest likely result to the highest likely result.

Use the following examples to check your understanding of these principles. Imagine that you talked to twenty people in your organization about whether they wanted more volunteers, and ten people said 'yes'. That is. 50% of your sample agreed with the idea of more volunteers. Would you estimate that the same proportion of the whole organization would also agree? Check the table below to see what proportion of the population would agree.

If 50% of the sample say 'yes' with a sample size of:	The percentage of the population saying 'yes' might be: As low as	or As high as
10	18%	82%
15	23%	77%
20	27%	73%
30	32%	68%
50	36%	64%
100	38%	62%
250	43%	57%
1000	47%	53%

With a sample as small as 20 people, if only 10 said 'yes', the proportion of the population who might agree that more volunteers were wanted could be as low as 27% or as high as 73%. Ninety-five times out of 100 you will be correct in assuming that. In your whole organization, the level of support for volunteers is between 27% and 73%. That's a very wide range of possible support or non-support. If we were in your shoes we would use a larger sample.

Here's another example, imagine that in your large municipality you want to find out how many citizens believe services for the disabled should be increased. Based on surveys in other cities and on newspaper articles you think 70% of the citizens will support increased services. What sample size would you want for your research? Look at the table below and choose the sample size that would give you the certainty you'd want before you would spend money on increased services.

If 70% of a sample 'agrees', then, with a sample size of:	The population value might be: As low as	or	As high as:
10	34%		94%
15	40%		91%
20	45%		88%
30	50%		86%
50	55%		83%
100	59%		78%
250	64%		76%
1000	67%		73%

How would you choose the sample size in this situation? First of all, you would want to know at what percentage (the lowest percent favoring the idea) a positive decision would be made. Would Council consider 59% in favor adequate to increase services? If so, a sample of 100 would be large enough. Would it want a higher percentage to ensure support? If so, you might need 250 or even more in the sample.

These examples illustrate how wide a margin of error can be when you generalize from sample results. When you actually do your research and choose your sample size, you will want to choose a sample that has a known margin of error. There are tables that give you appropriate sample size. These tables are set out according to specific margins of error and confidence levels.

2. Confidence level

We have used the term '95% sure' without fully explaining what it means. This refers to the level of confidence you can place in the research results. We've noted you can never be 100% certain when you use research samples; there is always some risk that errors will make your sample results less than 100% accurate when you generalize to the total population. In research, the risk of being wrong is called the 'confidence level'. The 99% confidence level means that 99% of the time your result will lie within the margin of error you have specified, and there will be a 1% risk that your results will lie outside this range. The 95% confidence level (expressed in research as C = .95) means there is a 5% chance of being inaccurate.

Medical research usually demands greater accuracy because the risk of errors has such important implications. Researchers in medicine generally demand the 99% level of confidence and a very small margin of error.

Most recreation research allows for a 5%-10% margin of error and most researchers operate at the 95% confidence level. In our swimming pool example, because of heavy capital costs and long term maintenance costs, we decided to keep our risks of being wrong to a 5% level. So, we used a table for the 95% confidence level and looked up the population range that could occur based on a sample of only thirty people.

There are statistical tables for various levels of confidence and various margins of error in the next section on 'How to Calculate Your Sample Size', we will show you how to use these tables to check the sample size you need in order to get results that will be 99% certain 95% certain, or 90% certain, depending on your particular research.

Before we go through the steps you use to calculate the size of sample you need, let's review the key concepts:

- When you cannot, or don't want to, survey all the population, use a sample.

- Use results from your sample to estimate the results that could have been obtained from surveying the whole population.

- Your estimated population results can never be 100% accurate so you choose the level of confidence you need.

- The 95% and 90% levels of confidence are those most frequently used in recreation research.

- Statistical tables for various confidence levels will show you how wide a margin of error you'll have with different sample sizes and the required sample size for different population sizes.

HOW TO CALCULATE YOUR SAMPLE SIZE

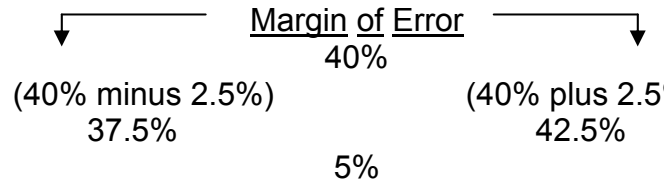
The two factors that determine the size of the sample you will need in your research are:

- the confidence level
- the margin of error.

In general, the 95% confidence level should give you all the security you need when drawing conclusions from your sample. We've used this level in the examples that follow. if you want to be more (or less) confident, you can use published tables* for other sample sizes.

*Fleiss. J. L. Statistical Methods for Rates and Proportions Toronto: Wiley-Interscience. 1973.

The margin of error is a matter of choice. If you want to be relatively safe in your conclusions then a 5% margin is acceptable. This means that if 40% of a sample says 'yes' to our research question, you can say that the result for the population would lie in a 5% range, that is, between 37.5% and 42.5%. A 5% margin means you would add 2.5% to the sample result and subtract 2.5% from the sample result to give you the population values.



If you combine a 5% confidence level and a 5% margin of error you are creating a precise basis for selecting a sample. If you relax your margin of error to a 10% range (±5%) it is still quite respectable. Tables for this margin are also published elsewhere.*

There is a third factor that can make a real difference to the size of the sample you need:

- your best estimate of the population proportion.

If you know nothing about the population being sampled and therefore can't guess how they might answer a question, then you assume the population result will be .50 (a 50-50 split). However, if you can estimate the population result - based on some informal questioning, other research, or the views of experts - then you can likely use a smaller sample to obtain the desired margin of error. These three (actors will be illustrated in the following examples and in Table

*Fleiss. J. L Statistical Methods for Rates and Proportions Toronto: Wiley-Interscience. 1973.

STEPS TO DETERMINE WHAT SAMPLE SIZE YOU WILL NEED

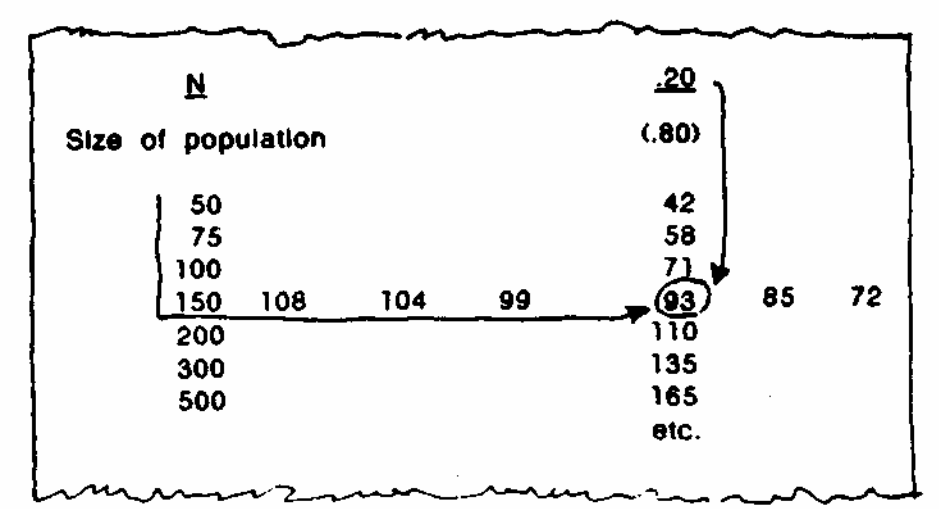
Example 1. Problem: You have 150 members in your association.
You are thinking of increasing membership fees, but don't want to without knowing what percentage might oppose your action and perhaps leave the association.

STEP 1 You ask three executives of the association what percentage of the members they think will oppose the increase. They produce estimates ranging from 5% to 20% to 30%. You average these and estimate about 20% will oppose the increase.

STEP 2 Look for your estimated value of 20% on the top line of Table 1 on the following page.

STEP 3 Find the size (150) of your association in the left-hand column.

STEP 4 Go across the line you found in Step 3 (150) until you are under the estimated value from Step 2 (.20). The figure there is 93. (We've reproduced the appropriate columns, below.)



If an estimated 20% of the membership have negative attitudes about increased fees, you will need to survey or interview 93 people to make sure (at least 95% certain) that you have enough opinions to reflect those who are positive as well as those who are negative.

Table 1*

Sample sizes for 95% confidence level (Margin of error ± 2.5%)

Populations (N) from 50 upwards

N Size of population (or strata)	Estimate of population proportion (p') .50 or .50	.33 (.67)	.25 (.75)	.20 (.80)	.15 (.85)	.10 (.90)
50	44	44	43	42	40	37
75	63	62	60	58	54	49
100	80	77	74	71	66	58
150	108	104	99	93	85	72
200	132	126	118	110	99	82
300	169	160	147	135	119	95
500	217	202	183	165	141	108
1,000	278	253	224	198	164	122
2,000	322	290	252	219	179	129
5,000	356	318	272	234	189	135
10,000	370	329	280	240	192	136
25,000	378	335	284	243	194	138
Much larger or totally unknown	384	340	288	246	196	138

Example 2

Problem: An organization with a staff of 450 wants to know whether the staff think they can provide a particular new service. Since the new service will require some changes in job responsibilities and hours, management wants to be fairly certain they have staff agreement to go ahead without extra budget. How big a sample for their staff survey would they need?

Step 1. Five staff members who know the organization fairly well could be asked: 'What percent of all staff in our organization would support the idea of providing the new service?' The researcher might receive estimates of 25%, 40%, 30%, 35%, and 35%. The average of these estimates (33%) would be used as the estimated proportion in the total organization (the population).

Step 2. Look for the estimated value of 33% on the top line of Table 1

Step 3. Find the size of the organization in the left-hand column (450). (Use the closest value shown in the table, in this case. 500.)

Step 4 Move across the line marked 500 to the column headed .33. The number in the table at that point is 202. Therefore, a sample of 202 persons would be needed.

This is, relatively speaking, a large sample. Two hundred and two people out of 450. means you would be sampling about 40% of the population (the total organization staff). However, sampling 40% of the population will obviously be less expensive than talking to the total population. For example, if you were going to do interviews and you figured a minimum of $10 per interview, then the required sample would cost $2,020, as opposed to $4,500 for interviewing the whole population. (This is an illustration for determining sample size; we do not recommend interviews with 202 people as the best research method for this problem.)

This example illustrates that whenever the population is small, the size of the sample tends to be a high proportion of that population. Five hundred is a relatively small population, with a population of 5000. Table 1 indicates you would need only 318 people for the sample - a much smaller proportion than 202 is of the total population of 500. Specifically, 318 is 6% of 5,000, whereas 202 is 40% of 500!

The sample size also increases as the estimated results get closer to fifty percent Notice that if only 10% favored the idea, you would have needed only 108 people in the sample. This is only 22% of the total organization of 450 people.

* See reference, page 57.

Example 3

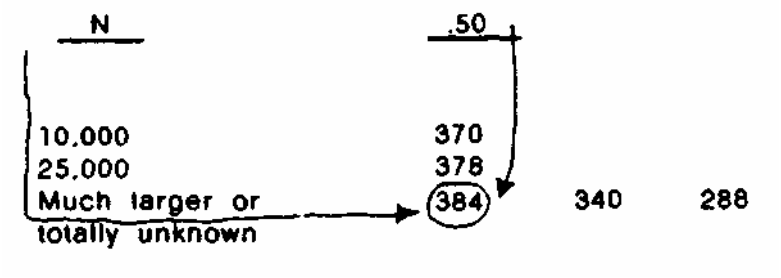
Problem: In a large urban area (population. 45,000) there is a proposal to build a multicultural centre. Before making the decision to do so, town council wants to know how many persons would use the centre for language classes, for its theatre facilities, as a meeting place, etc. How big a sample does council need for a city-wide survey?

Step 1. Since there are many questions to be asked about possible uses of the centre. it is difficult to use any one of them to get a population estimate. To be on the safe side the population estimate is taken as 50%.

Step 2. Look for the estimated value of 50% (or. 50)

Step 3. Look for size of the community population in the left-hand column. Since 45,000 is greater than the last figure shown (25,000) use the bottom line.

Step 4. Move across the line marked 'Much larger' to the first column of figures under the .50 heading. The sample size needed is 384. This is less than 1% (actually .8 of 1%) of the population. The results, however, will be accurate to within -2 1/2%, and you can be 95% sure of that.



How large should the two samples be when you want to compare two populations?

Sometimes we take samples of different populations because we want to compare their statements of needs and preferences. We may want to find out their levels of interest in our program, and also whether there is a real difference between the two groups' levels of interest. The question we must ask is 'What is the best sample size from each group in order to detect whether there are any real differences?' The answer to how many are needed in each of the sample groups is based on two estimates:

- the expected result from sample number 1.
- the expected result for sample number 2.

This is essentially the same as step number one in our examples for deciding on sample size from a single population. Once you have the two estimates, you can look up each sample size. We will not set out the tables here, but we can give you a general rule of thumb. When you get your expected results for group number 1 and for sample group number 2, subtract one from the other to get the expected difference in the two sample results. If the difference you get is only 10% you will need 400 people in each sample if the difference you get is about 20%. Then you will need two samples of approximately 100 people each. If the difference you get is about 30% then you will need only 50 people in each sample.

In short, If you expect fairly large difference between the two groups you will not need a very large sample. On the other hand, if the differences are likely to be small you need large samples.

FACTORS TO CONSIDER IN CHOOSING A SAMPLE

Knowing how many people should be in your sample is half the battle; the other half is knowing how to select people for that sample. We will provide some rough guidelines to help you to choose a sampling method. Whenever possible, you should consider these methods; arrive at a conclusion, and then consult someone who has survey research experience to confirm your choice of method, or to offer a better alternative.

The sampling method you use depends on three factors:

1. How will you be using the research results?
2. What is your population like?
3. What are your resources? (time, money, workers, etc.)

1. How will you use the research results?

Sometimes you want to gather information in order to talk with accuracy about a total population. If this is the case, you'll need a sampling method that gives you the numbers you need to make generalizations and also selects people without bias. Random, stratified, and cluster samples fit these requirements.

Other times, you want to gather information in order to discover the widest possible range of opinions or statements of needs. In this case, because you don't want to make comparisons between groups or generalizations about the needs of the total population, you can use less exacting methods such as reputational or accidental sampling.

2. What is your population like?

Sometimes defining your population is a task in itself. In our earlier example where we reported that 'Nine out of ten doctors recommend product X', the population groups for the sample of doctors could include all licensed doctors, or all practicing doctors, or all retired doctors, or all research doctors. The list of all licensed doctors could include doctors who are currently practising and doctors who have retired. The list of practising doctors would not necessarily include doctors who engage in research or administration. So, we'd have to make a clear decision about just who our population is to be. Sometimes we have to settle for less than we want because lists are out of date, or there are no lists, or because a mixture of people appears on the lists, and there is no economical way of sorting them out.

If you want to survey your community, you'll have to define what you mean by 'community', because it could have many definitions that would affect your sample. You could define the 'community' as the ethnic and indigenous groups your agency serves. Or, you could say your community population includes every person living within a certain geographic area.

3. What are your resources?

- Can you afford (time, person power and money) to interview, survey, or observe the numbers of people needed? If not. You will use less precise sampling methods.

- How can you contact the sample? If there are up-to-date population lists you'll be able to use random or stratified sampling. If there are no lists other types would be used.

The following discussion of six types of samples will relate your resources to different types of population and to different levels of precision.

SIX TYPES OF SAMPLES

1. Accidental sample

This is the weakest type of sample, but is the easiest to get. 'Man-in-the-street' interviews are typical of accidental samples. The researcher simply uses the first five, or ten (or whatever number) people who happen along and are willing to talk.

There are enormous sources of bias in accidental sampling. For example, suppose you were doing a survey of community recreational needs and you decided to interview 100 households, if the interviewers went to selected addresses and talked to whomever answered the door, the sample would be accidental. Children, mothers, fathers, babysitters, etc., could have answered the door and been interviewed. It's possible the majority of respondents would have been children or teen-agers — neither of whom represent the whole of the community.

Accidental sampling produces results that can lead to accidents in drawing conclusions and making decisions.

2. Reputational sample

This is a fairly common way of selecting people to respond to a survey or to be interviewed about issues it's not really a sampling method; it's a selection procedure in a true sampling method, each person in the population has an equal (or at least a known) chance of being selected for *a* sample in reputational samples, the choice of an individual depends on someone's judgment of who is and who isn't a 'typical' representative of the population That's why another name for this type of sample is 'purposive' Sometimes, people are selected because of their reputations, or because they are publicly visible, or because they hold some position in an organization.

Reputational samples (eg. talking to the presidents of organizations, to the executive directors or chairmen of councils, etc.) are perfectly legitimate ways of collecting information. However, no claims should be made that the views of these people represent the views of the population. The people chosen because of their role in an organization might well represent their group to government but. In a true (sampling) sense, their opinions are not representative of the population they come from. If you want to find out about the needs of staff in an organization, or people in a community, or volunteers in several agencies, you will produce more accurate and reliable information if you use one of the following samples (random, stratified, or cluster samples).

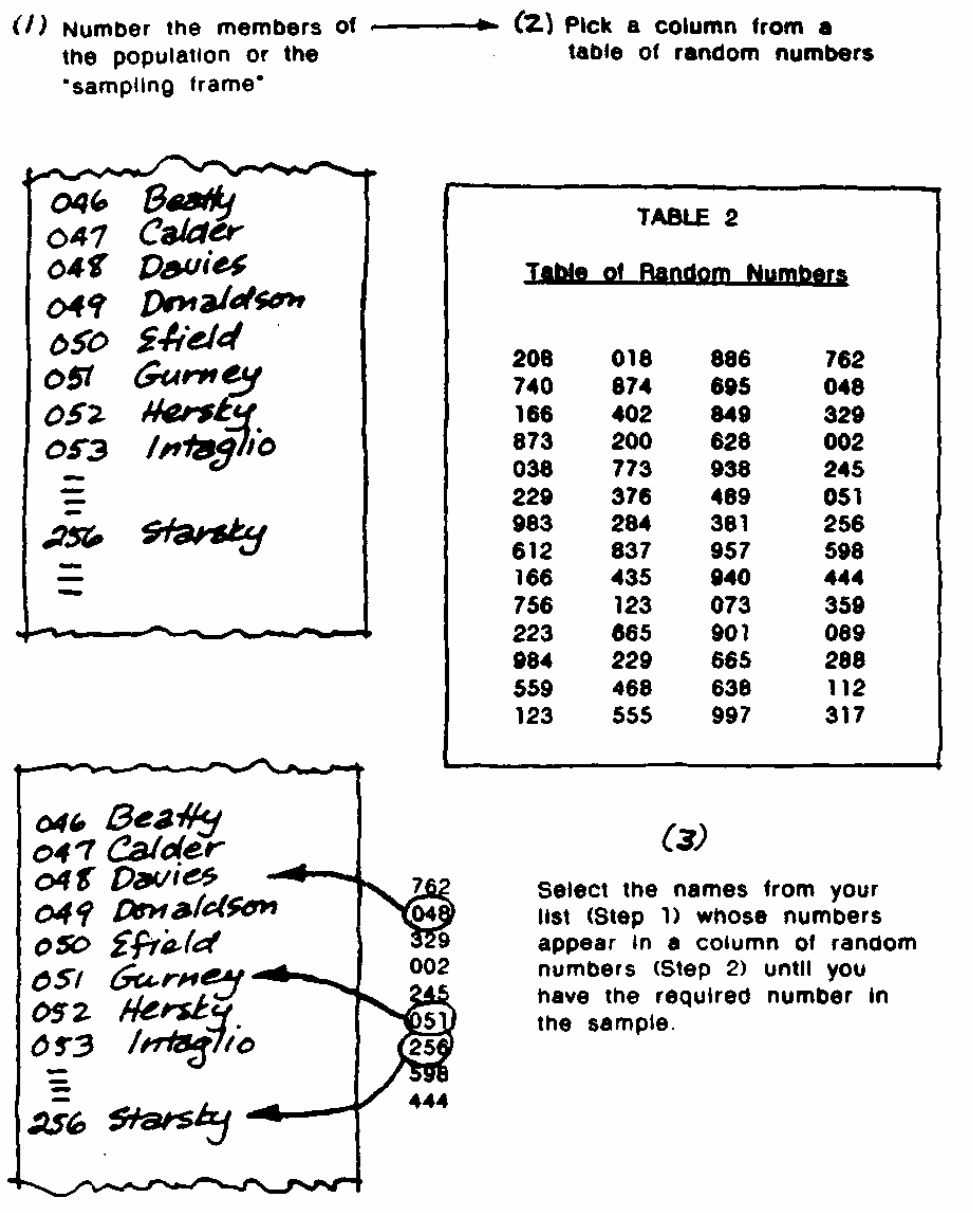
3. Random sampling

A random sample is one in which every member of the population has an equal chance of being selected and included in the sample. If you were assessing the training needs of members of a voluntary agency and you had a complete list of members (this would be the population) you could use a random sample. Here are three ways you could make the selection.

- Write each name on a separate piece of paper, mix up all the slips of paper, then draw out the number of names you require for your sample. This gets messy if you have hundreds of names to mix up.

- The second method has three steps. First, divide the total number of people on the list by the size of the sample you need. So, if you have a list of 500 people and you need a sample of 55 you would end up with the number 9.05. Therefore, your sample will consist of one out of every 9 persons. Then you would go through your list choosing every ninth person until you reach 55 names. You have to be careful to select names from the entire list, not just the beginning, so you would pick a starting point at random in the list, and start counting nine from that point. When you get to the bottom of the list, if you do not have your required sample size go back to the beginning and keep counting and selecting until the required number is reached. If you are sampling from municipal roles, make sure this procedure doesn't draw a sample consisting entirely of corner properties, these tend to be different from other properties.

Another method is to use a Table of Random Numbers. First, number each name on your list, then choose any column from the Table of Random Numbers (Table 2). Go down that column using either one, two. or three digits to identify the numbered names which will become part of your sample. Keep adding names until you have the sample size you need. If a number comes up that has already been used simply skip it and go on to the next number.



4. Stratified samples

There are times when you want to be sure your research sample represents several segments or sub-groups in your population. If you use a random sample, it is possible to miss an entire sub-group. Just as a simple random sample allows everyone an equal chance of being chosen. It also allows an equal chance of being missed. The following examples describe situations in which a stratified sample might be used:

- Assessing the recreation needs of patients in a large rehabilitation centre. You should make sure your sample represents different types of illnesses or restrictions of movement.

- Assessing needs of staff in a multi-level organization. You might choose to do group interviews with different levels of staff so they will be more directly involved in the needs assessment. If, however, you wanted to use a sample of individuals, you should make sure that program staff, clerical staff, secretarial staff, and administrative staff are represented in your sample.

- Assessing the needs of all volunteer centres, or all information centres, or all libraries. You should make sure that large and small centres are proportionally represented in your sample.

- Assessing people's summer recreational needs in a resort community. You should ensure that permanent residents, and summer visitors are proportionally represented

- Assessing the needs of a community with several ethnic groups. You should make sure each group is represented in your sample. Now let's work through an example to see how to create a stratified sample.

Suppose we want to assess recreation needs of families who live in high-rise buildings in the community. Let's say you've learned from other social service agencies, or the social planning council, that the high-rise buildings contain five types of households:

A. Single-parent homes - 10% of the population

B. Two-parent homes - 70% of the population.

C. Single parent plus grandparent - 10% of the population

D. Two parents plus grandparent - 5% of the population

E. Other family structures - 5% of the population.

Use the following steps to stratify the sample so that every subgroup will be represented:

1. Divide your population into the subgroups as identified by the social planning council.

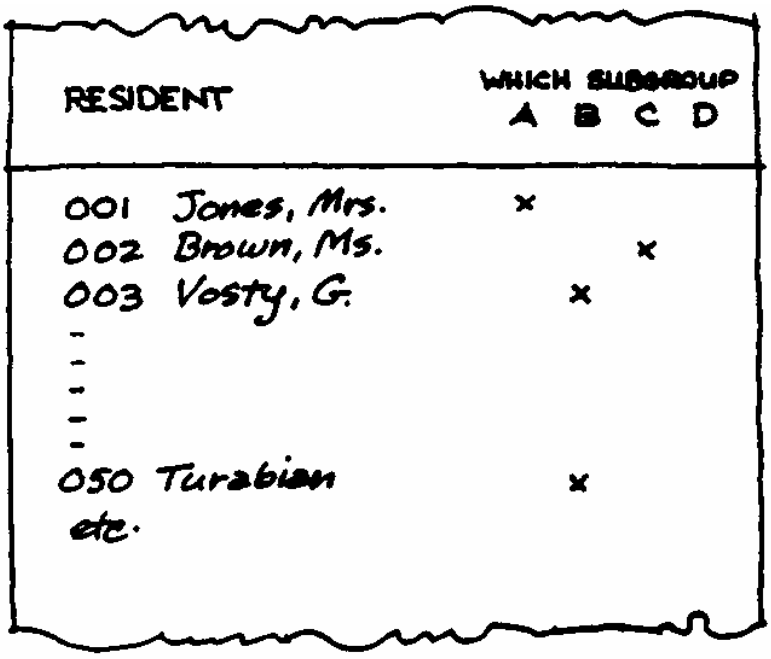
2. Determine the size of sample needed for the population. Follow the steps outlined on pages 67, 68, and 69 for sample size.

   In this example, we'll say 1,000 people live in these buildings and we want a 95% level of confidence, so we need 278 people in our sample.

3. Stratify your total sample into the same proportions as exist in the population. That is, multiply the number in the sample by the proportion of the population in each strata.

Type of household (strata)			Number of persons in each strata
A. 10% x 278	=	27.8	= 28
B. 70% x 278	=	194.6	= 195
C. 10% x 278	=	27.8	= 28
D. 5% x 278	=	13.9	= 14
E. 5% x 278	=	13.9	= 14
			279 (Comes to one more than is actually needed)

Separate your total population list into separate lists, one for each group (strata). Or, go through the total population list and indicate the appropriate subgroup beside each name.



RESIDENT	WHICH SUBGROUP A	B	C	D
001 Jones, Mrs.	x			
002 Brown, Ms.			x	
003 Vosty, G.		x		
-				
-				
-				
-				
-				
050 Turabian		x		
etc.				

Draw a random sample from each subgroup. If you've made a separate list for each subgroup, draw the required number of names at random from each list. If you are working from a master list, it is easiest to do one subgroup at a time.

Choose	28 people from group A
Choose	195 people from group B
Choose	28 people from group C
Choose	14 people from group D
Choose	14 people from group E

These 279 names from the five lists will represent the whole population of 1000 people. Any conclusions you draw you will be able to generalize back to the population of 1000 but not to the individual subgroups.

5. Cluster sampling

You can use cluster sampling when:

- your population is spread out over a large geographic area
- your research plan calls for face-to-face interviews or direct observations of people (or their houses, or recreation equipment, etc.).

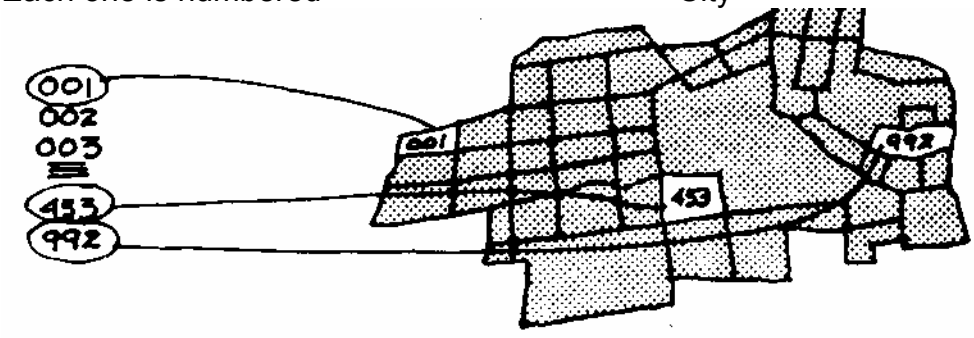
Cluster sampling is one form of a whole variety of sampling methods called multi-stage sampling. These are useful methods for situations such as the above, but they usually require the help of a consultant. We won't describe the details of cluster sampling because we believe two or three hours with a consultant will save you lots of time and trouble. But, we will outline the principles behind this method so you can determine whether cluster sampling is appropriate to your situation.

If you wanted to study a sample of people who are seniors and who live alone, you would realize immediately that seniors are sprinkled all over the city, if you drew a random sample (if you could obtain lists of all seniors who lived alone), it is likely that the addresses would be so scattered that, to reach them all would make travel costs very high. The same would be true if you wanted a sample of all municipal recreation committees in Ontario. You might get a list of all the committees, pick a random sample. Then find that travel would take you criss-crossing all over the province.

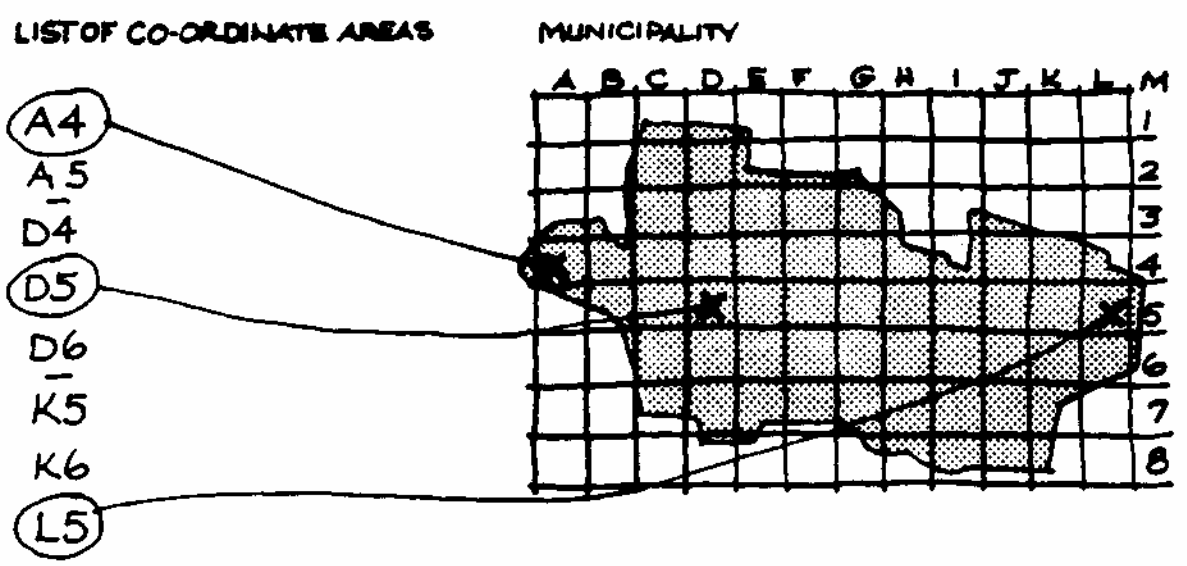
In cluster sampling, you minimize the number of areas that have to be visited by choosing only some areas for the study. The first step in cluster sampling is to select at random a number of different locations in the city or in the province depending on your research and population. You can do this first step in two ways.
The first way is to number every city block, or area of the province, then use a table of random numbers to select specific areas.

List of City Blocks
Each one is numbered

City



A second way involves using maps that divide a geographic area with a grid. Then a table of random numbers is used to select specific areas for study.



The last step of cluster sampling is to choose a random sample of names or houses within the selected area. When names and addresses are not available, an interviewer can be instructed to go to every third, fourth, (or whatever) house, depending on the sample size needed.

Cluster sampling maintains the principle of random selection of respondents so researchers can generalize results from a sample to the population, but it cuts down the final costs of interviewing locations are randomly chosen first, then respondents are randomly chosen in each location.

6. Quota sampling

Quota sampling is sometimes used when two conditions are present:

1. You have limited resources.

2. In spite of your limited resources you want to be certain that your sample mirrors, as closely as possible, the gross features of your population.

For example, you may decide that your research budget will allow interviews with a sample of only 60 people. Let's say you are interested in the view of a group of recent immigrants about recreation opportunities in their neighborhood. and you are also interested in the views of specific subgroups. Even though you can't afford to do a stratified sample of the size required to make precise generalizations, you can construct a sample of 60 in which you specify how many persons of different characteristics should be included.

Let's say your population of adult newcomers had the following characteristics:

Sex:	Males	60%
	Females	40%
Age:	21 - 34	25%
	35 - 54	45%
	Over 55	30%

If you want your sample of 60 to be as much like the population as possible, then it should be constructed to fit these known percentages. With a total sample size of 60. you will need 36 males (60% of 60) and 24 females (40% of 60). Among the male subsample, you will want 9 in the age group 21 - 34 (25% of 36). 16 in the age group 35 - 54 (45% of 36) and 11 in the age group over 55 (approximately 30% of 36).

Designing a Quota Sample of 60 Adults

Sex	Age			
	21 - 34	35 - 54	Over 55	
Male	9	16	11	60% = 36
Female	6	11	7	40% = 24
	25% = 15	45% = 27	30% = 18	60

The quota for females between 21 and 34 is 6 persons (25% x 40% x 60 = 6)

This procedure will give you a miniature of the population in a very small sample. The margin of error for each quota has to be calculated by experienced research consultants. In general, this type of sample will give you a 'quick reading' on the population, but there may be a large margin of error because sample members are not selected at random.

When the interviewer goes out, he or she will interview an adult from among the newcomers in the area, note which category that person fits into, then go on to the next address until all of the required numbers of people have been interviewed. That is, until the quota for each subgroup in the sample has been filled.

The next page summarizes the conditions under which you would use each of these six ways of choosing a sample.

Questions in selecting a sampling method	Type of Sample					
	Acci-dental	Repu-tat-ional	Random	Strat-ified	Cluster	Quota
A. Does the sampling method give you results you can generalize to the pop-ulation?	No	No	Yes	Yes	Yes	Caut-iously
B. Does the method let you estim-ate the percent of the pop-ulation who support or oppose something?	No	No	Yes	Yes	Yes	Caut-iously
C. Can the method give you a pro-file of needs of different subgroups of the pop-ulation?	Unlikely	No	Yes	Yes	Yes	Yes
D. Do you have enough $ to gather inform-ation from the required number of people? If "yes"	Don't Use	Don't Use	Use	Use	Use	Don't Use
E. Do you need a consultant?	No	No	No	Probably	Probably	Probably

Chapter Six
Estimating Time and Costs

INTRODUCTION

TIME AND COST FACTORS IN:

1. Identifying purposes
2. Identifying what information needs to be collected
3. Choosing a research method
4. Choosing sample size and sampling method
5. Developing information gathering tools
6. Administering questionnaires
7. Summarizing results
8. Preparing reports
9. Giving reports

CASE STUDIES ON TIME AND COST

1. Multicultural profile
2. Senior citizen centre
3. United States national comparison of telephone and face-to-face interviews
4. Citizen survey of municipal recreation services
5. Measuring the effectiveness of municipal recreation services

WORK SHEETS FOR PLANNING A RESEARCH STUDY

CHAPTER
6 Estimating Time and Costs

INTRODUCTION

The time required and the cost of a study will depend on the complexity of the study, sample size, available resources, and a host of other factors. While we can't give you specific costs or times, we can outline the factors that influence cost at each stage of a research study.

As we have described, the steps or stages in doing a study are:

1. Identifying the purposes of the research
2. Identifying the specific information to be collected
3. Choosing the research method
4. Choosing the sample size and sampling procedure
5. Developing information-gathering tools (eg. questionnaires)
6. Administering questionnaires
7. Summarizing results
8. Preparing reports
9. Giving reports

First we'll discuss the factors that affect both time and cost in relation to each of the above stages of a research project. Next, we'll outline some case studies and finally, we will provide you with six worksheets you can use for planning time and costs in your particular study.

TIME AND COST FACTORS

1. Time and cost factors in identifying purposes

In earlier chapters, we stressed that clear purposes are crucial to (a) gathering appropriate information, and (b) ensuring the information is relevant to decisions and decision-makers. This is a key part of designing research, and it can take a considerable amount of time. Some of the factors that will increase time and costs at this stage are:

a) How many decision-makers will need to be consulted about the purposes? How accessible are they?
b) Will those who will be affected by the research need to be consulted? How accessible are they?
c) Will external consultants be needed to help formulate the purposes?

Usually, it will take less time if decision-makers are directly involved in the research group, or if the organization is small enough that researchers have easy access to the decision-makers. Also, when the researchers are fairly knowledgeable about research, it will take them less time to identify what information can be collected: thus, less time will be spent obtaining agreement from decision-makers.

Sometimes sorting out which of the many purposes should take priority requires time. For example, one agency wanted to do a needs assessment of the agencies it served. The decision-makers established the following requirements.

1. The research should provide an opportunity for staff to meet and form a relationship with the client agencies.

2. The research should collect information on each agency's needs as seen by its staff.

3. The research should engage agency staff in a process of diagnosing their needs and organizational issues.

4. The research should provide for precise comparisons among agencies.

5. The research should sample a cross-section of 500 agencies spread over wide geographic distances.

6. The research should be completed within two months in order to provide information for scheduled decision-making meetings.

The first three requirements imply face-to-face interviews of some depth. The fourth implies that a fairly large sample would be required to provide precise results. The fifth implies a lot of travel time and co-ordination of meetings. The last requirement identifies a severe constraint on all previous ones.

In this case, it took three hours to clarify the first five requirements. Another three hours were needed to explain the required sample size, the time required of staff, the costs, and finally the potential biases that would be created by the first requirement. At a third two-hour meeting, the decision-makers were able to decide on a few requirements that could be achieved within their budget and time constraints.

As you can see, the process of clarifying the purposes of gathering information also involves considering what information needs to be collected and the sample size and research methods.

2. Time and cost factors in identifying what information needs to be collected

It takes time to find out what information presently exists (records, lists of names, times of events, programs, or meetings, etc). It also takes time to decide what information is actually required, or, in other words, what types of information the decision-makers will accept. The following example describes a situation in which researchers had to work with decision-makers to help them sort out the information they would accept.

In assessing community needs for recreation programs, decision-makers had to agree on what measuring stick they would be willing to use to decide on an increase in the number of programs. Some decision-makers said they would be satisfied to know what programs were offered and used in a community of the same size and composition. This would entail some relatively inexpensive information-gathering from one recreation department in each of three similar communities. Other decision-makers wanted a survey that would ask citizens what programs they wanted. Others wanted information, not only on what citizens wanted, but also on the potential costs of new programs and on what other agencies could offer. Clearly, for researchers to know specifically what information to collect, they had to give the decision-makers the costs and consequences of collecting different information, then help them come to agreement on what they wanted. In this particular case, two meetings with decision- makers were required and additional time was spent by the researchers in getting together the cost estimates and consequences of different approaches.

Remember, don't underestimate the thinking and meeting time required to clarify requirements, identify purposes and establish the research plan.

3. Time and cost factors in choosing a research method

Once the purposes are clear, the next step involves choosing a method. Sometimes this step is accomplished while researchers are clarifying the purposes. Other times, a decision still needs to be made. The factors that bear on costs and time are:

(a) Are there appropriate and relevant questionnaires, observation tools, or interview formats available?

(b) If observations tools or questionnaires must be developed from scratch, who will do it? Are there volunteers or staff whose costs are already covered? Will outside consultants be used? When will these people be available? Will they be able to do the work required within the time required, etc? To answer these questions may take ten minutes, or it may take several phone calls or meetings over several days or weeks.

4. Time and cost factors in choosing sample size and sampling method

The sampling issues that affect the time and costs o1 a study are:

a) What type of results are required to meet the purposes of the study? Do you need precise, quantitative results that you can generalize to the population, or do you need less precise, more impressionistic information? This will determine how large a sample you'll need and. therefore, the costs of gathering the information from that sample

b) Will it take time and involvement of decision-makers or others to decide on which sample size and sampling method should be used? Sometimes people will agree to the principle of collecting information, but resist talking to researchers. In one organization, everyone agreed to the need for *a* study of problems, but it required several meetings to get permission to talk to the workers about their problems. People who plan office interiors often want to ask staff what space they need have. Getting managers to agree to such a survey can take one or two meetings.

c) How many contacts will be necessary to obtain the desired number of completed interviews, observations, or questionnaires? With personal door-to-door interviews, how many times will the interviewer have to call to obtain and complete an interview? (In one study, an average of two calls were required to produce one completed face-to-face interview.) With telephone interviews, how many calls will it take to reach the required people? Studies have shown that it can take between 2.2 and 4 telephone calls to complete one survey call (each call-back is considered a separate call).

d) How much time and money will be required to get up-to-date lists? If up-to-date lists can't be used, how much effort will be required to locate people by other means?

e) With mall surveys, you need to estimate the time and costs involved in sending out the questionnaire, reminder cards and duplicate questionnaires. Researchers generally estimate that a reminder will be sent to half the sample and a third follow-up to half the sample again. This estimate will ensure that you have adequate postage and personnel time.

5. Time and cost factors in developing information gathering tools

There is no way we can estimate the time it will take to formulate your questions or the sequence in which you will ask them. This depends on the complexity of the information you want to gather and your skill in formulating questions. On several recent studies we have done. It took an average of one-and-one-half days to write a fifty-item questionnaire.

6. Time and cost factors in administering questionnaires

These (actors can best be illustrated by examining each of the major terms of information gathering: questionnaires. interviews, and observations.

a) Questionnaires

You'll need to budget cost and time for:

- writing the introduction to the interview or questionnaire
- doing the layout and coding
- typing questionnaires, letters, envelopes
- duplication
- paper
- mailing
- re-mailing
- pilot testing the questionnaire
- time for revisions.

A professional research firm recently estimated that the cost of completing 200 mail-out questionnaires would be between $8.00 and $20.00 per questionnaire This included all the preparatory work (i.e. clarifying purposes, preparation of questionnaires), mail out. and tabulation of results.

b) Interviews

In this category, we include both face-to-face and telephone interviews. You will need to budget cost and time for:

- preparing the introduction
- doing the layout and coding instructions
- typing interview questionnaires, code sheets, resources for interviewers
- pilot testing the questionnaire
- making revisions
- training interviewers (at least a half-day)
- duplication
- paper.

In 1979 a professional research firm estimated telephone interviewer fees between $4.00 and $5.00 per hour. To complete 200 calls, the costs per completed call were between $9.00 and $25.00. For face-to-face interviews, estimates ranged between $20.00 and $50.00-plus per completed interview. Naturally the cost of the interview depends on its length, the number of call-backs, and — in face-to-face situations— the travel time.

c) Observations

You'll need to budget time and coat for.

- developing coding sheets
- typist's name and costs
- paper and duplication coats
- training observers or judge*
- time to locale observation 'places'
- observers' fees.

7. Time and cost factors in summarizing results

The time and cost of summarizing results depends on how many questions or observations there are to summarize and analyze, and whether this information was collected in open-ended questions or closed questions.

The coding and summarizing of results can be done manually or key punched onto computer cards or tapes. Small samples can generally be handled manually by people who have some clerical skill.

Computer programs for most statistical procedures are available and can substantially reduce the time required for mathematical operations. Provincial government consultants or community colleges may provide such assistance at low or no cost. The likelihood of having access to these services increases if you contact the sources early in the design of your research.

8. Time and cost factors in preparing reports

Report costs include writing time, typing, drawing charts or graphs and duplication, in the last chapter of this book we will discuss the importance of giving feedback to your research sample, and to those who will be affected by the research results. This means budgeting time and cost for separate reports or reporting procedures, each one geared to meet the information needs of the particular group who will receive it.

9. Time and cost factors in giving reports

There are many ways for you to convey research results to decision-makers, the research sample, and those who will be affected by the research results. Standard, typed reports are used most often. The time and cost factors would include the writing, typing, duplication, etc. Another way to deliver research results is to hold a meeting. If you choose this method then you must budget for planning the meeting, audiovisual aids, take-away print materials, contacting people who should attend, and arranging space.

Our next section will describe three case studies; then we'll provide planning sheets to help you budget time and costs for your study.

CASE STUDIES ON TIME AND COST

1. Multicultural profile

In 1979, the following case study was presented to a Canadian research firm:

"For planning and development purposes, an agency wants to know the following about a 20-city-block area containing Italians. Portuguese, and white Anglo-Saxon Protestants:

a) the ethnic composition of the area
b) the leisure and recreation patterns of the residents
c) the interests and preferences of the residents in terms of programs and activities
d) the amount of disposable income available for recreation
e) the best ways to introduce new programs and activities."

To develop an ethnic map of the area, personal interviews were proposed. The sampling procedure was to start with the second house from the southwest corner of each block and go to every third house. Four questions were proposed:

- Ethnic origin of heads of households
- Household ethnic composition
- Ethnic composition of heads of households on either side of the respondents' home
- Name, address, and phone number, if willing to be interviewed.

The estimated cost would be the number of interviews multiplied by the cost per interview. The number of interviews would be estimated by dividing the estimated number of households in the area by three (every third house).

To develop information on items (b) through (e) in the case study, the firm proposed using:

- Six focus groups to develop a question form (2 for each ethnic group), and
- Telephone survey (approximately 300 calls) to be conducted in the respondent's native language.

The estimated costs were $6,400 for the focus groups and $4,800 for the telephone survey, a total of $13,200.

2. Senior citizen centre

A Canadian research firm was given the following case study on a community of about 19,000 residents:

“The Municipality, spurred on by a local pressure group, wants to assess community needs and attitudes to a proposed senior citizen centre. A key issue is whether or not the community will participate in the planning, administration, and programming if such a centre were to be developed.”

The research firm proposed a random sample of 400 (assuming 6.500 households and an accuracy of 5% at the 95% confidence level). They estimated 1800 for consultation with the municipality and for questionnaire development, and $12.800 for 400 interviews (approximately $32.00 per interview). The total cost of $13.600 would include research design, questionnaire development, interviewing, coding, key-punching, tabulating results and report writing. These costs were quoted late in 1979.

3. United States national comparison of telephone and face-to-face interviews

The following material was taken from one of the largest research studies published to date. The study was national in scope and thus incurred large telephone charges and travel costs for interviews. We provide the following information because it compares telephone and face-to-face interviews. Although the numbers are much larger than you're ever likely to encounter, we think the comparisons will interest you.

This case study offers some surprises and some lessons in time calculation. They report the average completed telephone interview lasted thirty minutes. Approximately 1600 telephone interviews were completed. Can you imagine the total amount of time required for the entire study, including sampling, questionnaire design and testing, administration and interviewing? The 1800 interviews, multiplied by thirty minutes each, took 800 hours to complete. How much time would you add for incomplete calls, recalls, design and testing of the questionnaire, training interviewers, and other tasks required for the study?

In fact, the total amount of time was 5419 hours. On that basis you can estimate that to design and complete this study of 1600 telephone interviews, the average time per completed interview was 3.3 hours.

The total amount of time spent to design and conduct 1600 face-to-face interviews was approximately 13,920 hours or 8.7 hours per completed face-to-face interview.

We do not want these figures to scare you. The sample in this study was huge and entailed a lot of travel. We do want you to note that a study takes much more time than appears at first glance, and that by using 3.3 hours to 8.7 hours per completed telephone or face-to-face interview, you may get a better idea of the amount of time you will have to budget for your study.

4. Citizen survey of municipal recreation services

'How Effective Are Your Community Recreation Services?' is a citizen survey that was conducted in Washington, O.C. and Rockford. Illinois in 1972. The complete survey questionnaire, code sheets, and telephone interviewing manual arc presented in the book.**

In discussing survey costs, the authors point out that because of the many factors affecting costs, it is difficult to give information at a general level. With this specific study, however, they report that to develop the survey, train interviewers and complete interviews, tabulate and analyze results with computer resources, the cost was approximately $18,000. They suggest costs could be substantially lower if conducted by volunteers or the staff of agencies.

They estimated that if an agency starts with the Citizen Survey form they developed and tested, the cost of obtaining 300 completed interviews would be $9,000 including the personnel costs for a survey leader, clerks, and interviewers. Note that these are 1972 figures.

They estimate it would take 20 weeks to run the survey, starting from the initial steps of clarifying objectives to the final stage of report writing.

*Dillman. Don A. Mail and Telephone Surveys: New York; john Wiley and Sons. 1978.

**'How Effective Are Your Community Recreation Services'. U.S. Department of the interior. Bureau of Outdoor Recreation. 1973.

5. Measuring the effectiveness of municipal recreation services

In "How Effective Are Your Community Recreation Services?" ** the following aspects of effectiveness are measured using various methods:

a) citizen views
b) physical accessibility of services
c) attendance
d) safety
e) variety of services and facilities
f) crowdedness of facilities and programs.

The definitions and methods for measuring the above are covered in the book. In 1972. Their estimation of the cost of collecting information on all of the above is as follows: In a city with a population of less than 100,000 that had a recreation budget of $500,000 and 40 full-time employees, the authors estimated the study would cost $10,000. That represents 2% of the total operating budget and involves a sample of 300 people. In a city of 25,000, the cost of the study would be $15,000. 1.5% of a $1,000,000 operating budget. They also give complete estimates for a city of more than 500,000, and the costs of conducting two or more surveys per year.

The authors also point out that costs could be reduced significantly if existing staff could undertake certain tasks.

Section 3 provides planning sheets to enable you to estimate the time, costs. and scheduling for your research project.

**See reference on previous page

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps:	Start Dates	Deadline Dates	No. of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
1. Identifying Purposes a. Defining purposes b. Clarifying with decision-makers c Obtaining agreements								
2. Developing Research Plan a. Identifying alternatives b. Identifying information available c. Clarifying objectives d. Obtaining agreement								
3. Choosing Methods a. Reviewing alternatives b. Obtaining agreements c. Planning all the steps of the project d. Obtaining agreements								

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps:	Start Dates	Deadline Dates	No of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
4. Sampling								
a. Designing the sample								
b. Getting lists, names								
c. Getting maps or other documents								
d. Drawing the sample								
e. Assigning interviewers								

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps:	Start Dates	Deadline Dates	No.of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
5(A) Designing Questionnaires								
a. Collecting existing questions								
b. Writing new questions								
c. Judging questions								
d. producing pilot questionnaires								
e. Briefing questionnaire testers								
f. Pretesting interview or questionnaire								
g. Revising								
h. Repeat last 4 steps as often as needed								
5(B) Designing Observation Forms								
a. Collecting existing forms								
b. Selecting items								
c. Designing final form								
d. Testing								
e. Revising								

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps:	Start Dates	Deadline Dates	No. of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
6. Administering the Study								
a. Writing introductory letter								
b. layout and coding								
c. Final typing								
d. Duplicating								
e. Mailing								
f. Contacting possible interviewers/observers								
g. Selecting interviewers or observers								
h. Training								
I. Arranging time								
j. Assigning jobs								
k. Interviewing or observing								
l. Supervising								
m. Reporting								

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps	Start Dates	Deadline Dates	No. of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
7. Summarizing and Analyzing Results								
a. Coding								
b. Keypunching								
c. Setting up tables								
d. Filling out tables								
e. Computing								
f. Checking								

WORK SHEETS FOR PLANNING A RESEARCH STUDY

Steps:	Start Dates	Deadline Dates	No. of hours	Place	Person(s) Responsible	Others Involved	Estimated Costs	Documents Produced
8. Preparing Reports								
a. Planning report								
b. Writing								
c. Graphing								
d. Typing								
e. Editing								
f. Printing								
9. Giving Report								
a. Distribution								
b. Mailing								
c. Planning meetings								
d. Preparing materials								
e. Conducting meetings								

Chapter Seven
Designing Questionnaires for Surveys and Interviews

INTRODUCTION

COMMON ERRORS IN WRITING QUESTIONNAIRES

1. **Loaded words**
2. **Loaded response categories**
3. **Loaded questionnaires**
4. **Leading questions**
5. **Vague words and phrases**
6. **Complex questions**
7. **Offensive or threatening questions**
8. **Inappropriate questions**

REVIEW AND REFLECTION ON PLANNING RESEARCH

TYPES OF QUESTIONS

Open questions

Closed questions

- nominal scale
- ordinal scale
  - rating scales
  - rank ordering
- interval scale
- checklists

SEQUENCE OF QUESTIONS

CHAPTER
7 Designing Questionnaires for Surveys and Interviews

INTRODUCTION

This chapter describes how to develop questionnaires that can be used in mail, telephone, and (ace-to-face interview situations. in Section 1. we will discuss the most common errors in writing questions for questionnaires. in Section 2. we will describe different types of questions, when they are used, and how to develop them Section 3 will outline how to sequence questions.

COMMON ERRORS IN WRITING QUESTIONNAIRES

> Humpty Dumpty. '... There are three hundred and sixty-four days when you might get unbirthday presents'
> 'Certainly.' said Alice.
> And only one for birthday presents, you know. There's glory for you.'
> 'I don't know what you mean by 'glory'.* Alice said.
> Humpty Dumpty smiled contemptuously. 'Of course you don't—till I tell you I meant, 'there's a nice Knock-down argument for you.'
> 'But 'glory' doesn't mean 'a nice knock-down argument'.* Alice
> 'When I use a word'. Humpty Dumpty said, in rather a scornful tone.
> 'it means just what I choose it to mean—neither more nor less.'
> 'The question is.' said Alice, 'whether you can make words mean so many different things.'*

Alice does not realize that people and groups do have special meanings for words. Humpty Dumpty knows it and is scornful of people who do not understand his meaning Question writers cannot be like Alice or Humpty Dumpty because the quality of information we get will depend on the words and phrases we use to ask our questions. We want people to know what we mean by the words in our questions, and we want to know what they mean when they respond

* Carroll Lewis Alice in Wonderland Racine. Wisconsin: Western Publishing Company. Inc. 1955. (p. 19).

Lots of jokes are funny because you are surprised by a sudden twist in the meaning of a word or a situation. Often jokes rely on double meanings for words. Collecting information via research has its laughs but you don't want your research to be a joke, or to have a surprise ending.

If you can avoid these common errors, you will improve the quality of information you get:

1. Loaded words
2. Loaded response categories
3. Loaded questionnaires
4. Leading questions
5. Vague words and phrases
6. Complex questions
7. Offensive or threatening questions
8. Inappropriate questions

1. Avoid loaded words

'Loaded' words or phrases are ones that stir up immediate positive or negative feelings. 'Drugs', 'strikes', and 'vandalism', are loaded words. When loaded words are used in question, people react more to the words than the issue the question is addressing. The following examples illustrate how words influence responses to questions:

People were shown a short film of a car accident. After viewing the film, each person was asked to estimate how fast the car was going at the time of the crash. One group of viewers was asked: 'How fast was Car A going when it smashed into Car B?' A second group of viewers was asked: 'How fast was Car A going when it contacted Car B?' As might be expected, the average speed estimated by the two groups differed significantly. When 'contacted' was used, the group estimated almost 32 m.p.h. When 'smashed' was used, the group estimated 9 m.p.h. faster.

Another experiment sent two different questionnaires to two different but similar samples of people. The questionnaires were the same except for one word. in questionnaire 'A', the word 'bosses' was used in questionnaire 'B', the word 'leaders' was used. The answers to the two questionnaires were very different.

When loaded words are used, the researcher does not know what part of the question the respondent is reacting to. Consider, for example, the following question:

If there was an election tomorrow, who would you vote for?

— Sam Smith, our present mayor

— John Jones, the present challenger

If respondents are not familiar with the candidates, they may be influenced by generalized attitudes. Some might indicate Sam Smith because they favor stability, experience in a job, etc. Others may choose John Jones because they are generally in favor of change, or because they sympathize with an underdog, or for other reasons not directly related to the candidate himself. The issue is, if you were going to use this questionnaire to assess current political standings, and to plan the rest of the election campaign, the information you'd get wouldn't be helpful because you would not know what it really meant. In this case, it would be better to phrase the question:

- If there was an election tomorrow, who would you vote for?

  — SAM SMITH
  —JOHN JONES
  —DON'T KNOW

Often the names of organizations, political parties, people, or groups are 'loaded'. When a question starts with a phrase such as. 'Doctors say ...', some people will be drawn to agree just because they trust what doctors say. Others will disagree simply because they are skeptical about medicine and doctors.

Writing questions for a particular questionnaire means choosing words for (1) a particular group. (2) for a specific purpose, and (3) for placement next to other questions in the questionnaire. Taking these three factors into consideration is part of the job. Even then, you may not know for sure which words are 'loaded'. To ensure your questions are clear and unbiased, you should always test them with a small group before you actually use them (We will talk further about pilot testing your questionnaire in Chapter 8. Administering Questionnaires.)

2. Avoid loaded response categories

When a questionnaire uses 'closed' questions (asks the respondent to choose from categories the researcher supplies), the categories should be balanced. if the number of positive categories is not the same as the number of negative categories, the lack of balance may subtly influence the respondent.

For example, let's say you want to find out what the effects would be of pay-as-you-play charges for baseball, football and tennis. First you'll ask if anyone in the family participates in these activities. Then you might ask:

> Since June 1979. what, if any. changes have taken place in the amount of funds you have spent on outdoor sports activity for your family (Please think of sports activity, not equipment or clothing purchases).

1_____Decreased
2_____Stayed the same
3_____Increased slightly
4_____Increased a lot

The above question is unbalanced because response 1 is outweighed by responses 3 and 4. The question would be better constructed as follows:

- Since June 1979, what, if any, changes have taken place in the amount of funds you have spent on outdoor sports activity for your family. (Please think of sports activity, not equipment or clothing purchases.)

____ DECREASED GREATLY
____ DECREASED SLIGHTLY
____ STAYED THE SAME
____ INCREASED SLIGHTLY
____ INCREASED GREATLY

In the second section of this chapter, we will give you specific steps or rules to follow in constructing questions of this type.

3. Avoid loading the entire questionnaire

When all the questions in the questionnaire are written, the questionnaire as a whole should not reflect a bias on any issue. Each section of the questionnaire should be neutral To do this, both sides of an issue should be asked about, the positive and negative features of a program should be addressed, and on important issues, questions should be asked from both a positive and *a* negative perspective For example, to explore people's opinions on disabled people in recreation, the following questions might be asked

- More opportunities for disabled people to participate in regular recreation programs should be developed.

____ STRONGLY AGREE
____AGREE
____UNDECIDED
____DISAGREE
____ STRONGLY DISAGREE

- There are enough opportunities for disabled people to participate in regular recreation programs.

____STRONGLY AGREE
____ AGREE
____ UNDECIDED
____ DISAGREE
____ STRONGLY DISAGREE

- With special arrangements, everyone can benefit from more disabled people participating in regular recreation programs.

____STRONGLY AGREE
____ AGREE
____ UNDECIDED
____ DISAGREE
____ STRONGLY DISAGREE

- Even with special arrangements, programs would suffer if more disabled people participated.

____STRONGLY AGREE
____ AGREE
____ UNDECIDED
____ DISAGREE
____ STRONGLY DISAGREE

In these examples, a respondent who supports integrating handicapped people in recreation programs would answer 'Strongly Agree' or 'Agree' to the first and third questions and 'Strongly Disagree' or 'Disagree' to the second and fourth questions.

Sometimes respondents mark 'Strongly Agree' or 'Agree' to every question. This may happen because, through the sequence of questions, the participant develops a 'Yes tendency'. A 'Yes tendency' is one form of RESPONSE SET.

RESPONSE SET is the phrase used to describe a respondent's habit of always marking the same response category (e.g. always marking Strongly Agree no matter what the question is). This happens when too many questions with the same perspective are asked in any one sequence. Reverse items such as the third and fourth questions in the example are used to reduce the possibility of someone developing a response set in an actual questionnaire, paired questions would generally be separated from one another.

You also need to provide balance when you use open questions. Always ask at least one question on each side of an issue or idea. The examples below could be used in mail questionnaires or in telephone or face-to-face
interviews.

- \+ What are the strengths of the provincial association?_____
- \- What are the weaknesses of the provincial association?_____
- \+ As you see it. what factors have contributed to the success of program X?_____
- \- As you see things, what factors have blocked program X from success?_____
- \+ What do you hope happens at our conference?_____
- \- What do you hope does not happen at our conference?_____

4. Avoid leading questions

Leading questions suggest:

- socially-acceptable answers
- the viewpoint or position of the researchers
- behavior that is expected

People sometimes respond to questions on the basis of what they think is the researcher's answer, or on what is the socially-desirable answer. These responses show what is called PRESTIGE BIAS.

PRESTIGE BIAS happens because of the human tendency to want to appear in a socially-acceptable way: i.e. as a successful, knowledgeable, fair, helpful, intelligent, good citizen. This tendency is so strong that people are reluctant to admit they don't know the answer to a question, or that they don't do things they say others should. So, on questionnaires, people will tell you they voted in the last election, brushed their teeth twice dally, bought church raffle tickets, read the dally papers, enjoyed the best-selling books, etc. often these answers are not exactly true.

Prestige bias often happens because of the way we ask our questions.

Are you in favor of extending services to seniors?

How much time did you devote to your child's homework last week?

To disagree with the first question is like voting against motherhood. The second question not only assumes the respondent did spend some time on the child's homework, it also uses a loaded word 'devote'. For some respondents to answer 'I did not spend any time' would almost be admitting 'I am not devoted to my child'

Here are a few more leading questions Notice how subtly they lead the respondent's answer.

Who do you think will win the Stanley Cup play-offs?

Which of the following sources do you use to find out about the programs of the Recreation Department?

____ Newspapers
____ Information Centre
____ Recreation Department Bulletin
____ Friends
____ Radio commercials

Both these questions make assumptions about the respondents. The first assumes the respondent knows about hockey. Since hockey is our national sport, there is some pressure in the question to encourage the respondent to answer with any team name that comes to mind.

In the second question, the research assumes the respondent actually does try to find out about the Recreation Department programs and does use some sources of information This may not be true at all. Because the researcher has offered some response categories. it will be easy for respondents to pick an answer.
Respondents may do this to be helpful, to avoid disappointing the researcher, or to avoid leaving a question unanswered. Whatever the motivation, the response will probably not be trustworthy.

Ask an open question to assess what sources of information the respondent knows about, and then follow with a more specific question about which sources the respondent uses.

- As far as you know, how do people find out about the programs offered by the Recreation Department?_____
- How do you find out about recreation programs?_____

Another subtle influence can be the title of a rating scale, or the title of a section of a questionnaire if the title has any hints about how a respondent may De judged, the respondent will often answer so as to be judged in a positive way imagine titles like 'Personal Adjustment'. 'Morale'. 'Attitudes Toward fitness', etc Titles like these should be avoided.

5. Avoid vague words and phrases

This is a tricky area. Sometimes you want to be deliberately vague because you are exploring. At other times, vagueness will be confusing to the respondent and/or the results will be confusing to the researcher.

The following are some common vague phrases that should not be used.

How often have you used the information Centre in the last month?

____ Never
____ Sometimes
____ Often
____ Always

The categories of response for this question are too vague. Also, the word 'you' may be taken to mean 'you personally', or 'you and your family'. When the word 'you' is used, always specify to whom it refers. Here's a better way to ask the same question.

- How often in the last two months have you personally used the information Centre?

____I NEVER HAVE
____I HAVE USED IT LESS THAN TWO TIMES
____I HAVE USED IT THREE TO FOUR TIMES
____I HAVE USED IT MORE THAN FOUR TIMES

If the question refers to a specific time. It is wise to specify it.

'1979' instead of 'in the last year'
'July and August' instead of 'During the summer'
'6:00 p.m. on instead of 'Evenings'
'A few times, once a month., etc.' Instead of 'Rarely, Never, Often'

6. Avoid complex questions

Sometimes you can't remember what you did last week, yet researchers have been known to ask people to remember details from last year. Some types of detailed information are hard to get.

1. How many books did you borrow from the Public Library during 1979? _____ books.

2. In the last month, what percentage of your leisure time would you say you spent watching competitive sports? _____ percent.

Many respondents will not be able to remember this information. The questions are so mentally demanding that respondents may develop negative feelings about completing the questionnaire or interview. The first question would be better phrased as a series of closed questions.

- 1(a). Have you borrowed any books for yourself or your family from the Public Library since January 1979?
  _____YES — please answer question 1(b)
  ____NO — please go directly to question 2

- 1(b) Approximately how many books have you borrowed?
  _____LESS THAN 10 BOOKS
  _____10 TO 20 BOOKS
  _____21 TO 30 BOOKS
  _____31 TO 40 BOOKS
  _____MORE THAN 40 BOOKS

The second question is disastrous. First, asking a respondent to calculate an accurate percentage of leisure time is asking a lot. Second, even if the respondent could give an accurate percentage, the researcher would not know what it means. Would 10% mean two hours, ten hours, fifteen hours? There are many other ways to ask for this information. Here is one way, using three closed questions.

- 2(a) On the average, how many hours of leisure time would you say you have a week? _____ hours, on the average.

- 2(b) Do you watch competitive sports on TV?

  ____YES
  ____ NO

2(c). Based on the last 3 months, for approximately how many hours per week would you say you watched competitive sports on TV?

____ NOT AT ALL
____ LESS THAN 1 HOUR PER WEEK
____ BETWEEN 1 AND 3 HOURS PER WEEK
____ BETWEEN 4 AND 6 HOURS PER WEEK
____ BETWEEN 7 AND 12 HOURS PER WEEK
____ BETWEEN 13 AND 18 HOURS PER WEEK
____19 OR MORE HOURS PER WEEK

Mentally-taxing questions often appear when researchers want to know how people spend money and time, or details of the respondent's past. This places unnecessary demands on the respondents unless questions are sequenced in an order that helps the respondent recall and answer sequential pieces of information involved in the question.

Checklists that are too long, and ranking questions with more than 8-10 items, place heavy demands on respondents. Similarly, a long series of attitude questions will tax respondents. With these types of questions, even an interested, willing respondent can suffer mental fatigue and be unable to give full attention and consideration to each item or question. When this happens. 'No Response' and 'Don't Know' answers increase and the quality of information you receive is low.

7. Avoid offensive or threatening questions

Some questions can offend respondents so much that they may answer dishonestly or even refuse to answer the question. One reason they may be offended is that a personal question may be seen as an invasion of privacy. For some people, the following may be an offensive question.

What is your income? _____

Such a question, if necessary. would be less offensive if the respondent could respond via broad closed categories, (in a face-to-face interview, a card with the categories could be given to the respondent.)

• Which of the following categories best describes your total income during 1978?

_____LESS THAN $5,000
_____ $6,000 TO $9,999
_____ $10,000 TO $19,999
_____ $20,000 TO $29,999
_____ $30,000 TO $39,999
_____ OVER $40,000

It is wise to use broad categories. Respondents will be offended if you ask about income and provide so many categories that a choice will show almost their precise income.

Some questions may threaten respondents. The first example below raises legal issues. The second example has not only a legal issue. It threatens the respondent's self-image as well.

- Do you smoke marijuana? Yes ___ No ____
- Have any of your children been involved in acts of vandalism (destruction of public and private property)? Yes_____ No _____

There are several ways to ask these questions in a less objectionable way:

- Provide an introduction or background to soften the question.

- Ask a series of questions starting with general opinion questions.

- As you may know, there is some discussion about vandalism in this community, and there are questions as to how it should be handled. Some people feel it is a serious problem: others feel it is not a serious problem. How about your opinion? Do you consider vandalism to be a serious, moderate, slight, or no problem in this community? (Circle the number beside your answer).

    1. SERIOUS PROBLEM
    2. MODERATE PROBLEM
    3. SLIGHT PROBLEM
    4. NOT A PROBLEM
    5. NO OPINION

- During the last few years, do you think the incidence of vandalism has increased, stayed the same, or decreased in this community?

    1. INCREASED
    2. STAYED THE SAME
    3. DECREASED
    4 DO NOT KNOW

- Do you personally know anyone who has been involved in destroying public or private property?

    1. YES
    2. NO

- Have your children ever been involved in destroying public or private property?

    1. YES
    2. NO

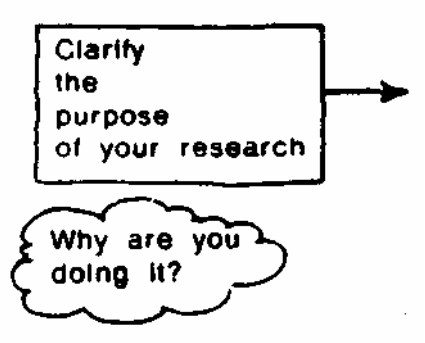
8. Avoid asking inappropriate questions

Perhaps the most costly error of all in writing questionnaires occurs when the researcher has forgotten or overlooked the purpose of the research and the specific information that needs to be collected. Don't laugh This frequently happens when people jump into writing questionnaires before clarifying how the responses will be used When this happens, a lot of information might be collected that is nice to know' but not necessary or, even worse, the needed information might be missing

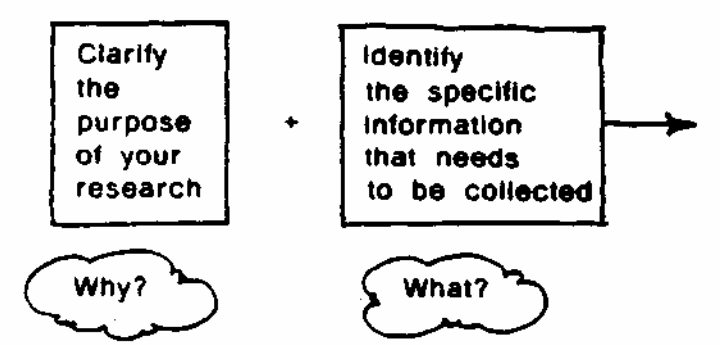
REVIEW AND REFLECTION ON PLANNING RESEARCH

We are at a point where we will begin to describe different types of questions, their advantages and disadvantages and how to construct them. The types of questions, wording, and sequence of questions are the details of HOW you will actually collect your information.

But, as we have already pointed out, you don't start with HOW, you start with WHY, WHAT, and WHERE. We described WHY in Chapter 2, where we talked about refining the purposes of your research. WHAT information you need to collect was outlined in Chapter 3 and the WHERE of information collection was presented in Chapter 4 on sampling. Let's briefly review the sequence:

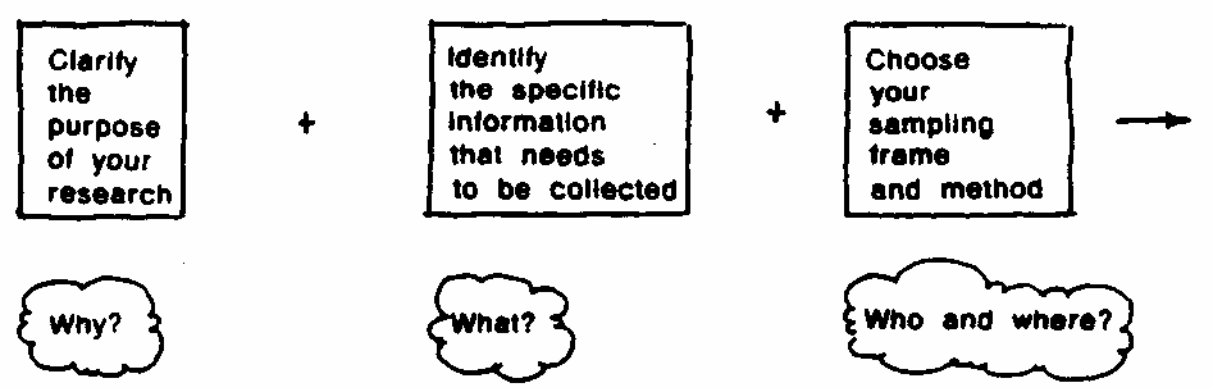


Developing the actual questionnaire starts with a review of the purposes of your research. Why are you doing it? Who is it for? What do they want to know? What possible decisions will be made on the basis of the research?

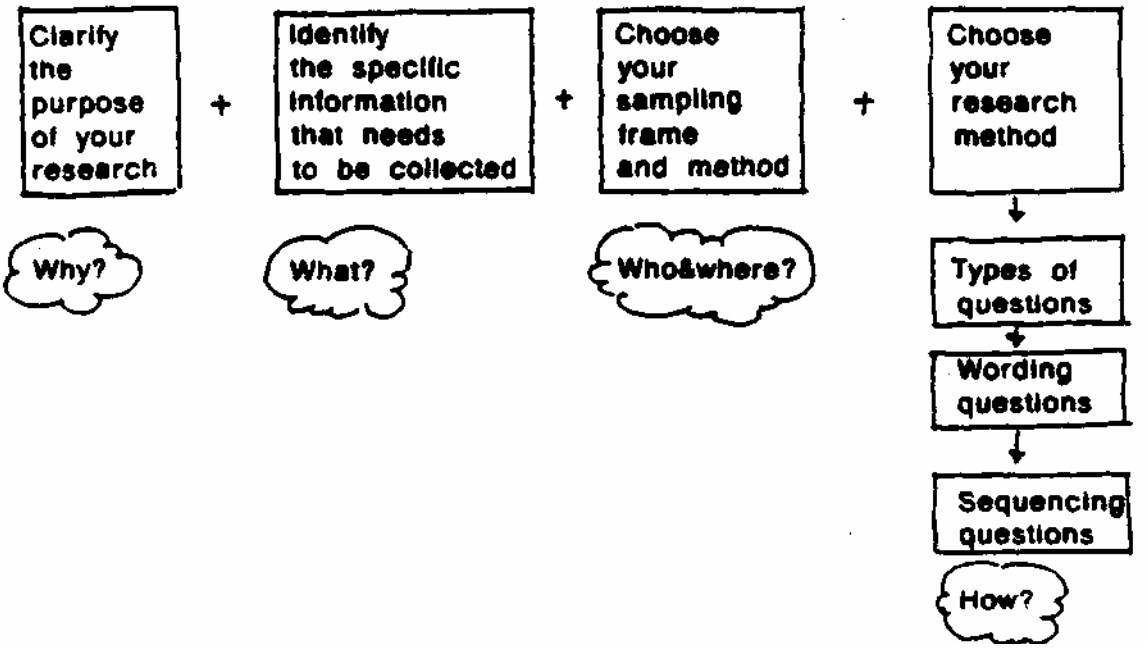


Then, what information do you need to collect to provide relevant input to planning and problem-solving decisions? This phase guides you to collect information about needs, wants, and/or preferences, and it tells you the types of information (beliefs, feelings, attitudes, and/or behavior) you need to seek out in the process you sift out the information that would be nice to find and you are left with a clear understanding of the information you 'must' find

So, now you have two building blocks: why you are doing it at all, and what you need to find out.

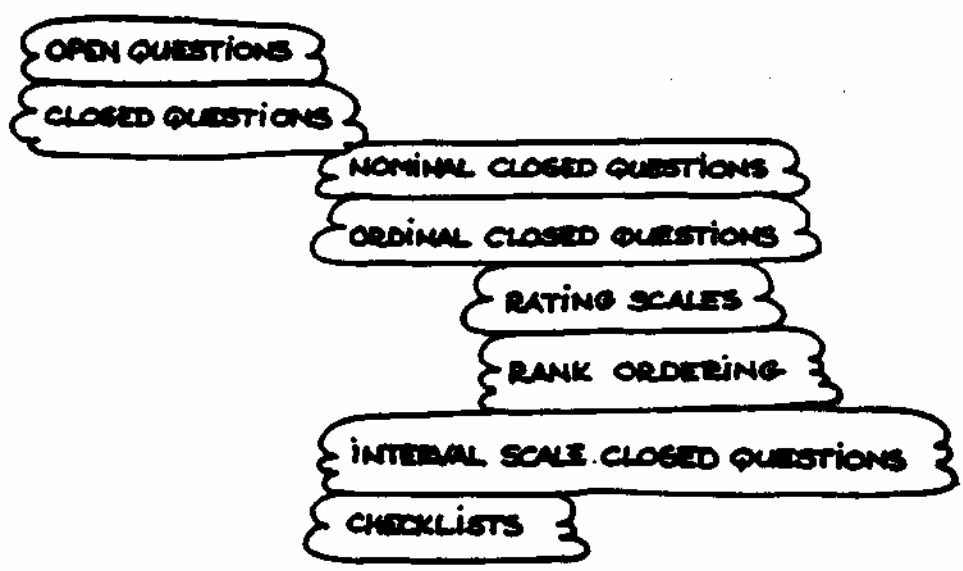


Before writing questions, you need to know where and from whom you will be collecting the information. You need to know whether to use printed questionnaires, telephone surveys, interviews, or observations. When you have chosen the broad method, you still refer to the type of people in your sample to determine the language, the pictures, or drawings and the types of questions you will use.



Based on all that planning and decision making, you are ready to begin writing a questionnaire. The next section focuses on constructing different types of questions.

The types of questions we will describe are:



We'll start with an overview of the two major formats: open questions and closed questions. Then we'll examine in detail each type and its subtypes.

We will be using some technical terms. We will do so because you'll find them in other books about research, consultants will use them, and they will help you locate the simple statistical procedures you may need to analyze the information you collect.

We will be examining the general uses, advantages and disadvantages, and rules to follow in constructing all types of questions, and will provide examples and exercises for you to check your understanding of the material as you go along.

Open questions

The essential characteristic of an open question is that the respondent answers in his or her own words. The researcher provides only the general area that he or she wants the respondent to focus on. in the samples below, the research can explore the problems, concerns, and suggestions that respondents have without giving them any particular point of view.

- If you had half an hour to talk to the mayor, what would you most want to say? _____
- If you wanted to join a volunteer organization, what types of things would you look for in the organization? _____
- What could the XYZ organization do to improve its programs?
- If a friend of yours asked about the XYZ program, what would you tell that person? _____

A special type of open question- the argument type- enables the researcher to find out how respondents feel about both sides of an issue. These questions generally come in pairs as the following examples demonstrate:

- What do you think are the advantages of Plan 'A'?
- What do you think are the disadvantages of Plan 'A'?
- What reasons do people give when they support increasing the use of volunteers here? _____
- What reasons do people give when they oppose using volunteers here? _____

These paired questions not only provide important information, they also serve to balance the questionnaire. If only one side of an issue is explored, people may think that side represents the researcher's point of view. This apparent lack of neutrality may lead to biased results. Biased results mean that the conclusions drawn from a survey may be incorrect and misleading.

Open questions can be used to find out what people know and what a word, place, or idea means to them.

- What does 'good quality' in health care service mean to you?

_____

- When someone mentions 'multicultural centre' to you, what comes to your mind?

_____

- What types of questions can an information centre answer?

_____

- What do volunteers do if they work for the Red Cross?

_____

When we look at the responses to these types of questions, we can learn a lot. We will probably discover the most common types of misinformation people have, the best-known information, and what types of information they lack. Using the responses, we can sort people into different groups according to the amount of information they have. We can then look at the answers they give to other questions and compare those who know more, to those who know less. It may be that those who have more information (e.g. give more correct information to questions such as the above) have different behaviors, attitudes, or thoughts than those who are less informed.

So, as well as telling us what a word means to different people, an open question can also help find out 'who knows what' about our area of interest. This information might be linked to the attitudes of different groups, behaviors such as registering or participating in a program, and feelings about the usefulness of something we are involved in. Sometimes trying to find out who-knows-what is difficult and we have to ask more than one question to get the information.

For instance, the following examples would help us find out if the community is aware of the courses offered at the YMCA.

- Please describe any of the programs being offered by the YMCA this fall. _____

- Please circle the number beside each program you think is being offered by the YMCA this fall.

---

1. TAKE / BREAK
2. FITNESS FOR TEENS
3. BRIDGE
4. CURRENT AFFAIRS
5. SWIMMING
6. BASKETBALL

In Chapter 2, we outlined recall and recognition as two different levels of knowledge. The first question above illustrates a recall question, the second is a good example of recognition.

The advantage of the recall question is that the researcher may find out what the respondents remember, without influencing their memory. The disadvantage of the question is that respondents may actually know more about the programs than they can remember on the spur of the moment, or they may think some information is so obvious it isn't worth writing down.

The categories in the closed question prompt the respondent. Most people don't want to appear uninformed or ignorant. They want to co-operate and be helpful so it is likely they'll mark off at least one item on the list. The researcher won't know if respondents guessed. One way of controlling 'guesses' is to deliberately place incorrect items on the list. If a lot of people mark off incorrect items, the researcher can assume that some guesswork is happening

A combination of an open and a closed question is often used to identify and compare what respondents will state spontaneously and what they will choose when given categories of responses

- What do you think are the issues facing our organization?

_____

Later on in the questionnaire, we might ask the following multiple choice closed question:

- In the following list of issues, which two do you think are the most important for our organization? (Please circle TWO only.)

1. FINANCES
2. RECRUITING VOLUNTEERS
3. EDUCATING THE PUBLIC
4. DEVELOPING NEW PROGRAMS
5. REORGANIZING THE WORK LOAD

By comparing these two questions, the researcher can identify which issues people talk about when they have not been prompted, which are top priorities in a forced choice situation, and which appear on both lists.

When open and closed questions are both used to explore the same area. It is wise to separate them with other questions you want to ask. Ask the open question first because if the closed question is first, the respondent might be influenced by the researcher's categories of response and might forget his or her own spontaneous reaction. (In interview situations, questions with many categories can be given to the respondent on a card. When there are only five or six items, the card is usually not needed.)

We have now identified some ways of using open questions. How good or how bad the open question is depends on whether or not it will give the information you need to collect. In Chapter 2, we outlined several categories of information. After you write an open question, check to see whether it gives you information about the respondent's thoughts, feelings, attitudes, or behavior.

To help you practice this checking process, we will analyze some of the sample questions presented so far. Before reading our analysis, look at each sample question and fill out your own responses. If the question will give information about thoughts write 'yes' in the Thought column. If the question may or may not give thought information, write 'maybe' in the Thought column

TYPES OF INFORMATION YIELDED BY EIGHT SAMPLE QUESTIONS

Sample Question	Thoughts	Feelings	Behavior	Attitudes
a) If you had half an hour to talk to the mayor, what would you most want to say?				
b) If you wanted to join a volunteer organization, what types of things would you look for in the organization?				
c) What could XYZ organization do to improve its program?				
d) If a friend asked you about the XYZ program, what would you tell the person?				
e) What do you think are the advantages of plan A?				
f) When someone mentions multicultural centre to you, what comes to your mind?				
g) What do you think are the issues facing our organization?				
h) In the following list of issues, which two do you think are the most important? - finances - recruiting volunteers - educating the public - developing new programs - reorganizing the workload				

TYPES OF INFORMATION YIELDED BY EIGHT SAMPLE QUESTIONS

Sample Question	Thoughts	Feelings	Behavior	Attitudes
a)	yes	maybe	Possible, e.g. 'I telephoned 4 times and no one ever returned the call. . . .'	could be one clue
b)	yes	unlikely	Possible future behavior, e.g. 'People who would let me work with teenagers.'	indirect clue
c)	yes	maybe, e.g. 'Programs are so good don't need improvements'	no clue	indirect clues
d)	yes	very likely	maybe, e.g. 'I did such and such on that program'	indirect clue
e)	yes	maybe	unlikely	very indirect
f)	yes	maybe	unlikely	very indirect clues
g)	yes	maybe	unlikely	clues
h)	yes	no	no	No

As you can see, in an open question researchers have less control, and therefore less knowledge, of the type of information the respondent will give. In face-to-face interviews or telephone surveys, interviewers can probe for more information or ask clarifying questions. In a mail questionnaire, researchers are taking more of a gamble about what they will get. Presumably they do so because they want to have participants express themselves in their own words and this is more important than predictability of response.

Summary of Open Questions

Use to:

- Identify respondents' awareness and knowledge of a program and service without prompting.
- Identify what words, titles, concepts, ideas mean to people.
- Obtain problem statements, suggestions, opinions, and issues in the respondents' languages.
- Find out what categories of information should be included in future questionnaires that will use a closed question form.

Advantages	Disadvantages
We get an answer that is relatively free and uninfluenced by the researcher. (We use the phrase 'relatively free' because open questions do influence people. just by asking about something, we are directing people to pay attention to it).	Open questions require more effort from the respondent than closed questions. Some people find it hard to express themselves on paper.
We learn the language people use in relation to a certain issue or service.	Some people are afraid to put their ideas and opinions on paper.
We find out what type of information people have.	People may know more than they remember to answer.
We find out what misinformation people have.	Open questions take longer to analyze and summarize than do closed questions (Chapter B will explain how to deal with responses to open questions.)
	You can't be sure what type of information (attitudes. feelings, behavior) you will get.

You will see in the next section on closed questions that every type of question has advantages and disadvantages. Your choice will depend on who your sample is and what your research objectives are.

Closed questions

In an open question the respondents provide their own answers. When a question is closed, respondents must choose their answers from response categories provided by the researcher.

Researchers can provide three major types of categories for closed questions. They are illustrated in these three different ways of asking about a respondent' age.

Nominal Scale

1. Were you born between 1919 and 1938? (Please circle the number beside the correct answer)

1. YES
2. NO

Ordinal Scale

2. Please indicate your age group. (Please circle the number beside the correct answer)

1. ADOLESCENT (age 9 - 12)
2. TEEN-AGER (age 13 - 19)
3. ADULT (age 20 - 39)
4. MIDDLE AGE (age 40 - 59)
5. SENIOR (age 60 - 80)

Interval Scale

3. Please indicate your age group. (Please circle the number beside the correct answer)

1. 11 to 20 YEARS
2. 21 to 30 YEARS
3. 31 to 40 YEARS
4. 41 to 50 YEARS
5. 51 to 60 YEARS
6. 61 to 70 YEARS
7. 71 to 80 YEARS

Different statistical procedures are used in relation to the different types of questions. This is more fully described in Chapter 10 and in a Statistics booklet which is a companion booklet to this book.

Nominal scale

The first question about age uses what is called a NOMINAL SCALE. Sometimes there are only two categories of response such as the 'YES' and 'NO' in this example. There can also be many categories of response, as in a checklist of different items.

The chief characteristics of a nominal scale area: it does not measure the amount of anything, and the responses do not have any logical order or relationship to each other. Look at the previous page and compare the nominal scale to the second and third scales in each of which there is an orderly increase from younger to older ages. There is a definite relationship between each category. You know that each category is older than the previous one in the first example, you would not know the relationship of the 'NO' category to the 'YES' category. If a person said 'NO' (i.e. I was not born between 1919 and 1938), you would not know whether a person was born before 1919 or after 1938. Yet, if you were interested only in people who are now middle aged, this nominal scale question could be an efficient question to sort out your sample.

Nominal scale questions are generally used to gather tactual information They do not measure degrees of feeling, relative strength of opinions, or frequencies of behavior. Look at the pairs of examples below to see the differences in the quality of information you get by using a nominal scale or an ordinal scale.

<u>Nominal Scale Questions</u>

• Since last New Year's, have you called the Community information Centre to ask any questions? (Please circle the number beside your response.)

1. YES
2. NO

Do you agree with the proposal to build an arena? (Please circle the number beside your response.)

1. YES
2. NO
3. I DON'T KNOW ABOUT IT

<u>Ordinal Scale Questions</u>

• Since last New Year's, how often have you called the Community Information Centre to ask a question? (Please circle the number beside your response.)

1. MORE THAN TEN TIMES
2. FOUR TO TEN TIMES
3. ONE TO THREE TIMES
4. NEVER

• To what extent do you agree or disagree with the proposal to build an arena? (Please circle the number beside your response.)

1. I STRONGLY AGREE
2. I AGREE
3. I AM UNCERTAIN
4. I DISAGREE
5 I STRONGLY DISAGREE

Notice that the nominal scale questions do not give as much information as the ordinal scale questions. However, this does not mean you shouldn't use nominal scale questions. Whether or not you use them depends on what you want to know, and the level of detail you want.

Rules for constructing nominal scale Questions

Because nominal scale questions are closed questions, the respondent must choose from alternative responses provided by the researcher. Therefore, the response categories must include all possible responses. In the following two examples, two response categories will 'cover' all the possible responses.

- Please circle one. Are you:

    1. MALE
    2. FEMALE

- Did you belong to XYZ Seniors Group during 1979?

    1. YES
    2. NO

The above examples are straightforward and complete. The response categories are EXHAUSTIVE. How about the next one?

Will you be joining XYZ Seniors Group this fall?

    1. YES
    2. NO

This one is not so easy. How should respondents reply if they haven't yet made a decision? How should they reply if they want to join but are unsure about transportation to meetings? For this question to follow the rules for well constructed, usable, nominal-scale questions, another category would have to be added to make the response categories EXHAUSTIVE.

- Will you be joining XYZ Seniors Group this fall? (Please circle one)

    1. YES
    2. NO
    3. UNCERTAIN

With the extra category, all respondents will be able to answer without distorting their information. The researcher can be assured that the 'YES' and 'NO' categories do not include people who are uncertain.

A second rule in constructing nominal scale questions is that the categories of response must not overlap. Each category must be mutually exclusive so it a respondent marks off one response, he or she cannot logically mark off another response. In the next example you can see how confusing overlapping categories would be to both the respondent and the researcher.

Several types of recreational activities are listed below, the one you do most often in your leisure time.

1. SKIING
2. SKATING
3 HOCKEY

4. TEAM SPORTS
5. SNOW SHOEING
6. CROSS COUNTRY SKIING
7. NONE OF THE ABOVE

In this example, one response category (team sports) is much more general than all the others, and therefore overlaps some other categories (e.g. hockey). Some respondents who play hockey would not want to mark both categories. Another weakness in this question is that K6 is one type of #1. It would be clearer if #1 read 'down-hill skiing.'

Summary of rules for constructing nominal scale questions

1. **Make sure the categories of response are exhaustive** (all possible responses are offered).

2. **Make sure the categories of response are mutually exclusive** (Eliminate any duplications of overlapping categories).

In developing nominal scale questions, we need to be careful that the question we ask is one that can best use a nominal scale. Sometimes what appears to be a simple question is not simple at all. Take the following, for example:

> Do you think the programs of the Recreation Department are better than they were two years ago?
>
> 1. YES
> 2. NO
> 3 UNCERTAIN

This appears to be a perfectly clear nominal scale question. But appearances can be deceiving. if respondents reply. 'NO', what does that tell us? Do they mean the programs are worse than two years ago? Do they mean the programs are about the same as two years ago? This ambiguity can be sorted out by making this question an ORDINAL SCALE, as follows:

> Do you think the programs of the recreation department are better than they were two years ago?
>
> 1. YES. THEY ARE BETTER
> 2. THEY ARE ABOUT THE SAME
> 3. NO. THEY ARE WORSE

This example is an ORDINAL SCALE because there is a logical order to the responses. The next section deals with a variety of ORDINAL SCALE questions.

Ordinal scale
To help you understand what an ordinal scale is, please try the following experiment.

Look at each of three columns of words below. Rearrange each column in a way that makes sense to you. There are several ways to do it, so proceed with your way.

(A)	(B)	(C)
NEVER	ONCE A WEEK	EXCELLENT
ALWAYS	EVERYDAY	POOR
SOMETIMES	NEVERTWICE A MONTH	FAIR
OFTEN	ONCE A MONTH	GOOD
RARELY		

Re-arrange each column here.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

In rearranging the words you have created an ordinal scale. In the first column, you may have ordered the words 'ALWAYS', 'OFTEN', 'SOMETIMES', 'RARELY', and 'NEVER', or you may have started with 'NEVER' and ended with 'Always'. Whichever you did, you created an ordinal scale.

The main characteristic of an ordinal scale is that the categories have a logical (ordered) relationship to each other. 'ALWAYS' is more frequent than 'OFTEN', and 'OFTEN' is more frequent than 'SOMETIMES' and so on. We may not know precisely the amount of difference between the categories, but we do know there is an orderly difference.

Although the words 'ALWAYS', ' OFTEN ', 'SOMETIMES', 'RARELY', and 'NEVER' do form a clear ordinal scale, they are not very precise words. When you want to know the frequency of something, it is better to use more precise terms such as those in the second column of your experiment.

Ordinal scale questions can be used to collect factual information.

• About how many times would you say you personally used the Community Centre facilities last winter (from December 1 to March 1)? (Please circle the number beside the one response that is true for you.)

1. MORE THAN SIXTEEN TIMES
2. BETWEEN EIGHT AND FIFTEEN TIMES
3. BETWEEN FOUR AND SEVEN TIMES
4. ONE TO THREE TIMES
5. NOT AT ALL

• Do you think you will use the centre facilities the same amount as you did last year?

1. I WILL NOT USE THEM AT ALL
2. I WILL USE THEM FEWER TIMES THAN I DID LAST YEAR
3. I WILL USE THEM THE SAME NUMBER OF TIMES AS LAST YEAR
4. I WILL USE THEM MORE TIMES THAN I DID LAST YEAR

The above ordinal scales have the same logical order that is common to all ordinal scales. We do not know what 'FEWER TIMES' means exactly, but we do know that 'FEWER' is more than the first category and less than the third category. So, while we don't know what the precise difference is between the responses, we do know there is an orderly difference and a relationship among the responses.

Ordinal scale questions are not only used to gather factual information. They are also ideally suited to finding out about people's opinions, attitudes, and judgments because the scale can be structured to reflect and measure degrees of intensity or feeling. The most widely used ordinal scales for assessing attitudes and opinions are called Likert scales which are illustrated on the next page.

• Learning about different types of research questions will help me in my work. (Please circle the number beside the response that best reflects your opinion.)

1. STRONGLY AGREE
2. AGREE
3. UNCERTAIN OR
4. DISAGREE
5. STRONGLY DISAGREE

1. STRONGLY AGREE
2. AGREE
3. DISAGREE
4. STRONGLY DISAGREE
5. NO OPINION

The form on the right is sometimes used to force those who have an opinion to express it in either a positive or negative direction.

• A bicycle path is being proposed from ABC Street through the ravine to XYZ Street. What is your opinion? (Circle one response.)

1. STRONGLY OPPOSE
2. TEND TO OPPOSE
3. UNDECIDED
4. TEND TO FAVOR
5. STRONGLY FAVOR

• To what extent do you approve or disapprove of the proposed bicycle path from ABC Street to XYZ Street through the ravine? (Check one response.)

_____ **STRONGLY APPROVE**
_____ **APPROVE**
_____ **UNDECIDED**
_____ **DISAPPROVE**
_____ **STRONGLY DISAPPROVE**

• How would you rate the services offered by the public library? (Check one response.)

_____ **VERY SATISFACTORY**
_____ **SATISFACTORY**
_____ **UNSATISFACTORY**
_____ **VERY UNSATISFACTORY**

In some cases we have numbered the response categories and asked people to respond by circling one number. Other times we have placed a line beside each response category and asked them to indicate their choice with a check mark. There has been no conclusive research to show which format is best, so both are used. When you write your questionnaire, choose one formal and use only one throughout.

Rules for constructing ordinal scale Questions

On the basis of the samples of ordinal scales we have discussed so far, we can identify several rules for constructing questions.

1. Provide at least four or five alternative responses.

2. Provide the same number of positive statements as negative statement's. If there are two statements indicating two levels of agreement, make sure there are two statements reflecting two levels of disagreement. If there is one statement reflecting 'more than' something or other, there should be a corresponding statement reflecting 'less than' something or other. In other words, the scale should be balanced.

3. List the responses in a logical order. You did this when you re-arranged the columns of words. A logical order means that each response has some relationship to the response preceding it. In the sequence excellent-good-fair-poor, the relationship is in gradually decreasing quality, in the sequence satisfactory-unsatisfactory-very unsatisfactory, the feeling goes from strongly positive to strongly negative.

4. Make sure there are no overlapping categories. Even if you follow rules two and three you may have overlapping categories. You must also make sure the differences between the degrees of feeling are easily understood. If respondents have trouble telling the difference between two categories, they will not know which one to check off.

5. **Include all possible responses.** Some respondents may not have an opinion, or they may not have made a decision. Therefore, you need to include a category such as 'undecided', 'uncertain', 'no opinion', or 'I do not know'.

Rating scales

A rating scale can be used to find out people's reactions, opinions, or feelings on an issue or event. Here are some examples:

• How important is it to you that we develop a course for volunteers on agency policy?

1	2	3	4	5
NOT AT ALL IMPORTANT				EXTREMELY IMPORTANT

• To what extent do you think resource material on research methods will be useful to your staff?

1	2	3	4	5
NOT VERY USEFUL				VERY USEFUL

• At our next meeting, to what extent are you interested in seeing the videotape of this meeting?

1	2	3	4	5
NOT VERY INTERESTED				VERY INTERESTED

The advantage of this rating scale over Likert scales is it takes less room on a page and can be quickly summarized it also takes little space and time to put the questions and responses up on a blackboard or flip chart when re -porting the results. One disadvantage of this type of scale is that it sometimes contuses people.

The number of steps in a rating scale usually varies from five to seven, although at times you will see ten points on a scale. Some researchers favor an uneven number of steps (as in the above examples). An uneven number provides a neutral midpoint so that favorable responses lie on one side and unfavorable responses lie on the other side of the midpoint. If you want to force the respondent to express an opinion, eliminate the midpoint by using an even number of points on the scale.

Rating scales are often used to explore an attitude or personal impression from a subjective point of view. A special scale, the Semantic Differential, is used when we want to know what meaning or attitude something stimulates in the respondent.

Town Council

HARD ---------- SOFT
STRONG ---------- WEAK
PASSIVE ---------- ACTIVE
NOT RESPONSIBLE ---------- RESPONSBLE
WELL INFORMED ---------- POORLY INFORMED
CARELESS ---------- CAREFUL

With this Semantic Differential format, respondents are asked to place a checkmark on one of the seven lines between each pair of words. Respondents who see Council as soft, would mark the line closest to the word soft. Those who see Council as a little on the soft side, would check off the first line after the midline. After all the pairs of words are marked off the researcher can see the respondent's subjective impression of Town Council This type of scale is often used to rate both an ideal situation (eg. ideal Town Council) and the real situation (eg. Present Town Council). Then the two sets of ratings are compared.

This and other attitude scales will be more fully discussed in Chapter 9.

Rank ordering

Researchers often want to know about people's priorities and preferences. Having respondents put items in order of priority is one way of finding out how they value the items. Thus, respondents are creating an ordinal scale.

• Please rank the following topics in order of your interest in attending a seminar about each one. Place a 1 beside the topic you would most like to learn about; place a 2 beside your second choice, and so on, until you have ranked all the topics.

HOW OUR COMMUNITY TAXES ARE DECIDED
WHAT THE RECREATIN COMMITTEE OF CITY COUNCIL DOES
WHAT THE COMMITTEE OF CITCOUNCIL DOES
WHAT THE MAYOR DOES IN AN AVERAGE DAY
HOW DECISIONS ARE MADE IN CITY COUNCIL
HOW TO UNDERSTAND CITY HALL MEETINGS

If you were to use the last question, or any question asking people to rank what they want, you should ask a follow-up question similar to those below. Even though people rank something at the top of their list it doesn't necessarily indicate real interest, or that they would participate in something or buy something One big mistake made on many needs-assessment questionnaires is to assume that people will actually do things they rate high on a list.

Follow-Up Question

• How interested are you in the topic you ranked as your first choice?

1. STRONGLY INTERESTED
2. MODERATELY INTERESTED
3. SLIGHTLY INTERESTED

Follow-Up Question

• Would you want to attend a seminar of three hours on the topic you ranked first choice?

1. I DEFINITELY WOULD
2. I MIGHT
3. I PROBABLY WOULD NOT

When you use ranking items on a questionnaire, you don't know if a person's first choice was a strong and clear preference over the second choice, or whether the respondent had a hard time choosing which to place first. The same applies to other items in the list; you don't know how strongly the respondent felt about the order of the items. Also, there are practical limitations to the number of items people can handle in a ranking task. Ten items are probably the most that people can reasonably rank in order.

Another reliable way to obtain a rank order is to use a method called paired comparisons, in this method, the objects to be ranked are presented two at a time and the respondent chooses between them. To obtain a rank order from this procedure, all possible combinations of pairs would have to be presented in random order. When the test results are tabulated the object most frequently chosen is given the highest rank.

Suppose four sculptures 'Man,' 'Family,' 'Abstract,' and 'Hands' are being considered for the area in front of City Hall, and you want to know people's preferences before purchasing one of them. The following question could be asked:

• City Hall is buying one of the four sculptures you have just seen. We want to know your preferences.

1. BETWEEN "MAN" AND "FAMILY".....I CHOOSE: ___MAN _____FAMILY
2. BETWEEN "FAMILY" AND "ABSTRACT".....I CHOOSE: ___FAMILY _____ABSTRACT
3. BETWEEN "ABSTRACT" AND "HANDS".....I CHOOSE: ___ABSTRACT __HANDS
4. BETWEEN "HANDS" AND "MAN".....I CHOOSE: ___HANDS _____MAN
5. BETWEEN "MAN" AND "ABSTRACTS".....I CHOOSE: ___MAN _____ABSTRACT
6. BETWEEN "FAMILY" AND "HANDS".....I CHOOSE: ___FAMILY _____HANDS

This is a relatively easy number of paired comparisons for a respondent to deal with if you want respondents to deal with the six topics in the first example of rank ordering they would have to make fifteen comparisons. That is probably the maximum number a respondent could handle without getting confused or annoyed.

Interval scale questions

An INTERVAL SCALE not only has a logical ordering like an ordinal scale; it also has equal differences between adjacent categories. Notice in the examples below that each category represents the same quantity as the category before it and the category after it.

• How many people do you think attended open City Council meetings last year?

UNDER 200 PEOPLE
____ 200 - 399 PEOPLE
____ 400 - 599 PEOPLE
____ 600 - 799 PEOPLE
____ 800 - 999 PEOPLE

• What do you think the monthly operating costs for the arena are?

____ $1,000 - $1,499
____ $1,500 - $1,999
____ $2,000 - $2,499
____ $2,500 - $2,999

Interval scales should be used to gather quantitative information. Perhaps the most common interval scales are those that ask respondents' age. Income, years of service, etc.

Rules for constructing interval scale questions

Most of the rules for constructing interval scales are similar to those for constructing ordinal scales: the first rule is different.

1. Ensure that each category is the same size. If your first category is 1 - 9 then your next category must be 10 - 19.

2. Make sure there are no overlapping categories. If your first category is 1 - 10. then the next category cannot start at 10. The second category would be 11 - 20. The third category would be 21 - 30. and so on.

3. List the categories in logical order. The numbers you use can increase in size or decrease in size.

Before reading rule 4 please do the following experiment:

Circle any one	23
number from the column	46
of numbers on the right.	68
Please choose one even	82
though it may seem like	103
a silly request.	

We asked you to do this because according to research, the majority of people will choose the third number in the column. Did you? Try it out on some of your friends.
Given a list of numbers, people who are uncertain about their response will tend to choose numbers near the middle of the list. Therefore, it is wise to set up any list of figures that is designed to test knowledge with the correct figures near the top or the bottom of the list.

4. When using an interval scale to test knowledge that involves numbers, place the correct answer near the too or near the bottom of the list.

People react differently when presented with a list of names, ideas, or statements, they appear to favor the top or the bottom of the list. In fact, the top position is the most frequently chosen, the bottom is chosen next most frequently. This happens most often when people are unsure about their own answer in such a case, follow rule 5.

5. When using an interval scale to test knowledge of names. ideas or statements, place the correct answer near the middle of the list.

Checklists

CHECKLISTS allow respondents to make several choices. You use them to list programs or services of your organization, sources of information, schedules, etc. A checklist is used when there is more than one alternative that may be correct for the respondent.

In an inventory checklist, the respondent is asked to check each item as if it was a separate question in fact, a checklist is really a series of nominal scales.

• Some of the activities of XYZ Seniors Groups are listed below. We would like to know whether or not you want more information about these activities.

	I DO NOT WANT MORE INFORMATION	I DO WANT MORE INFORMATION
CURRENT EVENTS DISCUSSIONS	_____	_____
DAY EXCURSIONS	_____	_____
VOLUNTEER GRANDPARENTS	_____	_____
CRAFT COURSES	_____	_____
HISTORY OF CANADA	_____	_____
BRIDGE FOR BEGINNERS	_____	_____
PSYCHOLOGY COURSES	_____	_____
MODERN THEATRE	_____	_____

In an inventory checklist, there is a danger the respondent will not treat each response category as a separate Item. In the above example, the respondent may feel 'more information is always useful', and mark the first category all the time. When someone is influenced by an overall feeling, he or she may not treat each item separately. This is known as the HALO EFFECT. One way to minimize the tendency to mark off all items in the same way is to list only live or six items, if you have more items, put a large space or a line between each set of four or five as we did above.

Here is another example of an inventory checklist:

• Almost everyone at one time or another is concerned about using volunteers in key services. Different people are concerned about different things. Read through the list and check off whether each item concerns you a lot, a little, or does not concern you at all.

REGARDING VOLUNTEERS THEY:

	CONCERNS ME A LOT	CONCERNS ME A LITTLE	HARDLY EVER CONCERNS ME
1. MAY NOT HAVE ENOUGH TRAINING	_____	_____	_____
2. MAY RESENT SUPERVISION	_____	_____	_____
3. MAY NEED A LOT OF SUPPORT	_____	_____	_____
4. MAY NOT BE RELIABLE	_____	_____	_____

In another type of checklist, the respondent is asked to select only a few items according to some stated criteria. For example:

• Which of the following best describes your reasons for not participating in this sport or activity (Check one or more).

_____ CAN'T FIND OTHERS TO PARTICIPATE
_____ I AM PHYSICALLY UNABLE TO PARTICIPATE
_____ NOT ENOUGH TIME - OTHER LEISURE ACTIVITIES
_____ NO OPPORTUNITY TO PARTICIPATE NEAR MY HOME
_____ IT COSTS TOO MUCH TO PARTICIPATE
_____ AVAILABLE FACLITIES ARE INADEQUATE
_____ I DO NOT KNOW HOW TO DO IT WELL ENOUGH
_____ OTHER REASONS (SPECIFY)_____

Rules for writing checklists

1. The list should include all possible answers. Otherwise an idea may be totally lost, not because it is unimportant to the public, but simply because it has been overlooked or considered unimportant when the question is written.

Who should run the Pee Wee Hockey? (Please choose one.)
_____ CAHA OFFICIALS:
_____ PARENTS:
_____ COACHES:
_____ RECREATION DEPARTMENT STAFF:

In this case you would miss out on those respondents who believe the sport should be run by a combination of people. How could you improve this question?

Exception to rule 1

Sometimes an alternative is deliberately left out because the alternative is so strong or socially acceptable that people would be drawn to it automatically. Price is often eliminated when you are interested in finding out about secondary considerations in purchasing a service or product. in the following example the 'cause' or goal of the organization was deliberately left out.

• Aside from the purpose of the organization, what attracts you personally to a volunteer job? (Check one or more.)

__OPPORTUNITY TO MEET INTERESTING PEOPLE:
__OPPORTUNITY TO DO A PARTTCULAR TYPE OF WORK:
__OPPORTUNITY TO WORK WITH FRIENDS:
__OPPORTUNITY TO INFLUENCE DECISIONS:
__OPPORTUNITY TO LEARN NEW SKILLS:
__OPPORTUNITY TO DEMONSTRATE MY SKILLS:

When you analyze the responses to the above question. It is important to remember the list was purposely incomplete, and that the responses could be secondary factors.

Sometimes it is impossible to list all the possible responses. In this case add the category 'other' with space to fill in specifics.

- Who should run the Pee Wee Hockey? (Check one or more)
  ___ PARENTS
  ___ COACHES
  ___ RECREATION DEPARTMENT STAFF
  ___ CAHA OFFICIALS
  ___ OTHER. PLEASE SPECIFY _____

2. <u>The list should not contain overlapping items.</u> Each item should be mutually exclusive.

Aside from the cost of a course, what do you consider the most important factors in choosing a course? (Check 3 only).

THE TIME

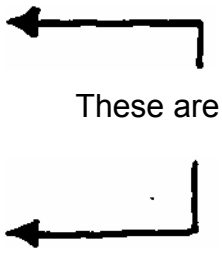
THE DAY OF THE WEEK

THE CONTENT OF THE COURSE (a)

THE INSTRUCTOR

THE OTHER CLASS MEMBERS

THE SUBJECT MATTER (b)



This list is unbalanced because although people can see six items, there are only five real choices. This will confuse respondents. The researcher won't know why some people checked off (a), others checked (b). Some might have checked both response categories. When it comes to statistical analysis, this question is biased or weighted in favor of the repeated response category. Thus, the value of the question is minimal.

How many response categories can be offered in a checklist. Many researchers say six items. Others say twelve items. To decide what would be best for you, ask yourself. 'What does the question demand of the respondent?' if you are asking the respondent to compare and choose, twelve items is probably too many to mentally compare. If you are asking the respondent to relate to each item separately (inventory type), then twelve items can usually be handled.

SEQUENCE OF QUESTIONS

The process of writing a questionnaire, whether for mail, telephone, or interview situations. involves writing draft questions, trying out different forms of the same question, revising and rewriting. You must keep checking back to see if the questions you will formulate will provide the type of information you need to fulfill the purposes of your research. Once you have all your questions, then you must consider how to order or sequence them.

In Section 1. Common Errors in Questionnaires, we commented on some aspects of ordering questions. Now, we'll elaborate on the general principles involved in choosing the order in which you ask your questions.

Which questions should come first? Some researchers begin with questions about age, sex, marital status, education, etc. These questions are easy to answer and they give respondents a feeling of confidence about completing the questionnaire or interview. Another good reason for following this order: people are used to it; they look on these questions as a necessary piece of housekeeping.

Other researchers argue that these demographic questions should be put to the end of the questionnaire. They believe a questionnaire should start with interesting questions that will motivate the respondent by demonstrating the potential social value of the study. They recommend that questions at the beginning of the questionnaire follow these rules:

1. They should relate directly to the purpose of the study as stated in a covering letter or title page or verbal introduction to the study.

2. They should be relatively easy to answer. They should be closed questions with only a few categories of response, rather than open-ended questions, or complex closed ones.

3. They should be neutral questions. The respondent should not be asked to agree or disagree with a position right at the beginning of an interview or print questionnaire. Questions that ask participants what they think is important, or what they prefer, tend to be more neutral than those that ask for agreement or disagreement.

4. They should be questions that everyone can answer.

The principle behind these criteria is to motivate respondents by creating interest and the confidence that they can answer all the questions.

After you have worked out - with some creativity and thought - which questions you will ask first, your next job is to put the rest of your questions in a logical sequence. Usually, you group questions about each topic together so that respondents aren't forced to do mental gymnastics as they move from one question to another. When you finish asking one group of questions let the respondent know you are making a change. Use linking sentences or short paragraphs to help the respondent travel through the questionnaire or interview. For example:

“Now. we will shift slightly to ask about the leisure activities available in this community “

“We would like to get your opinion on some related areas. One area we do not know enough about … “

“We have only a few questions left. We want to ask about… (broad topic area).”

“To help us summarize the responses we get: and to interpret the results, we would like to know some information about you (move into the demographic questions, marital status, length of time in community, etc.).”

During the process of selecting a sequence, question-writers may have to go back to the drawing board to change the basic format of a question. The best test of your wording, and your sequence of questions, comes when you try out your interview or questionnaire with some people from your sample. This is discussed in the next chapter.

Chapter Eight
Administering Questionnaires, Surveys and Interviews

CHAPTER
8 Administering Questionnaires, Surveys and interviews

INTRODUCTION

This chapter describes the back-up work that is necessary to ensure that your mail questionnaires, telephone surveys, and face-to-face interviews are successful. We deal with:

- How to introduce your study to the respondents
- How to lay out your questionnaire
- How to code your questionnaire
- How to pretest your questionnaire
- How to train interviewers for telephone and face-to-face interviews.

HOW TO INTRODUCE YOUR STUDY TO RESPONDENTS

When respondents receive a questionnaire in the mail, or a call from an interviewer, they decide whether or not to respond based on their assessment of:

- the value of the study
- the time it will take them to reply
- their own ability to answer the questions.

First impressions are important. Respondents will make their decisions based on the covering letter and appearance of the questionnaire, the interviewer's opening comments on the telephone, and (in face-to-face situations) the appearance of the interviewer. Therefore, the letter or opening remarks should answer these questions:

- who is conducting the research?
- why the research is being conducted?
- what information is being sought?
- how each respondent has been chosen?
- what will be done with the information collected?
- will the respondents' answers be confidential?
- what feedback will the respondent get about the results of the study?

When you conduct face-to-face or telephone interviews, tell respondents as much of this information as possible at the beginning of the interview. Introducing your study clearly will help respondents understand the type of questions you might ask and will also help them decide whether the study is important enough for them to respond. It's not good enough to have an interviewer say. 'I really don't know what this is all about. I am just helping out the organization by doing some interviews.' if respondents are to give up time and privacy (however little), they expect the interviewer to be knowledgeable and to have some personal commitment, or at least understanding of the study.

When you design a mailed questionnaire, the covering letter should also contain as much of this information as possible.

The following format for a covering letter is recommended in the book. Mail and Telephone Surveys: The Total Design Method.'

- Dear (respondent's name)
- What this study is about and why it is important
- Who is being asked to respond and how each person was chosen
- Whether or not the responses will be confidential
- How the results will be used
- What rewards or feedback the respondents will get
- Signature (sign each letter)

The first paragraph should appeal either to the respondent's self-interest or to his or her desire to be useful to others. Don Dillman, author of Mail and Telephone Surveys. warns against turning people off by using phrases such as. 'Your help is needed' or 'Enclosed is a questionnaire.'

He suggests an opening paragraph that identifies the nature of the problem being studied, its importance, and the need for people's opinions. For example:

There has been a lot of discussion about what the programs and activities of the Recreation Department should be. Are programs meeting the needs and desires of the people in our community? Should different programs be offered? Should some be expanded or stopped? Who should make these decisions? We are conducting this study so that people in this community have a way to express their views.

The second paragraph should explain how respondents were chosen and what will happen if someone who receives a telephone call or a questionnaire does not reply.

It would be too costly to ask for the opinions of every resident in the community. So we have drawn the names of a small number of people at random from a large list of all residents and asked them to give their opinions. For this study to be truly representative of our community, it is very important that each person who receives a questionnaire completes and returns it.

The third paragraph deals with confidentiality. People are often suspicious about how the information they give will be used. Researchers must protect the privacy of respondents and clearly state that confidentiality will be maintained. If respondents will not be anonymous when the results are collected, or if their responses will not be held in confidence, then they should be told this.

Sometimes an identifying number is placed on a questionnaire so that people can be thanked for responding or sent a follow-up letter if they haven't responded. Don't hide the number, place it clearly on the front page and explain how it will be used. For example:

* Dillman. Don A. Mail and Telephone Surveys: The Total Design Method. New York: John Wiley and Sons. Inc. 1978.

Your answers will not be seen by anyone except the researchers. The identification number on the first page of the questionnaire is for mailing purposes only. This is so we can check off the names on our mailing list when a questionnaire is returned. Your name will never be placed on your questionnaire.

This is an important issue if your needs-assessment study is requesting information from staff or volunteers inside an organization. if there is any chance of a respondent being identified because you've chosen a small sample from a specific department, (or because of some requested personal information e.g. age. sex. etc.) then don't say 'results will be confidential'. if the study is to be confidential, make sure you don't in any way compromise the respondents.

The fourth paragraph should reinforce the usefulness of the responses and. if possible, should tell what actions will be taken with the results. For example:

> The results of this study will be presented to City Council in May.
>
> As a result of your responses and the responses of others who answer this survey, we will outline some alternative plans for senior management
>
> The results of this study will be made available to the Board of Directors for consideration in their planning for next year.

The last paragraph of the covering letter should offer to answer any questions respondents might have about the survey. Provide an address and phone number where a named person can be contacted. When -ever possible, offer respondents a copy of the results of the study. One way to do this without requiring respondents to put their names on the questionnaire is to provide a place on the return envelope.

☐ Yes. I would like a copy of the results of the study.
Return Address_____
_____
_____

Mail and Telephone Surveys: The Total Design Method also suggests the questionnaire have a cover page printed with the title of the study, who to contact with questions or comments, and a drawing or photo that symbolizes the study. You could use the symbol or crest of the organization or a simple line drawing.

HOW TO LAY OUT QUESTIONNAIRES

The appearance of a mail questionnaire will also influence the respondent's decision about participating in the study. Poor quality paper, messy typing, and poor reproduction do not convey the message, 'this is important and worth the time you will spend on it'.

The following principles apply to the layout of each page of a questionnaire that will be used for mail, telephone, or interview situations.

In closed questions, because the question itself generally has more words than the response categories, type the questions as you would any sentence: begin with a capital letter and end with a period. Use all capital letters for each word in the response categories. Do this throughout the questionnaire.

Don't crowd too many items on a page.

Don't split a question so that part of it is at the bottom of one page and the other part is at the top of the next page. It is confusing to the respondent.

Set up the answer categories so they are clearly visible. Ail answer categories should be indented the same number of spaces from the margin.

For open questions, leave plenty of room for the respondent's answer. If you leave only one line, the respondent will assume you don't want much information. If you leave several lines, the respondents will have enough space to reply without being forced to shrink their responses or their handwriting.

Sometimes you will include questions to be answered by only some of the respondents. Clearly instruct the respondents what to do if they can answer, and what to do if they cannot answer. These are called SCREEN QUESTIONS.

27. Do you know about the Museum's Public Awareness Programs?

1. NO → PLEASE SKIP FROM HERE TO Q. 32 ON THE NEXT PAGE

2. YES

28. Have you ever attended a session of the Public Awareness Program?

1. NO

2. YES

29. What did you think of the session or sessions you attended?

_____

_____

_____

30. Do you know anyone who has attended any sessions of the Museum's Public Awareness Program?

1. NO → PLEASE SKIP FROM HERE TO Q.32 ON THE NEXT PAGE

2. YES

31. What did they think about the session or sessions they attended?

1. I DO NOT KNOW

2. WHAT DID THEY SAY?

_____

_____

_____

Although the page layout for a telephone survey is basically the same as that of a mail questionnaire, you do have to consider the needs of the interviewer as well as the needs of the respondent. A telephone questionnaire must include specific instructions for interviewers. These instructions must be set out so they won't be confused with the instructions the interviewers will give to the respondents. Interviewers have a tough job: they have to ask the question, listen to the response, record the response accurately and. at the same time, get ready to ask the next question.

In a telephone survey. interviewers often have response categories that they are not supposed to reveal to the respondent. These categories of response are presented on the page so the interviewer can check off those which the respondent mentions. At other times. interviewers are supposed to tell the respondent what the response categories are. The researcher must indicate clearly to interviewers when they should or should not give alternative responses. The researcher must also anticipate other situations that interviewers might encounter, and give clear instructions.

Instructions to the interviewer always appear in capital letters. What the interviewer says to the respondent is always in regular type. The only exception to this rule is that all answer categories—whether given to respondents or not—are printed in capital letters.

The following excerpt from a sample questionnaire illustrates some of these instructions.

Sample Questions from a telephone interview

9. Have you heard of any of the programs or services offered by the Volunteer Centre of Middlecity? (DO NOT GIVE ANSWER CATEGORIES. CIRCLE THE ONES MENTIONED)

1. DOES NOT KNOW ANY
2. REFERRAL OF VOLUNTEERS TO AGENCIES
3. PUBLIC RELATIONS FOR ALL VOLUNTARY ORGANIZATIONS
4. GOVERNMENT LIAISON
5. CONSULTING ON ORGANIZATIONAL PROBLEMS
6. TRAINING
7. BOARD AND COMMITTEE DEVELOPMENT
8. OTHER _____

10. What do you think the main purpose of a Volunteer Centre should be? (IF MORE THAN ONE PURPOSE IS OFFERED. RECORD ALL AND THEN ASK 'Which purpose do you think is most important' AND CIRCLE THE ONE REPEATED)

_____
_____
_____

11. What factors do you think have contributed to the success of Volunteer day? (PROBE, e.g. 'Can you say more about that?' AND WRITE VERBATIM)

_____

_____

12. What factors do you think blocked the success of Volunteer Day? (PROBE AND WRITE VERBATIM)

One other difference between mail questionnaires and telephone surveys is based on how much information a person can handle when the information can be seen versus how much a person can handle when the information is heard. On a mail questionnaire, respondents can deal with a long question and six or seven categories of response. In a telephone survey. It is difficult for respondents to remember the question and several categories of response, and. at the same time, mull over their opinion. Therefore, on telephone surveys, questions and answers must be shorter, or broken into several parts. The following examples illustrate how the same question could be asked differently for a mail and a telephone situation.

Mail Questionnaire

• To what extent do you approve or disapprove of canceling membership fees in our organization?

1. **STRONGLY APPROVE**
2. **APPROVE**
3. **INDIFFERENT**
4. **DISAPPROVE**
5. **STRONGLY DISAPPROVE**

Telephone Survey

• We would like to ask you how you feel about the proposal to cancel membership fees in our organization. Would you say you approve or disapprove?

1. **APPROVE**
2. **DISAPPROVE**
3. **NO RESPONSE**
4. **OTHER _____**

Would you say your feelings are strong, medium, or mild on this issue?

1. **STRONG**
2. **MEDIUM**
3. **MILD**

Mail questionnaire

• People have identified many goals for the Volunteer Centre. Would you please look at the list of goals below and rate each goal in terms of the priority you think it should have. (Place a check mark on the line beneath the priority you think is appropriate for each goal.)

	VERY HIGH PRIORITY	HIGH PRIORITY	MEDIUM PRIORITY	LOW PRIORITY	VERY LOW PRIORITY
Serve small agencies who have less than XYZ budget					
Serve all voluntary agencies and organizations that use volunteers regardless of their budget					
Represent all voluntary agencies to the government					
Consult on fund raising					
Provide training for volunteers					
Provide training for staff					
Publicize volunteer job?					
Recruit volunteers for agencies					
Refer citizens for volunteer jobs					
Provide resource centre on areas related to volunteers					
Conduct research on voluntary action					

Telephone survey

• People have identified many different goals for the Volunteer Centre. We would like your opinion on the goals most often stated by people in the community. I would like to read you a list of 10 goals. In relation to each one. Would you please tell me whether you think it should be a high, medium, or low priority, or whether it has no priority. (READ GOAL AND RECORD PRIORITY.)

	HIGH PRIORITY (1)	MEDIUM PRIORITY (2)	LOW PRIORITY (3)	NOT A GOAL (4)	REFUSES TO ANSWER (9)
One of me possible goals is to serve small agencies who have less than XYZ budget. Would you say this is not a goal, or would you say it is a high, medium, or low priority	1	2	3	4	9
The next one is: to serve all voluntary agencies and organizations that use volunteers regard-less of their budget. Should it not be a goal, or should it be a high, medium or low priority?	1	2	3	4	9
(REPEAT CATEGORIES OF RESPONSE AS YOU THINK IS NECESSARY FOR THE RESPONDENT)					
The next possible goal is: to represent all voluntary agencies to government	1	2	3	4	9
The next one is... etc.	1	2	3	4	9

In a face-to-face situation, the respondent can be asked the question the same way as in a telephone interview Another method is to type each goal on a separate card Give all cards to the respondent and ask him or her to separate the cards into tour piles—those that are not goals, those that should be a high priority, medium priority, and so on.

The wording, layout, and sequence of questions should be tested before you implement your study. During the testing, any problems that may be encountered by interviewers and respondents will come to light, and you'll be able to correct them before you conduct the study. Before testing your questionnaire, there is one last step in the preparation: coding the response categories.

HOW TO CODE RESPONSES ON QUESTIONNAIRES

Questionnaires generally need to be organized so you can summarize and analyze the results. The first step in preparing for summary and analysis is called CODING. Coding involves assigning a number to each response category in each question.

Before we outline the principles involved in coding questionnaires, we advise that if you are going to use a computer to tabulate, summarize, and analyze your results, consult with the computer people before you code and print your questionnaires. They will help you to work out an appropriate coding method. Although they will follow the same general principles outlined in the next, few pages, they may have routine instructions for their key punch operators, or special features on their machines that would affect the coding numbers.

Even if you are not using a computer to help summarize and analyze your results, you still code the response categories of your questionnaire.

1. Coding closed questions

Because they are somewhat easier to code, we will explain now to code closed questions before dealing with open questions. Closed questions are always coded before your survey is implemented.

The following example illustrates how coding categories can be placed on a questionnaire.

1. Are you: (Please circle the number beside your answer).	
1. MALE	3-0 3-1
2. FEMALE	3-2
2. What is your age group?	
1. UNDER 50	4-0 4-1
2. BETWEEN 50 AND 60	4-2
3. BETWEEN 61 AND 70	4-3
4. BETWEEN 71 AND 80	4-4
5. OVER 80	4-5
3. Did you belong to XZY Seniors Club for any part of 1980?	
1. YES	5-0 5-1
2. NO → PLEASE SKIP FROM HERE TO QUESTION 6 ON THE NEXT PAGE	5-2
4. How often on the average did you participate in the activities during weekdays while you were a member?	
1. NEVER	6-0 6-1
2. LESS THAN ONCE A WEEK	6-2
3. ABOUT ONCE A WEEK	6-3
4 SEVERAL TIMES A WEEK	6-4
5. EVERY WEEKDAY	6-5

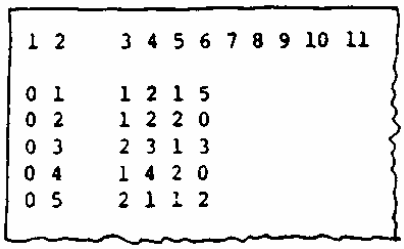
The codes, on the right-hand side of the page, are separated from the actual questionnaire by a vertical line. The first number in each code refers to the appropriate column on a computer card or in the pages of a hand-marked code book. In this example, you don't see references to column 1 and column 2 because they will be used to record an identifying number for each respondent

In our example, question 1 will be entered in the third column of the computer card or code sheet. The second number in the code tells you which response category was chosen by the respondent.

The code 0 or 9 is often reserved to indicate when a respondent has not answered a question, or when the question was not asked as the result of a screening question or skip pattern.

Our example illustrates a typical code layout for a telephone or interview questionnaire, it can also be used for mail questionnaires with a note at the top of the code column 'FOR RESEARCHERS ONLY' or 'FOR OFFICE USE ONLY'. Some researchers think this code column is distracting to respondents and so do not put it on mail questionnaires. They keep the codes on the master questionnaire and in a code book. Chapter 10. Summarizing Research Results, provides step-by-step instructions on how to set up a code book for your research, but the following example illustrates how a code sheet would look with responses recorded from five respondents to the questionnaire on the previous page.

CODE BOOK



1 2	3 4 5 6 7 8 9 10 11
0 1	1 2 1 5
0 2	1 2 2 0
0 3	2 3 1 3
0 4	1 4 2 0
0 5	2 1 1 2

Respondent 01 marked off that he is male (question 1, code 1), between the ages of 50 and 60 (question 2, code 2), belonged to the Seniors Club (question 3. code 1), and participated every weekday (code 5). Notice, respondents 02 and 04 said they did not belong to the Seniors Club (question 3. column 5. code 2). Therefore on question 4, (column 6) a 0 is entered to indicate 'Question not applicable'. As you can see, once you have coded your response categories, only a few pages are needed to summarize many questionnaires.

Now, back to code the responses.

Questions 1 and 3 on our sample coded questionnaire are nominal questions—there is no particular order or relationship between the response categories. Therefore, you can assign any code number to the responses. In our example, we used the code 1 for a 'yes' response. 2 for a 'no' response, but we could have chosen to assign code 1 to the 'no' response and 2 to the 'yes' response Whichever numbers you choose, it will be easier for both coders and researchers if you maintain the same 'yes' and 'no' codes throughout the questionnaire.

Ordinal (question 4) and interval (question 2) questions always have a logical progression of response categories — they always increase or decrease. Therefore, it is important to assign codes that have the same logical order and consistency. In question 4, the response categories progress from 'Never' to a frequency of 'Every weekday': therefore, the code categories should also increase. 'Never' is given a code of 1, and 'Every weekday' is given a code of 5.

The following question represents another type of ordinal scale—the Likert Scale—and is used to find out people's opinions and attitudes. To code these scales, consecutive response categories are given consecutive coding numbers.

• Everyone would benefit if special arrangements allowed disabled people to participate in regular recreation programs.

1. STRONGLY AGREE
2. AGREE
3. UNDECIDED
4. DISAGREE
5. STRONGLY DISAGREE

If you assign a code of 1 to 'Strongly agree' then you must assign a code of 2 to 'Agree', a code of 3 to 'Undecided', a code of 4 to 'Disagree' and a code of 5 to 'Strongly disagree'.

If you assign a code of 5 to 'Strongly agree' then you must assign a code of 4 to 'Agree', a code of 3 to 'Undecided', a code of 2 to 'Disagree' and a code of 1 to 'Strongly disagree'.

Whichever order you choose, code of 1 OR code of 5 for 'Strongly agree' this order must be followed throughout your questionnaire.

Often in a questionnaire, you ask about the same issue with two questions posed from different perspectives. You do this to check on the consistency of the responses you are getting. These questions are called reverse items. Their coding requires special instructions to the person who will code and categorize the responses to the questions.

That is, if we have chosen to code all responses that support an issue with 1 and 2 for the two degrees of agreement with the issue, then all responses that disagree with the issue will be coded 4 and 5. Notice how the sample questions on the next page are coded.

Sample questions 1 and 2 are coded as follows, and one person's responses are shown as circled items on the questionnaire and strokes on the code sheet at the bottom of the page.

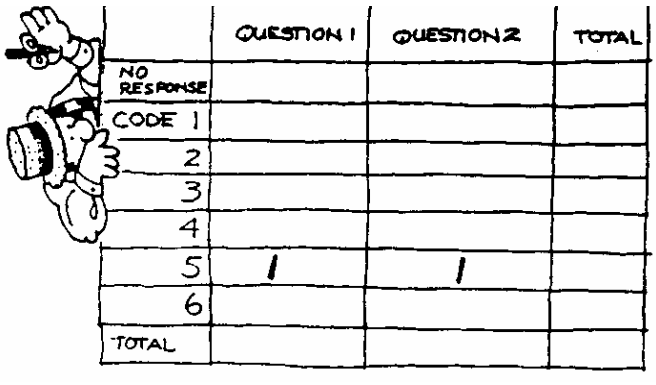
- 1. The proposed bicycle path from ABC Street to XYZ Ravine is a good idea. (Please circle your answer.)

	code
1. STRONGLY AGREE	1
2. AGREE	2
3. UNDECSDED	3
4. DISAGREE	4
5. STRONGLY DISAGREE	5
6. DO NOT KNOW	6

- 2. I am opposed to the bicycle path between XYZ Ravine and ABC Street. (Please circle your answer.)

1. STRONGLY AGREE	5
2. AGREE	4
3. UNDECIDED	3
4. DISAGREE	2
5. STRONGLY DISAGREE	1
6. DO NOT KNOW	6

In this example, Code 1 in both questions indicates a positive response to the issue of building a bicycle path.



In an actual questionnaire these questions would be separated from each other by other questions to ensure that the respondent considers each one separately.

Notice that if the respondent is consistent, he or she would check off a positive category on one question and a negative category on the other question. If someone supports the bicycle path, he or she would mark 'Strongly Agree' on question 1 and 'Strongly Disagree' on question 2.

It's a good idea to write several questions to measure attitudes toward an issue because each question attempts to discover the same opinion or altitude from a different perspective. When you use more than one question to assess an opinion, you can measure the reliability or consistency of your results.

The steps for coding several reverse-order questions on the same issue are:

1. Clarify the issue the questions are addressing.

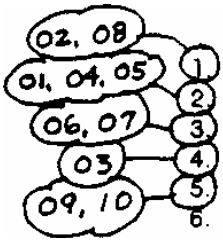
2. Decide the one code number you will give to the strongest response that supports the issue in each question. (That is, determine whether 1 or 5 will be the code for the strongest supporting position.)

3. In each question about the issue, code the strongest category that supports the issue with the same number.

4. In each question about the issue, code the rest of the items consistently.

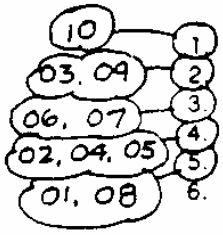
Here are three questions to practice coding and summarizing. First, code the response categories of each question. Then, record the responses of ten respondents (indicated by respondent numbers inside 'bubbles' on the left) in the code book. Then, tabulate the results.

QUESTION 1 The Recreation Department should use more volunteers in their program and services.



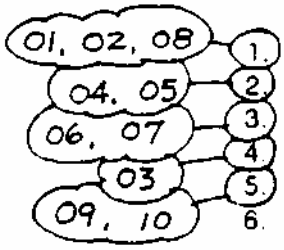
		CODE
1.	STRONGLY AGREE	3-
2.	AGREE	3-
3.	UNDECIDED	3-
4.	DISAGREE	3-
5.	STRONGLY DISAGREE	3-
6.	DO NOT KNOW	3-

QUESTION 2 Support should not be given to increase the number of volunteers in the Recreation Department programs and services.



		CODE
1.	STRONGLY AGREE	4-
2.	AGREE	4-
3.	UNDECIDED	4-
4.	DISAGREE	4-
5.	STRONGLY DISAGREE	4-
6.	DO NOT KNOW	4-

QUESTION 3 Recreation Department programs could benefit from increased use of volunteers.



		CODE
1.	STRONGLY AGREE	5-
2.	AGREE	5-
3.	UNDECIDED	5-
4.	DISAGREE	5-
5.	STRONGLY DISAGREE	5-
6.	DO NOT KNOW	5-

CODE BOOK

	Quest One	Quest Two	Quest Three	
1	2	3	4	5
0	1			
0	2			

SUMMARY TABLE

CODE	QUEST. ONE 3-	QUEST. TWO 4-	QUEST. THREE 5-	TOTAL
1				
2				
3				
4				
5				
6				
7				
TOTAL				

CODE BOOK

Code book if you gave the code 5 to STRONG AGREEMENT

1	2	3	4	5
0	1	4	5	5
0	2	5	4	5
0	3	2	2	2
0	4	4	4	4
0	5	4	4	4
0	6	3	3	3
0	7	3	3	3
0	8	5	5	5
0	9	1	2	1
1	0	1	1	1

Code book if you gave the code 1 to STRONG AGREEMENT

1	2	3	4	5
0	1	2	1	1
0	2	1	2	1
0	3	4	4	4
0	4	2	2	2
0	5	2	2	2
0	6	3	3	3
0	7	3	3	3
0	8	1	1	1
0	9	5	4	5
1	0	5	5	5

TABLE SUMMARIZING QUESTIONS 1, 2, AND 3.

Code: 1=Strong agreement with issue

CODE	QUEST. ONE	QUEST. TWO	QUEST. THREE	TOTAL	
1	II	II	III	7	Strong agreement with idea of using volunteers.
2	III	III	II	8	
3	II	II	II	6	Undecided
4	I	II	I	4	
5	II	I	II	5	Strong disagreement with idea of using volunteers.
6	0	0	0		
TOTAL	10	10	10	30	

Once the respondents' scores have been transferred to tables like those on the previous page, you will see how a summary of several questions can reflect your sample's views on an issue. Consistent coding allows you to do this quickly. This table is the starting point for some simple statistical tests that will be described in Chapter 10. Summarizing Research Results, and a 'Statistical Booklet', a companion to this manual.

Ranking questions and checklist items are coded in a special way. Each item in a list of items to be ranked, or in a checklist, is treated as if it was a separate question. Each item is coded in a separate column of the code book or computer card.

• Please rank the following in order of importance to you. (Place 1 in front of the most important item for you. 2 in front of the next most important, etc.)

_____ SWIMMING POOL	CODE
_____ ARENA	21 - 1 2 3
_____ TRACK	22 - 1 2 3
	21 - 1 2 3

In the above ranking task, the respondent's answers on the swimming pool item win be coded in column 21, in column 21, the coder will circle 1 if the respondent ranked the swimming pool first. 2 if the respondent marked it second rank, and so on. The respondent's answers on the arena item will be coded in column 22. If nine items were being ranked, nine columns would be used, and the coder would have nine figures beside the column number.

Next, we will turn our attention to coding open questions.

2. Coding open questions

Open questions can also be quantified Coding an open-ended question involves five steps. The first four steps are used to develop the coding categories. In the fifth step you actually code all the questionnaires.

a) Choose a representative sample of questionnaires. Number the questionnaires. (This sample can come from your pilot test or from final returned final questionnaires).

b) Take one open question and copy every response from every questionnaire in the sample. Put the questionnaire number at the beginning of each copied response.

c) Look over all the responses and see what common types of responses there are. Then decide which categories to use. This depends on the purpose of the question. You will lose some information in the coding process, but you want to make sure that what is lost is the least important information.

d) On a separate sheet, give each category a name or descriptive phrase, and give examples that describe the type of responses that are to be included in each category. The examples come from the responses you looked at in step (c).

This information is often put in a code book so that when the coders read through all the questionnaires, they will be able to look up the categories that apply to each code for each open question.

e) Each open question on every questionnaire is then read and the responses are coded according to the categories developed to that point. To ensure consistent coding, two people often code the same questionnaires independently. They then compare their results, discuss, and resolve any differences between their codings. This would eliminate ambiguities and reduce the possibility of inconsistency between coders. They would do this using a sample of questionnaires rather than all the questionnaires returned.

Now that you have developed how you wilt introduce your study to respondents, and have laid out and coded your questionnaire, you are ready to pilot-test your study

HOW TO PRETEST YOUR QUESTIONNAIRE

Whatever form of questionnaire or test is being used, you can be sure of one thing: it will need corrections and revisions to make it work effectively. Once you prepare the questionnaire, especially if it is for a telephone survey or face-to-face interview, try reading it aloud as if you were in the actual interview situation. The flow of words must sound conversational and communicate clearly. (One definition of an interview is 'a conversation with a purpose'). In a mailed questionnaire, the words must read smoothly and the directions must not leave any doubt about what the respondent is supposed to do.

Next, try the screen questions. For example:

4. Do you watch the multicultural TV channel?

1. YES
2. NO → PLEASE SKIP FROM HERE TO QUESTION 8.

Make sure that question 5 will make sense to someone who answers 'Yes' to Question 4 and that question 8 makes sense to someone who answered 'No'. Check these connections carefully because in drafting questions, the numbers and flow can easily get mixed up.

Finally, go over every word in the questionnaire and ask yourself whether each question is going to produce the type of information you want. Check back with the purpose of your research to verify that you will get the belief, feeling, behavior, attitude, or social characteristic information you need, and whether you will get wants, needs, or preferences. Then check that each arc every word in each question is clear and has only one meaning.

At this point, you will have checked your questionnaire by yourself, or with a small group of people who are willing to help. This is not enough. NEVER assume that because you and your colleagues or relatives understand your questionnaire, your research sample will too. Friends, relatives, and colleagues are well-meaning but (a) they are too kind, (b) they are not the same as the people in your sample, and (c) they may have heard you discuss your study, which would help them understand your questions.

Take a small sample from the list of people to be surveyed and test your questionnaire with them. if you are doing telephone or face-to-lace interviews, spend time at the end of the interview asking such questions as:

- Were any of the questions confusing? Which ones?
- Did I seem to be repeating myself? Where?
- Did the questions seem relevant to the problem or issue I said we were studying in my introduction?
- What other questions should I be asking?
- Do you think other people will have difficulty answering? If yes who will have difficulty with what?

With a mail questionnaire, ask these same questions and provide space for people to respond.

After doing this 'pilot study' with six or so people from your sample, USE the feedback you get. Go back to the drawing board. Revise. Clean up the form.

Once you have made your revisions. If you are conducting a mail survey, you are ready to print and mail out your questionnaire. If you are conducting a telephone survey, or face-to-face interviews, you have one more step before implementing your full study: you need to train the interviewers.

HOW TO TRAIN YOUR INTERVIEWERS

Set up imaginary interviews. Get the interviewers together and, if necessary, bring in extra people so that each interviewer will have someone with whom to practice. Give the interviewers your questionnaire and have them conduct the interview as if it was the real situation. If possible, record the interview. If you don't have a tape recorder, arrange for someone to observe each interview.

There are specific points to watch and listen for: tone of voice, speed, energy level, and clarity. These speech behaviors will often influence the respondent without the interviewer or respondent realizing it. If your interviewers skip across some questions and linger over others, it is important to find out why this happens. Are some questions boring to the interviewer? Do some questions cause embarrassment or anxiety? The interviewer's attitudes and feelings can be communicated quite subtly and they will influence the respondent. There is nothing more discouraging than finding out after the study is over that your respondents were influenced by the interviewer and your research results are biased.

Check for leading statements and fast closure. Interviewers - sometimes unknowingly - shape the respondents' answers either by suggesting answers they personally favor or by moving quickly to the next question when they hear something they don't favor. These influences are often nonverbal. The interviewer may unwittingly, 'reward' some responses by smiles, nods of agreement, or change in tone of voice. They may 'punish' other responses by simply not reacting, puzzled looks, or by sighs.

Compare what the interviewer writes down to what the respondent said (listen to the tape recording or read what the observer recorded during the interview). When an interviewer is asked to record exactly what the respondent said (verbatim) that is what the researcher needs. Notes that just give a sense of what was said will not be good enough. What's left out of an interviewer's records might actually be a source of bias. What an interviewer adds (thinking it was said, or trying to clarify what the respondent meant) is also a source of bias. Sometimes, in comparing two records of the same interview, you'll discover the interviewer has systematically—but unconsciously—distorted what was said, to fit what he or she thinks the question means or what the respondent meant. Sometimes the interviewers fail to record something because they think the information is so basic it can be taken for granted. All these behaviors will distort the information collected.

Check that interviewers understand how to probe for more information and how to clarify responses. Give them examples of neutral probes like 'Could you say more about that...' 'I'm not certain I got exactly what you meant. Could you tell me again?', or 'May I repeat what I wrote down so you can check that I have everything you want to say...'

Training interviewers is critical to the success of your study. It's also important that you supervise them on a regular basis to check if they are having any problems, and to read their completed interviews. Practice-Interviewing should give interviewers an opportunity to deal with such typical statements as:

• I don't know enough about the topic so please interview someone else
The interviewer should not contradict the respondent, but should reply. 'The focus of this survey is how people feel about ABC rather than what they know. Whatever information you can give us will be helpful. Perhaps if I read you a couple of questions you'll know what I mean...'

• I'm too busy
The interviewer should acknowledge that he or she may have interrupted the respondent, explain how long the interview will take, and ask when to call back.

• I don't believe in surveys
The interviewer should acknowledge that sometimes surveys take a long time and no one sees the results, and then repeat how the results will be used, the importance of the study, and offer the respondent feedback from the study.

• That question is ridiculous
The interviewer should not dismiss the respondent's comment or rush on to the next question, instead, record the respondent's comments, criticisms, and suggestions, and assure the respondent that his or her comments are being taken seriously. In fact, if the early returns of a study show a lot of criticism, anger, or anxiousness, researchers should review the interviewer's introductory comments and the questions being asked.

• This is an invasion of my privacy. It's nobody else's business what I think.
The interviewer should describe and clarify the measures that have been taken to ensure confidentiality (names do not appear on the questionnaire).

• Who is sponsoring this research?

The interviewer needs to know what to say about the sponsoring and funding agency. In market research, it is often important not to identify the specific company that is asking for the information, so a broad term is used, for example. 'Ski areas want this information', or 'An agency working with volunteers', might be used.

Sometimes, typical respondent statements, and the appropriate interviewer responses are typed out and given to interviewers. This back-up material will help the interviewer to feel prepared and supported. In addition, interviewers should have written information on the purpose of the study, whose respondents can call for further information, how respondents were chosen, and if and when a copy of the results will be sent to respondents.

After you have completed the training sessions, your study is ready to begin.

SUMMARY

The planning that goes into conducting research takes time. Earlier chapters described how to clarify the purpose of your research and identify the information you need to collect, who to collect it from, and what methods to use. This chapter focused on the final planning steps:

- How to introduce your study to respondents.
- How to lay out and code questionnaires and interviews.
- How to pilot test your introduction and questionnaire.
- How to train interviewers.

Chapter Nine
Conducting Research on Attitudes

INTRODUCTION

ISSUES IN ATTITUDE RESEARCH

1. **What is an attitude?**

2. **How to define the attitude you want to study**

3. **How to check your definition of an attitude**
   a. test your construct with a panel of judges
   b. test your construct with a reference group

METHODS OF MEASURING ATTITUDES

1. **Reactive measures (direct)**

2. **Reactive measures (indirect)**
   a. sentence completion
   b. photographs and drawings

3. **Non-reactive measures for assessing attitudes**

SUMAMRY

CHAPTER
9 Conducting Research on Attitudes

INTRODUCTION

You usually collect information about attitudes at the same time you are collecting other types of information. We are devoting a separate chapter to attitude research because there are special considerations and techniques related to finding out about attitudes.

In the first section we will define what we mean by 'attitude', and briefly describe those issues that are always involved when you do attitude research. In the second section we will discuss specific methods such as questionnaires, interviews, observations, tests* and the use of records.

INSUES IN ATTITUDE RESEARCH 1. What is an attitude?

Defining people's attitudes is rarely as simple as asking whether they like something or whether they believe something is good or bad. An attitude consists of more than feelings. An attitude includes beliefs and some tendency to act or behave in a certain way.

Sometimes thoughts, feelings, and behavior are consistent. I might believe in democracy, feel strongly that people should have the right to vote, and I might vote on election days. Other times, thoughts, feelings and behaviors are not consistent. I might feel strongly about voting and yet not go to the polls on election day.

Attitudes are complex combinations of feelings, beliefs, and behaviors. When any one of the three aspects of an attitude is neglected, the resulting research findings can mislead planners and decision-makers.

* An excellent collection of attitude scales can be found in Shaw. M. E. and Wright. J M Scales For The Measurement of Attitudes. Toronto: McGraw-Hill Book Company. 1967.

People's attitudes to a new service, program, or facility are often surveyed before deciding to go ahead with plans.

Let's look at an example of what can happen if attitude research is incomplete.

The group planning a new Art Gallery conducts a survey of people's attitudes toward the plan. People are questioned to find out what they think of cultural centres and art galleries, the importance of art galleries relative to other types of cultural facilities, how they would feel about having a second gallery, and whether they favor the proposed plan. The planning group finds that the majority of those surveyed gave positive responses.

Unfortunately, when people say they want or favor something, you cannot predict with any accuracy what they will actually do with it in the future. On the basis of the information collected on what people believe and feel about a new gallery, it would be dangerous to assume that people will actually go to the gallery or that they will support it with volunteer time or money. in this case, the research did not reveal the behavior component of people's attitudes toward a new gallery. To collect such information, they could have been asked whether they had visited other galleries in the city or in other cities, what they think they will do. and how they would be willing to support a gallery in the following example, see if you can tell which attitude component is missing.

An Urban Centre decided that participation in fitness classes was not high enough. A survey was conducted asking people how important they thought fitness was, whether or not they thought fitness classes could improve one's well being, whether fitness classes could be offered by the Centre, the preferred times and fees, and whether people would consider joining a class. The Centre discovered that, by and large, people believed in fitness and supported the classes. The Centre rescheduled classes, revised the fees and advertised the new programs widely. There was little increase in participation.

As you have probably noted, in this survey the researchers missed the 'feeling' component of people's attitudes toward fitness classes. They did not find out how people feel about doing exercises, about working with strangers, or about listening to a teacher. This information might have suggested a different advertising approach.

These two examples illustrate the importance of defining what specific feelings, beliefs, and behaviors will be included in the definition and measurement of any particular attitude. This principle of being specific in identifying the information that needs to be collected was first presented in Chapter 3 when we discussed research plans. Although the principle is the same, there is a special method for identifying what an attitude is and what information should be collected. The next section deals with how to define the attitude you are interested in studying.

2. How to define the attitude you want to study

Since an attitude is not a simple thing that someone can point at, we use a construct made up of a combination of feelings, beliefs, and behaviors. Researchers cannot measure all possible feelings, beliefs, and behaviors, so they choose certain ones and say that those chosen represent a certain attitude. The particular feelings, beliefs, and behaviors we choose to represent an attitude in a given situation are called. In research terms, our attitude construct.

Let's take an example. Say a City Department received complaints about the staff's attitudes toward a particular group. The Department wanted to check out the complaints and assess staff attitudes.

The best approach to define the construct of 'attitudes of staff to Group x* is to explain precisely what is meant by a positive attitude toward Group X and what is meant by a negative attitude toward Group X. Here's how you do it:

Step 1. Make a list of characteristics that describe or define a person who has the positive attitude desired. Do this by asking: What would such a person believe or think about Group X? How would such a person feel in the presence of people from Group X? How would such a person behave in relation to Group X? What might such a person say about Group X ?

Step 2. Make a list of the characteristics that describe a staff person who would lack the desired attitude. Ask yourself how such a person with a negative attitude toward Group X would think, feel, behave, and what they might say.

Step 3. Arrange the phrases that describe the characteristics according to the three categories of an attitude: feelings, beliefs and behaviors

Step 4. use the characteristics identified in steps 1 and *2* to develop measurement tools (questionnaires, observations, or tests) that you can use to measure attitudes of the staff.

Use these same steps in developing any attitude construct, regardless of what particular attitude you want to measure. Remember, the principle is exactly the same as the principle you use to identify the information you need to collect. That is, first specify exactly what you mean by a certain attitude. Here is an example that illustrates steps 1 and 2.

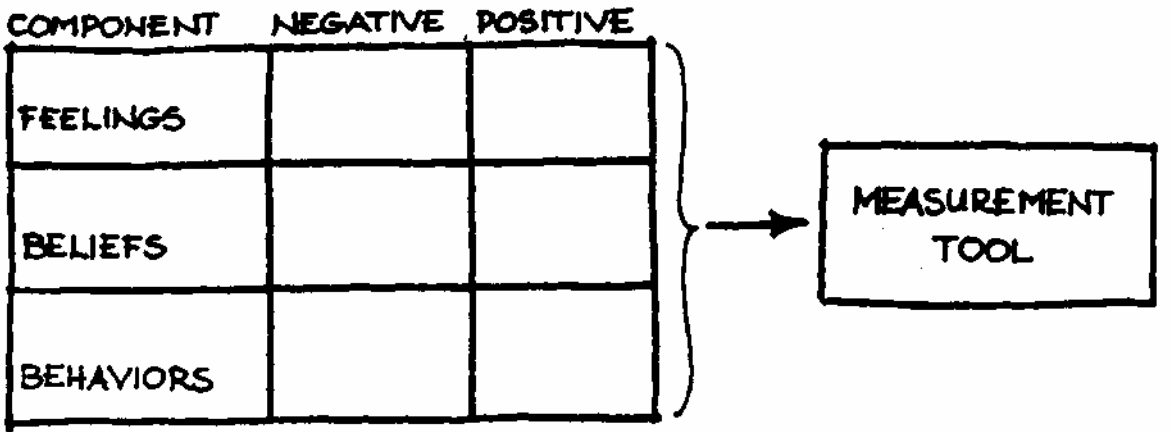
Let's say we want to assess senior citizens' attitudes toward a proposed recreation program in their residence. We want to design a set of questions that will be included in a larger questionnaire about life in the residence. Below are the results of our brainstorming categorized into the three factors of attitude.

Senior citizens' attitudes towards proposed recreational program

	Those who have negative attitudes	Those who have positive attitudes
Feelings	-angry -disinterested -suspicious -lack of trust	-excitement -anticipation -trust -interest
Beliefs	-program seen as being for others' benefit or irrelevant -program is not valued -program is meaningless -waste of time and money -program will be 'laid on' by professional do-gooders -program will not appeal widely -program will not actually turn out as it is described	-program is seen as being for seniors' benefit, personally relevant -program will affect health positively -program design will involve seniors -program will facilitate social contact among seniors
Behaviors	-say they will not go to programs -refuse to talk to planners -refuse to go to presentation about the program -say they will vote against it -say they refuse to support it.	-say they will participate in the program -say they will vote for the program -say they will go to presentation about the program -openly support planners by talking to others about the program

When you have developed your two lists of characteristics, you will be ready to develop measurement tools. Before we illustrate different types of measurement tools for this example, we want to deal with the last major issue in conducting research on attitudes. That is the importance of checking your attitude construct to ensure it includes the important feelings, behaviors, and thoughts.

ATTITUDE



3. How to check your definition of an attitude

To make sure the construct you develop is a good one, check the validity of what you come up with using one or two relatively simple methods, (a) test your construct with a panel of judges, or (b) with a reference group.

a. test your construct with a panel of judges

This is a method of consulting with people to ensure the research will do what it says it will do, and that it will be perceived that way by key people in your community.

This procedure is very important in evaluation research. If you are attempting to design, run, evaluate, and report on a program that has objectives related to attitudes or values, using a panel of judges is an important step.

Find a group of knowledgeable, respected individuals from the community. These people should know something about the thoughts, feelings and behaviors of those people whose attitudes you want to study. For example, if you want to study attitudes of some particular group, let's call it the ABC group, toward a new program, you could choose your panel from any one of the following.

- a neutral person from New Program who has had a fair amount of contact with people from ABC group
- someone from another organization or agency who has had contact with people from ABC group
- a community health nurse, an information Centre person, or a grocery man from the area where people from ABC group live
- someone who has worked with a group like ABC group. The panel of judges should contain no fewer than three people: six or seven provide the best basis for assuring validity.

Give each judge your testing or measurement instrument (questionnaire, observation directions. interview questions) and ask each one to comment on what he or she thinks you will be measuring. You don't have to bring the judges together, you can contact them separately. Of course, they are not told beforehand what you are trying to assess and they should not be familiar with the research you are doing. They are simply asked: 'Based on those tools, what do you think we'll find out?', or 'What attitudes do you think these research tools will measure?'

Record what the judges say, then show or tell them the name of the attitude you are studying, and ask if that name or term applies to what they said. While each judge may have used different words to talk about what he or she thinks you are measuring, there should be a fair level of agreement that your term is a suitable one to apply to their individual statements. Then show them your construct and ask them if you've left out any feelings, behaviors, or beliefs.

One caution here if the people you choose as judges do not have the respect of those who will be affected by the research, then their opinions about the validity of your construct will not be credible and neither will your research results.

b. test your construct with a reference group

This method depends on finding two groups of people outside the sample whose attitudes you want to study. One group should consist of prime examples of people who have positive attitudes, the second group should be made up of prime examples of people who have a negative attitude. That is, you locate two groups of people who make a good reference group or model of the extremes of the attitude you want to study.

Once you have located two such groups, test them with the same instruments you will use on your sample group. if the instruments (questionnaires, interviews, observations, etc.) produce the expected results, then the construct is valid. That is. if the people who are identified by the measurement instrument as having positive attitudes are the same people who are identified as the models of positive attitudes before the measurement, then the tool is valid. (The pre-Identified people who are models of the negative attitude should also be identified by the measurement tool.)

Let's say you want to measure attitudes toward paying fees for use of municipal baseball diamonds. First, identify on paper the specific feelings, beliefs, and behaviors associated with a positive and a negative attitude toward paying fees (steps 1 and 2. page 184) and then develop your measurement tool (step 3. page 164). Then you would ask around the community to find people who oppose and people who are in favor of fees and give each group of people your test instrument.

The results listed below would prove the validity of your measurement tools. If you test six people who are expected to favor the fees (the six you chose because of their positive attitude), and six who are expected to oppose the fees (the six you chose because of their negative attitude), the ideal results of your test would be:

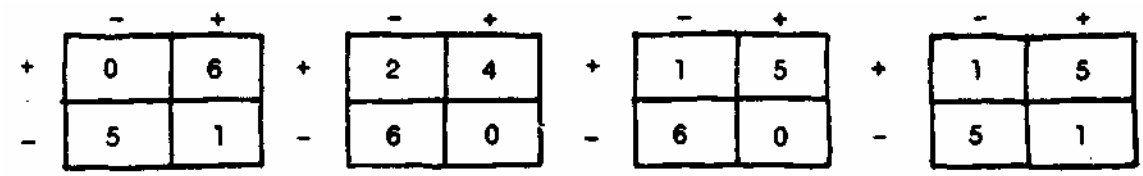
Ideal Test Results

People Selected	Number who scored NEGATIVE	Number who scored POSITIVE
Positive People (6 persons)	0	6
Negative People 6 persons)	6	0

You will not always get ideal results, but that does not necessarily mean your test is invalid. By using statistical procedures, you'll find that some results, though less than ideal, are still acceptable indicators of validity. In fact, you could accept your test as having reasonably good construct validity if you get any of the following results after testing twelve people you selected as a reference or criterion group.

Acceptable Test Results

People Selected	Number who scored NEGATIVE	Number who scored POSITIVE
Positive People (6 persons)	0	6
Negative People (6 persons)	4	2



There are several other ways to deal with construct validity. Many involve statistical procedures to correlate or compare several test scores and should probably be administered by a consultant.

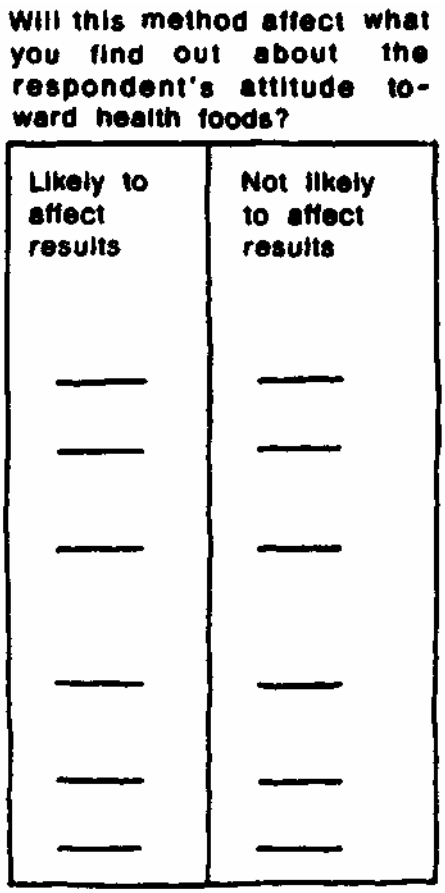
METHODS OF MEASURING ATTITUDES

In most research, you should be concerned about how much influence the research method and the researcher will have on the information that people give. This is a special concern in attitude research.

In the examples below indicate whether you think each method will influence the information collected about someone's attitude toward health foods.

Method

1. Respondent gets questionnaire in the mail
2. Respondent is personally interviewed
3. Respondent's family is asked about last week's meals
4. Respondent is asked to look at a picture of people eating and asked to tell a story
5. Respondent is observed while grocery shopping
6. Researcher looks in respondent's pantry



Items 1 through 4 are called reactive measures because the presence of a researcher or a questionnaire (which is symbolic of research) may cause respondents to react differently than if there was no research. The most reactive measure is the interview. When we walk up to someone and ask about health food attitudes or if she likes a movie or if he exercises each day, our tone of voice, our dress, our precise wording, or even a fleeting expression on our face may affect the response we get. Furthermore, just the fact that we're asking for personal information may raise concerns, reservations, fears, or a desire to please the researcher.

Items 5 and 6 are called non-reactive measures because there is less impact or influence by the researcher.

The balance of this chapter provides details on the construction and use of the following reactive and non-reactive measures:

1. Reactive measures (direct)

A questionnaire is generally a less reactive measure than an interview simply because the person responding is not influenced by the presence of the researcher. But even questions on a printed page can evoke feelings and reactions other than the ones we want to measure. As we saw in Chapter 7, the sources of bias are numerous and need to be carefully controlled. However, we can carefully develop items to assess attitudes via a questionnaire.

To develop questionnaire items you begin by defining your attitude construct. You would follow the steps 1-3 as outlined on page 184. Step 4 is the development of your measuring tool. We will do that now using the attitude construct we developed for seniors' attitudes toward a recreation program in their residence.

To refresh your memory, here is the attitude construct.

Senior citizens' attitudes
towards proposed recreational program

	Those who have negative attitudes	Those who have positive attitudes
Feelings:	-angry -disinterested -suspicious -lack of trust	-excitement -anticipation -trust -interest
Beliefs:	-program seen as being for others' benefit or irrelevant -program is not valued -program is meaningless -waste of time and money -program will be 'laid on' by professional do-gooders -program will not appeal widely -program will not actually turn out as it is described	-program is seen as being for seniors' benefit, personally relevant -program will affect health positively -program design will involve seniors -program will facilitate social contact among seniors
Behaviors:	-say they will not go to programs -refuse to talk to planners -refuse to go to presentation about the program -say they will vote against it -say they refuse to support it	-say they will participate in the program -say they will vote for the program -say they will go to presentation about the program -openly support planners by talking to others about the program

Once these characteristics have been identified, it is fairly easy to develop test items for a questionnaire. We will show you two types of direct test items: two category items and rating scales.

At the simplest level, we design several two-category items. (in research terms this is called a nominal scale.) We give the respondent only two choices of response: yes/no; agree/disagree; applies to me/does not apply to me. For example, drawing on the attitude construct on the previous page, we might create the following mini-scale:

Mini-scale to assess seniors' attitudes toward establishing a recreation program
For each statement check whether you agree or disagree

	Agree	Disagree
1. I feel angry about the proposed recreation program.		
2. I am excited about the proposed recreation program.		
3. I see the proposed recreation program as being for my benefit.		
4. The proposed recreation program is meaningless, a waste of time and money.		
5. I will support the program by talking about it with friends and neighbors.		
6. I will not vote for the program.		

Notice that some statements are drawn from the positive side and others are drawn from the negative side of the characteristics list.

Notice also that all three components of attitudes are include, items 1 and 2 present the feeling component: items 3 and 4 deal with beliefs: and items 5 and 6 deal with behavior.

Here are the responses from one respondent. What would you say about this person's attitude?

	Agree	Disagree
1. I feel angry about the proposed recreation program.		
2. I am excited about the proposed recreation program.		
3. I see this program as being for my benefit.		
4. This program is meaningless, a waste of time and money.		
5. I will support the program by talking about it with friends and neighbors.		
6. I will not vote for the program.		

To find out if the respondent's attitude is positive, add up the number of positive statements the respondent agrees with, plus the number of negative statements the respondent disagrees with. (Or you could add up all the negative statements agreed with, plus the positive statements disagreed with, to tell you how negative the respondent's attitude is.)

These are statements from the negative viewpoint. If the respondent agrees, this reflects a negative attitude. if respondent disagrees with a negative statement this is one indicator of a positive attitude.

1. I feel angry about the proposed recreation program.

4. The program is meaningless. a waste of time and money,

6. I will vote against the proposed recreation program.

This hypothetical respondent has a highly positive attitude toward the program—agreement with all three positive items and disagreement with all the statements against the program.
Item 5 is special because it deals with what the respondent intends to do rather than current or past behavior. When researchers ask people about the future (will you vote, will you participate, will you buy X), they generally add the following question:

"How certain are you that you will vote against the program?"

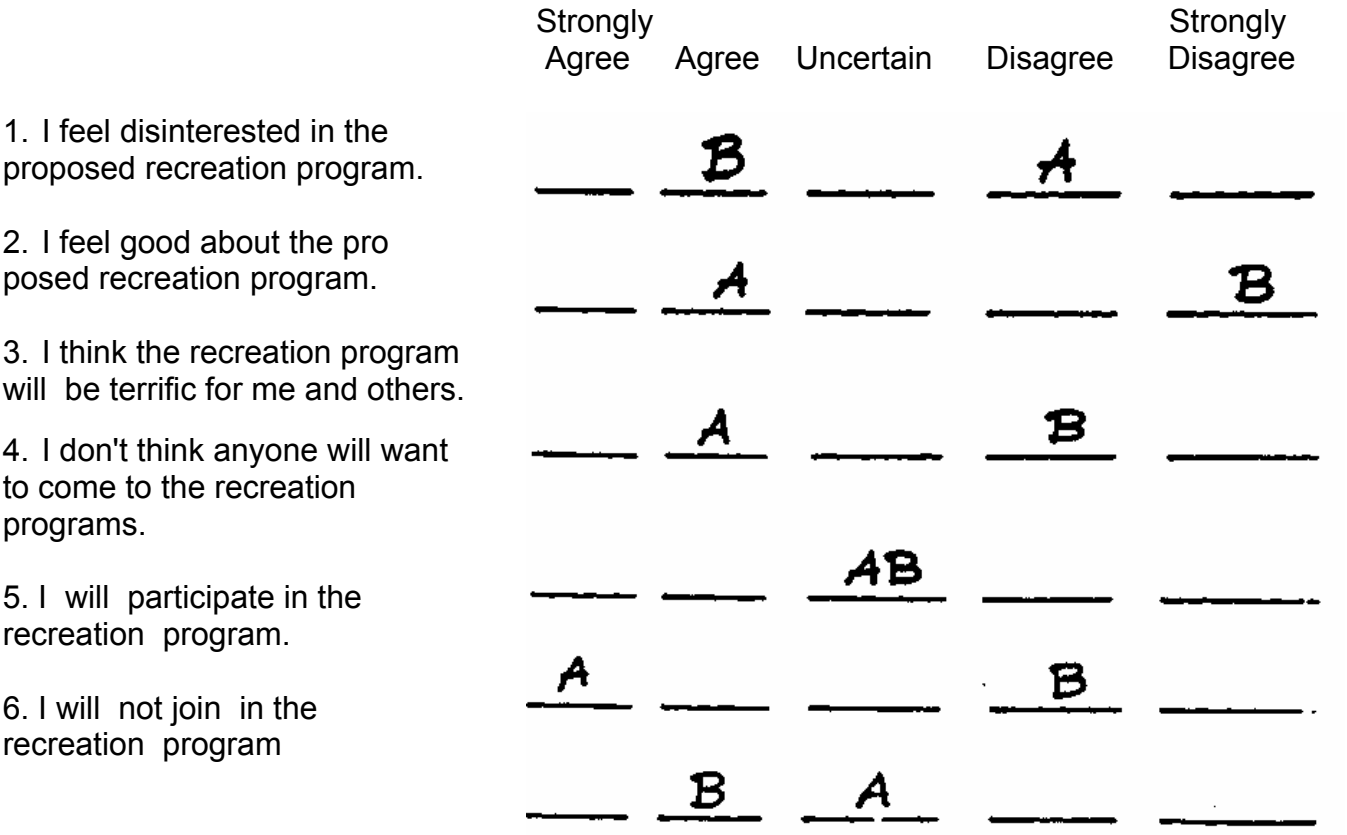
_____ABSOLUTELY SURE
_____QUITE SURE
_____FAIRLY SURE
_____NOT VERY SURE

A rating scale, unlike a two-category item, allows respondents to indicate their degree of agreement, the intensity of their feelings, and the strength of their tendency to act in a particular way. In this case, we could use the same items as those in the last example but provide a five-point Likert scale (strongly agree, agree, uncertain, disagree, strongly disagree) for the respondents' answers.

For example, here is a new set of test items from our basic construct information, in this case, we have put in sample responses from two hypothetical people, A and B.

Mini-scale to assess seniors' attitudes toward a recreation program using a Likert Scale

Please check off the line under the one category that best represents your reaction to the statement.



A person's attitude would be defined by totaling all the scale values checked off by that person. To summarize a person's score:

First, score all the positive Items (numbers 2, 3, and 5) so that Strongly Agree has a score value of 5, Agree has a score value of 4, and so on.

	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
For example, Statement 2 I feel good about the proposed recreation program	_____	___A____	_____	_____	___B____

Second, score negative Items (numbers 1, 4, and 6) so that Strongly Agree has a score value of 1. Agree has a score value of 2, and so on. Notice that by doing this you are reversing the scale on the statements: disagreeing with a negative statement will have the same score value as agreeing with a positive statement.

	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
For example, Statement 2 I feel good about the proposed recreation program	_____	___B____	_____	_____	___A____

Third, add up the values of the Items a person checked off.

Person A would have the following score (4 + 4 + 4 + 3 + 5 + 3) = 23
Person B would have the following score (2 + 1 +2 + 3 + 2 + 2) = 12

A weighted score of 23 out of a maximum of 30 (six scale Items times five possible points for each one) is a fairly positive attitude. Person A has a fairly positive attitude toward the recreation program whereas person B's attitude is mildly negative.

This Likert scale allows us to learn more about the attitudes people have because we can see the more subtle gradations of feelings, beliefs, and behavior.

Two category items and rating scales are direct reactive measures. The next section outlines reactive measures that are indirect.

2. Reactive measures (indirect)

To reduce the impact of the tester and of the questionnaire on the respondent, it is sometimes possible to use less direct, less reactive means of measuring attitudes. However, these indirect methods do still involve the researcher in asking the respondent for his or her answers. Because we are involved in asking, recording, etc., these indirect methods are still reactive. We will describe two indirect methods: (a) sentence completion and (b) use of photographs, cartoons, and drawings.

a. sentence completion

Sentence completion is an indirect method of gathering information because the respondent has a lot of freedom in responding. Instead of checking off an answer provided by the researcher, respondents have the freedom to choose their own words in answer to a question.

To measure citizens' attitudes toward a cultural centre we could ask them to complete any - or all - of the following:

• In my life in this city, the cultural centre

_____
_____
_____

• When I consider a program to create a new cultural centre, I

_____
_____
_____

• My concern about the proposed cultural centre is

_____
_____
_____

• The proposed cultural centre will

_____
_____
_____

These questions can be posed in a mail questionnaire or an interview. In an interview, after respondents have completed their response they can be asked to elaborate on or to explain their response in more detail if it seems appropriate. The response(s) should not be challenged but a gentle probe such as 'Can you say a little more about that' or 'Tell me a bit more about why you say that' can elicit useful and sometimes deeper attitudes. Material collected in this way is analyzed either by comparing it to pre-existing categories or through content analysis.

Sentence completion is a technique often used at the end of a meeting to assess attitudes:

I feel _____
I think the decisions made were _____
I think the meeting _____
I wish _____

Notice that you can obtain similar information by using a rating scale which is a direct rather than indirect measure.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. I am satisfied with our meetings.	_____	_____	_____	_____	_____
2. I feel bored or frustrated in our meetings.	_____	_____	_____	_____	_____
3. I think we should change our meetings.	_____	_____	_____	_____	_____
4. People listened to each other's views.	_____	_____	_____	_____	_____
5. I think good decisions were made.	_____	_____	_____	_____	_____
6. I expressed my views.	_____	_____	_____	_____	_____

The format you choose depends on (a) what you want to know, (b) which format your group prefers, (c) the time available to summarize the information (the indirect method takes more time).

b. photographs and drawings

When people are shown a photograph or drawing, and asked to tell or make up a story, they provide a lot of information about their attitudes. From the analysis of a wide variety of tape-recorded or written reactions, you can find themes, patterns, and important information because the respondent has created his or her own meaning out of a relatively vague visual image.

The following example will illustrate several facets of this indirect method. The board of a museum wanted to investigate how the public perceived the museum as an institution, and how they related to it. In effect the board wanted to check out the museum's 'image' and assess public attitudes.

To answer these questions researchers created a simple testing device. The museum was photographed from across the street at a point directly opposite the main doors, and an 8" x 10" black and white print was made. Then the figures of a man, a woman, a male and female child were cut out. The figures were drawn so that when they were placed on the photo with their feet on the sidewalk in front of the museum there would be no clues as to whether the figure or figures were about to enter or leave the building.

Members of the public (selected as part of a city-wide sample) were shown either one, two, three or four figures placed on the photo. They were asked to 'Tell what's happening in this scene', no other instructions were given. The respondent was encouraged to interpret the photo and the figures in any way he or she chose.

Many respondents noted the large wooden doors and built a story around the museum being closed. Many saw the building as a place where children were not welcome. Many felt the 'family' (two children plus one adult: one child plus two adults, etc.) was tired, and that it had been an expensive visit.

Note the words being used.

doors ....closed
children ....not welcome
family ....tired
visit ....expensive

In the second part of this study, the cut-outs were removed from the photo and respondents were asked to look at the photo and to comment on how they felt about the museum and how they would feel standing in front of it. This produced a wide variety of answers but the most frequent were:

- not sure I'd be comfortable going in
- interested in visiting the piece
- looks like a church or a serious place
- I get bored with exhibitions

The results of this particular question—it took no more than five minutes of a thirty-five minute interview—led to a redesign of the outside of the building and to information campaigns, aimed at making the museum more of a 'fun' place for both individuals and families.

Photographs are an excellent method to use with people who are not comfortable with printed questionnaires or with such abstract questions as “What do you think about …”

To analyze stories respondents give refer to Chapter 8.

3. Non-reactive measures for assessing attitudes

Non-reactive measures are those that do not involve direct questioning, or contact between the researcher and the respondent. Nor do they require the respondent's co-operation. These are the methods used by our famous detectives. Sherlock Holmes, Inspector Clouseau, and Columbo. They analyze past behavior on the basis of clues: what traces are left behind (cigarettes in ashtrays, glasses), what was missing (money, jewels), what behavior patterns change (blush, stuttering, etc.).

The following example illustrates non-reactive measures from a research study Notice that the information collected was not specifically asked for or produced for the study. The information was there and a clever researcher recognized how to use it as an indicator of preferences.

The floor tile story: The classic non-reactive, unobtrusive measure was 'discovered' at the Museum of Science and industry in Chicago. Someone noticed that the floor tiles throughout the huge museum tended to wear out at different rates in different parts of the building. Specifically, the tiles around a display of chickens hatching from eggs had worn out much faster than the tiles around many other displays. It seemed obvious that active, dynamic displays attracted more attention and more people than other types of displays: a finding that has now been corroborated many times.

This is a classic example of a non-reactive measure: it measured the attitudes toward different types of exhibits without asking anyone anything. In fact, it was not even necessary to watch or be present when people visited the museum. All one had to do was consult the maintenance records or observe wear patterns on the floor or carpet. These records and observations are called unobtrusive measures.

In this study, you can question whether the exhibits were in fact the most popular ones or whether people were drawn to certain exhibits simply because they followed (consciously or unconsciously) the footprints of others. As with most non-reactive measures, it would be wise to use more than one indicator.

Preferences or popularity of books in a library, sports equipment in a centre, toys and magazines in waiting rooms, can all be assessed by wear and tear. What gets taken away (with or without permission) can be another type of non-reactive measure.

When people are offered free hand-outs or brochures, the researcher should be cautious in drawing conclusions. People tend to take free hand-whether they actually want them or not.

Note. In all these cases you can gather information about what people prefer among the options already there. You will not find out what they want or prefer outside of what is already available.

The number of items sold, number of tickets purchased, attendance figures, and sales revenue are also non-reactive measures. They'll tell you something about movement of goods or imply something about people's willingness to spend money or participate. Of special interest in preference studies is to watch how these figures change in relation to changes in display methods, variety, advertising, or prices. You can also monitor how these figures change when different age groups or different types of people are involved.

For example, the Board of Directors of a craft gallery wants to increase the number of visitors to the gallery. To assess what the community wants, the directors decide to study, (a) the attitude of different age groups toward the gallery, (b) to what areas of the city promotional materials should be mailed, and (c) how to display the items for sale.

Here's how they did it: For objective (a), they used a picture of the gallery in an interview situation to get the information they wanted. For objective (b) they used the gallery's sign-in visitor book that listed names, addresses, and dates. By looking at the addresses, they knew from which areas of the city they did and did not draw people. For objective (c), they carefully monitored the sales, and created an index (revenue divided by number of items sold). This gave them the average cost of items sold on different days of the week. Thus they were able to change their display of sales items on weekends to match visitor preferences.

One caution about using any kind of records (registrations, membership lists, letters of complaint, archives, letters, etc.): there are often errors. Lists can be out of date or incomplete. People may have forgotten or deliberately chosen not to record certain types of information. Once again, you probably need to use more than one of these methods to measure attitudes.

SUMMARY

This chapter has described how to define an attitude. It has outlined two types of reactive measures. Direct reactive methods were illustrated by questionnaires using different types of preset response categories. Examples of indirect reactive measures were sentence completion format for questionnaires and interviews, photographs, drawings. Non-reactive and unobtrusive measures were illustrated in terms of observing what people do to physical things, what they leave behind, the analysis of records.

All research methods have weaknesses. Where possible try to use more than one method for gathering information. The particular method you use when you want to find out about attitudes depends on:

- who you want to collect information about (how comfortable are they with research, print materials, etc.)
- what information already exists (records, physical 'evidence')
- the number of people you need to contact for your sample.

Chapter Ten
Summarizing and Analyzing Research Results

INTRODUCTION

SAMPLE QUESTIONNAIRE AND CODE BOOK

CONSTRUCTING TABLES

GRAPHS AND OTHER DIAGRAMS

1. Overview
2. How to construct Bar Graphs
3. How to construct Histograms and Polygons
4. How to construct a Pie Chart
5. How to construct a Scatterplot

CALCULATING AVERAGES

VARIABILITY

1. Range
2. Standard Deviation (S.D.)

COMPARISONS AND RELATIONSHIPS

1. How do you compare the averages of two groups?
2. How do you compare percentages?
3. How do you look at relationships among scores?

CHAPTER
10 Summarizing and Analyzing Research Results
INTRODUCTION

In this chapter, we focus on ways to describe, present, and analyze the information you collect.* It is also a guide for interpreting the tables, graphs, and descriptive statistics you see in newspapers and research reports.

When time and effort have gone into gathering information from many people, you need to summarize and present the information clearly and concisely. This is done with

- Tables
- Graphs and Other Diagrams
- Averages
- Variability

We have designed a sample questionnaire to use when you prepare the tables, graphs, and other summary methods described in these sections. The sample questionnaire and code book are included in the first section.

In the second section you will learn how to transfer the information from questionnaires. Interviews, or observations into summary tables. The Graphs section will show you how to present summaries in picture form. The next section will explain different ways of summarizing your information with numbers such as means, medians, and modes. The final section deals with variability, comparing percentages, comparing averages and relationships among scores.

A. SAMPLE QUESTIONNAIRE AND CODE BOOK

This is part of a questionnaire that was sent to a random sample of 15 males and 15 females. The check marks you see indicate the responses made by one person in the sample of 30. We'll call her Susan.

* A more advanced presentation than the one given here can be found in Cohen, L. and Holliday, M. Statistics for Education and Physical Education. New York: Harper and Row Publishers. 1979.

1. What is your sex? _____ MALE __X__ FEMALE

2. Please check the category that includes your age
__X__ under 20 YEARS
_____ 20 - 34 YEARS
_____ 35 - 49 YEARS
_____ 50 - 64 YEARS
_____ 65 PLUS

3. Please check the category below that includes the furthest formal education you have completed.
__X__ LESS THAN GRADE 9
_____ 9 - 11 AND NO OTHER
_____ 9 - 13
_____ 9 - 13 AND SOME OTHER
_____ UNIVERSITY

4. Please check off the one category that includes the total actual income in your household.
_____ LESS THAN $3,000
_____ $3,000 - $5,999
_____ $6,000 - $8,999
__X__ $9,000 - $11,999
_____ $12,000 - $14,999
_____ $15,000 - $17,999
_____ $18,000 - $20,999
_____ $21,000 AND OVER

5. How would you describe your current physical activity level?
_____ CONSIDERABLY BELOW AVERAGE
_____ SOMEWHAT BELOW AVERAGE
__X__ AVERAGE
_____ SOMEWHAT ABOVE AVERAGE
_____ CONSIDERABLY ABOVE AVERAGE

6. Between May 1980 and May 1981, how many different sports did you engage in? __7__ SPORTS

7. Are you personally involved in playing softball?
_____ YES
__X__ NO

8. How much are you willing to spend per week to support softball in the community?
__X__ LESS THAN $1.00
_____ $1.00 - $1.49
_____ $1.50 - $1.99
_____ $2.00 OR MORE

Setting up a code book and code sheet

When you have thirty questionnaires, each with at least seven questions, you'll need to make summaries of the answers to each question. A code book will allow you to record all the information on one, or a few pages.

STEP 1
The first step in developing a code book is to go back to your pile of questionnaires and give each one a code number. This will be the respondent's identifying number and a substitute for his or her name. Using the number will ensure that a person's questionnaire is not recorded twice by mistake, and so that you can check back for errors.

Notice that on the next page. In the sample code sheet, columns 1 and 2 are used for the respondents' identifying numbers. The two columns are necessary because, with thirty respondents, we must enter double-digit numbers. More than 99 questionnaires would require three columns for respondents' numbers (eg. 001 - 099. 100. 101. etc.).

STEP 2
Assign each question a column number: question 1 (sex) in column 3, question 2 (age) in column 4, and so on.

STEP 3
Give each answer category of each question a code number. In our example, Question 1 Male is given a code of 0, and Female is given a code of 1. They could easily have been coded Male 1, Female 2. Some researchers avoid codes of 0 because the zero may mislead people into thinking there was no response.

Because each question is assigned a different column, you can use the same code numbers over again for the response categories in each question, as has been done in our example on the next pages.

Because we will use this sample questionnaire to develop tables and graphs, we have completed it with the responses of the 30 people who answered the questionnaires. All the questionnaires have been coded except Susan's. Please go back to page 194 and use Susan's Questionnaire to transfer her responses below. Susan's identifying number is 01.

Code Book

Coding Sheet

ASSIGNING CODES TO SAMPLE QUESTIONNAIRE:

Question	Column	Codes
	1,2	Respondent Number (0-31)
1	3	Sex 0 Male 1 Female
2	4	Age 1 12-19 Years 2 20-34 " 3 35-49 " 4 50-64 " 5 65 + "
3	5	Educational Level 1 Less than Gr. 9 2 9-11 No other 3 9-13 4 9-13 Some other 5 University
4	6	Household Income (annual) 1 Less than $3,000 2 $ 3,000 - 5,999 3 $ 6,000 - 8,999 4 $ 9,000 - 11,999 5 $12,000 - 14,999 6 $15,000 - 17,999 7 $18,000 - 20,999 8 $21,000 and over
5	7	Activity Level 1 Considerably below average 2 Somewhat below average 3 Average 4 Somewhat above average 5 Considerably above average
6	8,9	Number of sports engaged in during previous year (00-99)
7	10	Personally interested in playing softball? 1 Yes 2 No
8	11	How much would you spend on softball fees? 1 Less than $1.00 2 Between $1.00 and $1.49 3 Between $1.50 and $1.99 4 $2.00 or more

RESPONDENT: SUE

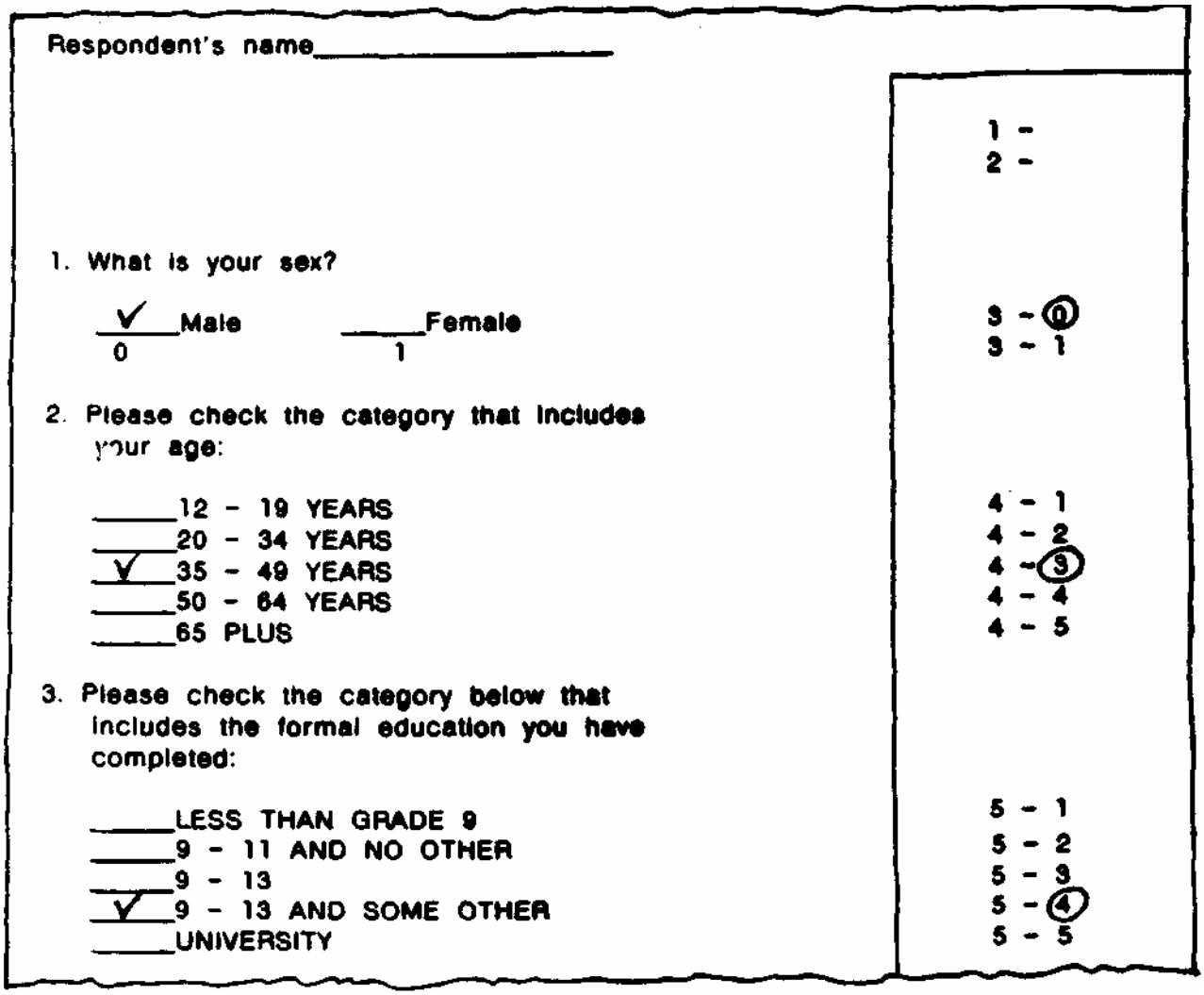
COLUMN	1	2	3	4	5	6	7	8	9
	0	1							

1	2	3	4	5	6	7	8	9	10	11	
0	1										
0	2	1	1	1	3	3	0	0	2	3	
0	3	0	2	3	4	4	0	6	1	2	
0	4	1	3	3	5	4	0	4	1	3	
0	5	1	4	4	3	5	0	9	2	2	
0	6	1	3	3	5	5	0	2	2	1	
0	7	0	3	3	5	5	0	7	1	4	
0	8	0	2	2	4	2	0	5	1	3	
0	9	0	2	2	3	3	1	1	1	2	
1	0	0	2	2	3	4	1	2	1	3	
1	1	0	1	1	2	2	1	1	1	4	
1	2	1	2	2	3	4	0	5	1	3	
1	3	1	2	2	4	3	0	6	1	3	
1	4	0	5	4	7	5	0	6	2	3	
1	5	1	1	1	1	3	0	0	2	4	
1	6	0	2	1	3	1	1	2	1	2	
1	7	1	3	3	5	4	0	3	2	4	
1	8	1	4	4	7	5	1	0	2	3	
1	9	1	2	2	4	3	0	7	1	3	
2	0	1	2	2	4	2	0	2	1	2	
2	1	0	3	3	5	4	0	8	1	4	
2	2	0	3	3	5	3	0	8	2	2	
2	3	0	4	4	3	5	1	1	2	3	
2	4	0	1	1	1	2	1	0	2	3	
2	5	0	1	1	2	1	1	0	2	3	
2	6	0	4	4	3	4	1	1	2	2	
2	7	1	5	5	7	5	1	0	2	3	
2	8	1	5	5	8	5	0	0	1	3	
2	9	0	5	5	8	5	1	0	2	2	
3	0	1	2	1	3	2	0	1	2	3	

* Susan's codes starting at column 3, should be: 1, 1, 1, 1, 4, 3, 0, 7, 2, 1.

Another method of coding questionnaire results is to print the identifying codes directly on the questionnaire. The responses can be recorded at a glance. A code book may still be used for open-ended questions and the codes developed after looking at the replies. Preceding some of the questions will save a great deal of time and will generally increase the accuracy of going from the interview itself to the coding sheet or keypunching.

For example, the questionnaire could have been set up like this:



Respondent's name_____

1 -
2 -

1. What is your sex?

✓ Male (0) _____ Female (1)

3 - (0)
3 - 1

2. Please check the category that includes your age:

_____ 12 - 19 YEARS
_____ 20 - 34 YEARS
✓ 35 - 49 YEARS
_____ 50 - 64 YEARS
_____ 65 PLUS

4 - 1
4 - 2
4 - (3)
4 - 4
4 - 5

3. Please check the category below that includes the formal education you have completed:

_____ LESS THAN GRADE 9
_____ 9 - 11 AND NO OTHER
_____ 9 - 13
✓ 9 - 13 AND SOME OTHER
_____ UNIVERSITY

5 - 1
5 - 2
5 - 3
5 - (4)
5 - 5

After the questionnaire is completed, the number in the right-hand margin, opposite each response checked, is circled.

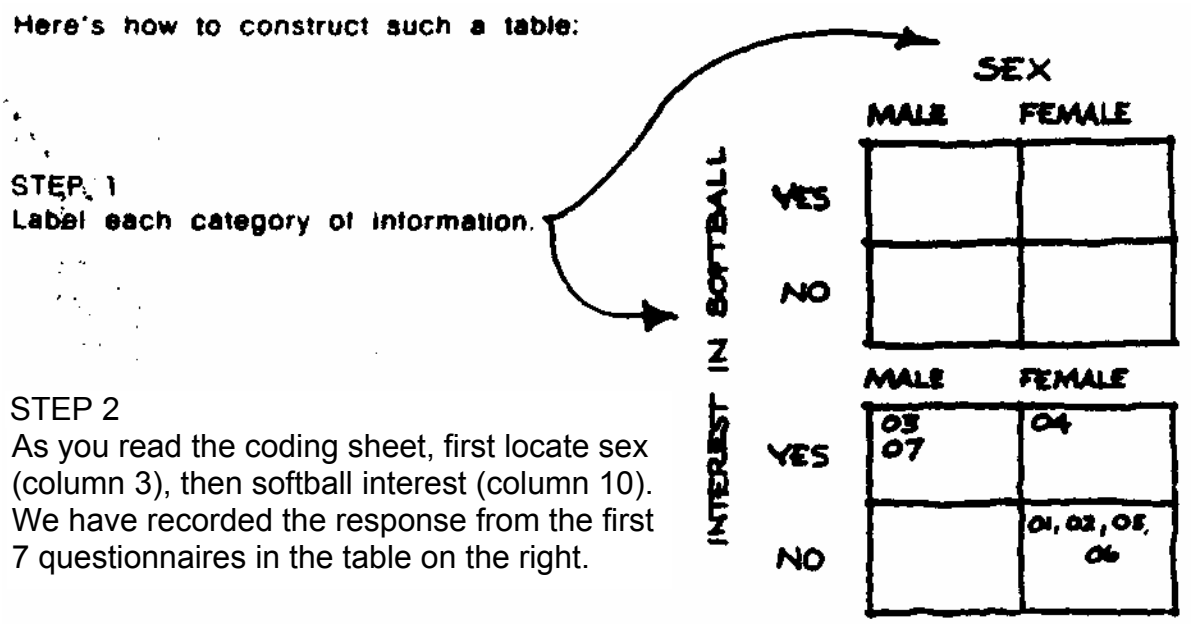
For example, if a respondent gave her age in the 35 - 49 range, then the code 3 for that question would be circled. Then, in preparing the coding sheet or punching a card, a '3' would be marked (punched) in column 4.

CONSTRUCTING TABLES

To construct a table, you can eliminate the code sheet and work directly from the questionnaires, but we recommend using a code sheet because:

1. It would take too many pages to give you thirty questions;
2. You can collect all the information from all the questionnaires on one sheet, and it's easier to handle than thirty questionnaires;
3. A code sheet can be photocopied for less than it would cost to reproduce all the questionnaires.

Sometimes we want to know it responses to different questions are related. A table allows you to check out how your sample responded on two or more questions at the same time. Suppose you want to know how men and women responded to the question about softball. This is a 2 x 2 table — two sexes and two ways of expressing interest ('Yes' or 'No').



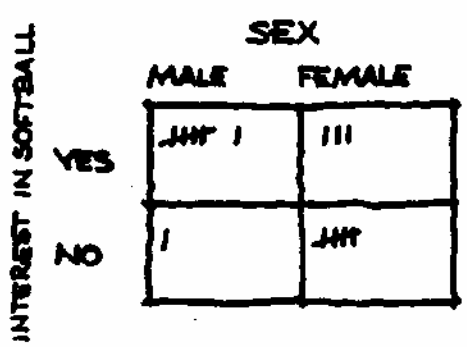
STEP 2
As you read the coding sheet, first locate sex (column 3), then softball interest (column 10). We have recorded the response from the first 7 questionnaires in the table on the right.

Normally, instead of using the respondent number in the appropriate box, you would use a tally mark for each respondent.

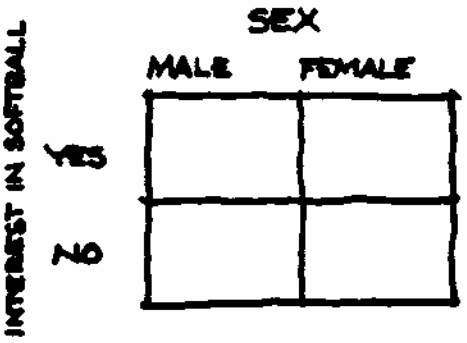
The table at the right shows tally marks for the first 15 respondents.

Notice that |||| = 4 respondents
𝍸 = 5 respondents

Use the blank table at the right to produce your own table of all 30 scores.

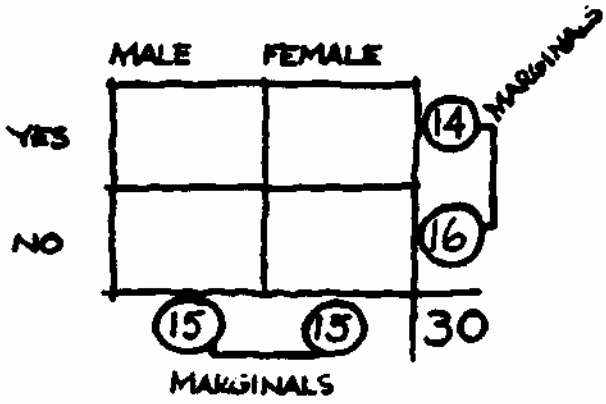


In the top row of your table you should have Yes/Male (8) and Yes/Female (6). The bottom row should have No/Male (7) No/Female (9).



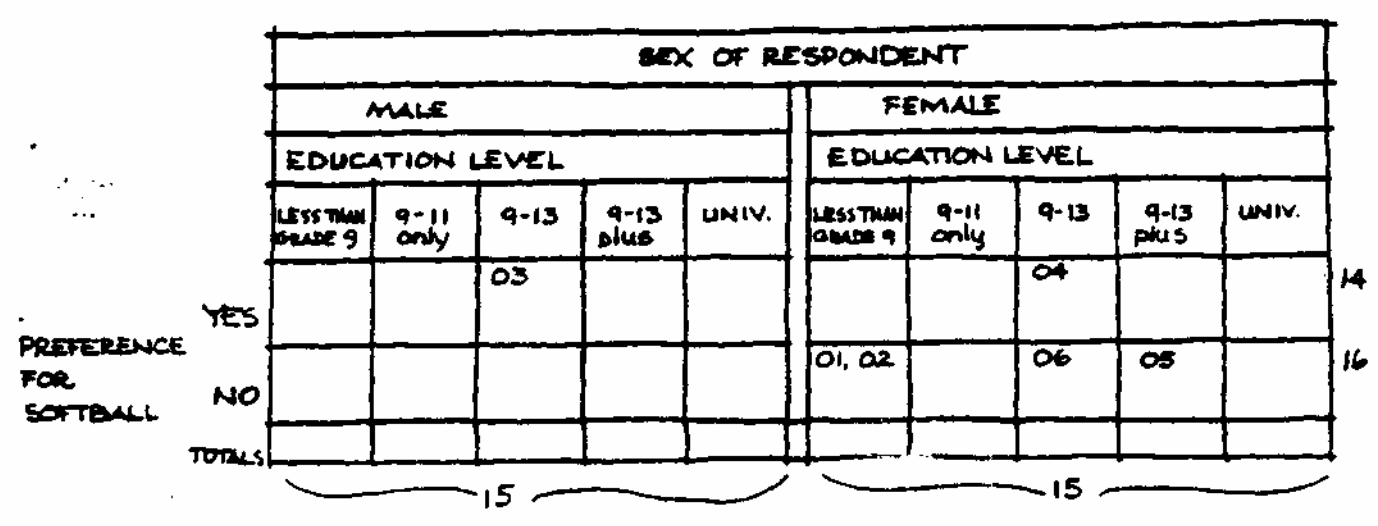
STEP 3
Check your table by comparing the totals of the marginals to the number in your sample.

A table can also be used for more than two categories of information. Let's say you want to know softball preference for each sex and for education level. The beginning of the table is set out below. (It is called a preference-by-sex-by-education table and is written 'preference x sex x education').



STEP 1:
Set up the table so you have boxes available for each education level, for each sex, and for each possible answer to the softball question.

A Table to Present 3 Categories of information (Preference x Sex x Education)



STEP 2
Place a tally mark for each respondent in the appropriate box. We have marked in the first six respondents to the sample questionnaire. Locate Sex (column 3), and prepare to mark only the boxes on the Female side of the table (response code '1'). Locate Education Level (column 5) and prepare to mark a tally in the Yes or No section of the correct Education Level. Finally, note 'Yes' or 'No'(l or 2) in column 10 and mark appropriate 'Yes' or No box Repeat for Male responses.

STEP 3
Check the marginals. They should each add up to the total number in your sample in this case 15 male plus 15 female equals 30, and 14 'YES' plus 16 'NO' also equals 30.

Complete the table using the information from the coding sheet. We have used respondents' numbers (01. 02. etc.) to illustrate. You will probably use tally marks.

Tables summarize individual pieces of information so you can develop graphs and descriptive statistics. The next section explains how to prepare some commonly used graphs.

GRAPHS AND OTHER DIAGRAMS
1. Overview

There are three important reasons for taking the time to understand graphs:

• Graphs summarize a lot of information in a clear way

When you sort the information you obtain from many respondents into categories in a table, you are looking for patterns in the responses. Often people can't remember numbers in a table but a graph is like a picture. It's easier to read and to remember.

• Graphs are often used to summarize information in research reports and newspaper articles.

Because you are so often presented with picture summaries, you should know how to read them and understand what they mean.

• Graphs and other visual diagrams help you recognize whether or not further statistical tests will be worth doing.

Statistical tests are used to assess whether the differences you notice between groups are greater than the differences that could have been produced by luck or chance. They are also used to see whether there is a relationship among the measurements you made of two or more characteristics of your sample. Sometimes, by looking at a graph, the pattern will show you whether or not it is worth doing any statistical tests.

In the following pages we'll describe five basic diagrams and show how to construct them.

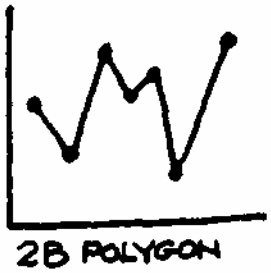
Bar graph and histogram
When you compare a bar graph to a histogram, you see that in a bar graph the vertical lines do not touch each other. A bar graph is used to display information that does not have a precise logical order or sequence. That is, it is used to present data from nominal scale questions (See Chapter 7). A histogram is used to present information that does have an order. That is. data from ordinal and interval scales are presented in histograms. The following lists indicate the kind of information usually presented in the two types of diagrams.

Bar graph
Sex
Marital status
Ethnic origin
Area of residence
Type of activity
Yes/No information

Histogram
Income Levels
Age groupings
Price ranges
Performance scores
Responses to a rating scale

Polygon

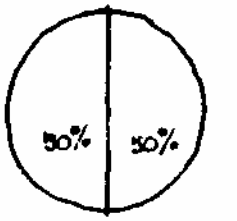
A polygon is another way of diagramming the data that forms a histogram. It is produced by joining the mid-points of the top of the histogram bars if you draw in the bars on the polygon above you'll see a histogram that says exactly the same things as the polygon. However, the polygon is often easier to read because it is less cluttered with vertical lines



2B POLYGON

Pie Chart

A pie chart uses segments of a circle to represent different amounts of some result. If the results of a question were split 50-50, then each result would be represented by half of the pie.



3. PIE CHART

Scatterplot

In a scatterplot, each dot represents two measures on one person. You may plot the age and activity level for each of several persons on one graph, or you could plot their income and education: or distance from an arena and the number of times the arena is used Scatterplots are very useful for summarizing how two sets of results are related to each other.

4. SCATTERPLOT

2. How to construct Bar Graphs

Imagine you want to portray the number of people who said 'yes' or 'no' to a question about their interest in softball — and you want to show these results separately for male and female. There are two ways to do this. One way is to work directly from coding sheet to a bar graph, the second way is to make a table and then make a graph.

METHOD A Develop Bar Graph from Coding Sheet

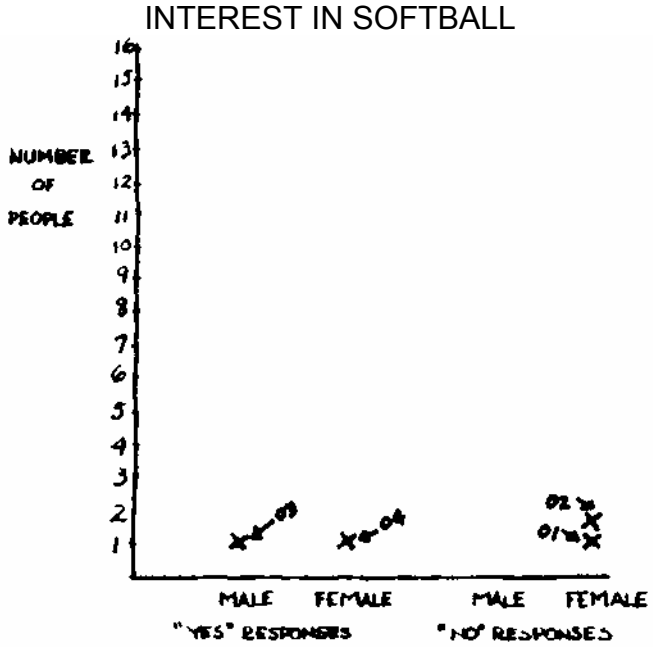
STEP 1
Count the number of YES (or NO) responses by looking down column 10.

There are 14 Yes responses (Code 1). Therefore there are 16 No responses (count code 2 or, knowing there are 30 responses in total. subtract the 14 Yes) Place 16 spaces on the vertical line (called the 'y' axis) and label it. 'Number of People'.

STEP 2
Label the horizontal line (called the 'x' axis) 'Yes' and 'No'.

STEP 3
Create a 'Male' and 'Female' column both for the 'Yes' and for the 'No' responses.

STEP 4
Start to mark the scores. First look at column 3 to locate sex. Then look at column 10 to locate a Yes and No.



Complete this graph using the coding sheet at the beginning of this chapter. Compare your graph with the graph on the following page.

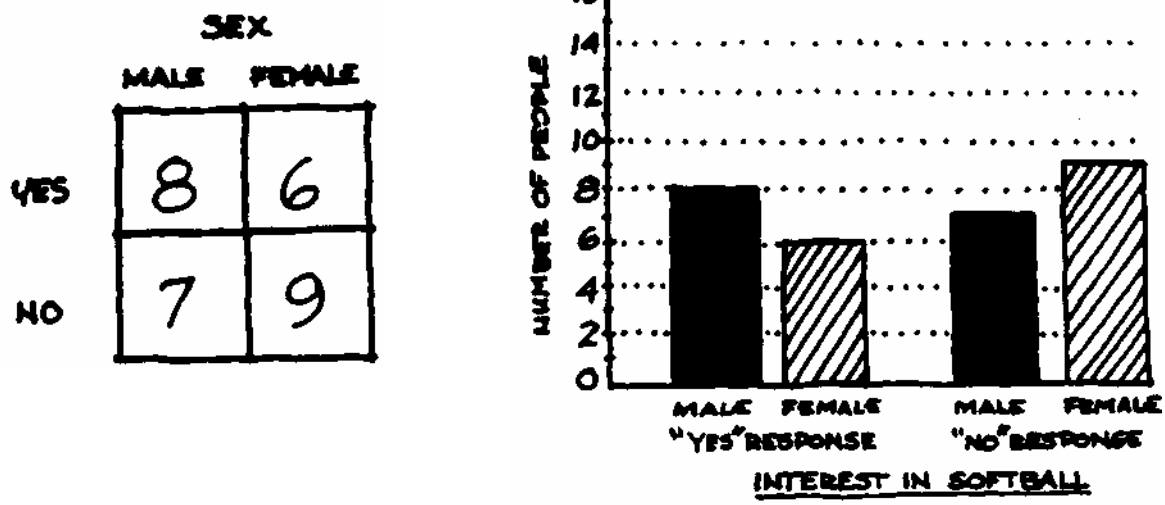
METHOD B Constructing a bar graph from a table

STEP 1
Construct a table according to the guidelines on page 204. We'll use the same example of interest in softball according to sex. The table is below on the left.

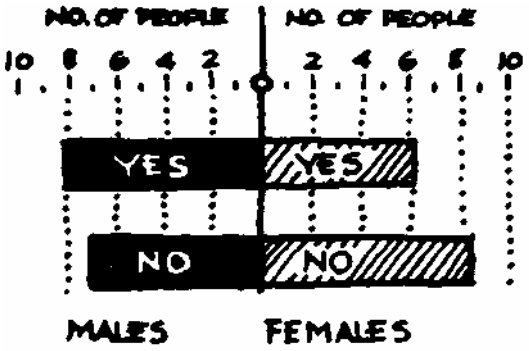
STEP 2
Label the vertical axis and determine the number of categories in the same way as you did on the previous page.

STEP 3
Label the horizontal axis so there is a Male and Female label for 'Yes' category, and a Male and Female label for the 'No' category.

STEP 4
On the vertical axis locate the number that appeared in each box in turn and draw a horizontal line over the appropriate category.



STEP 5
Complete vertical lines to produce bars.
The same information could be presented in a horizontal bar graph:



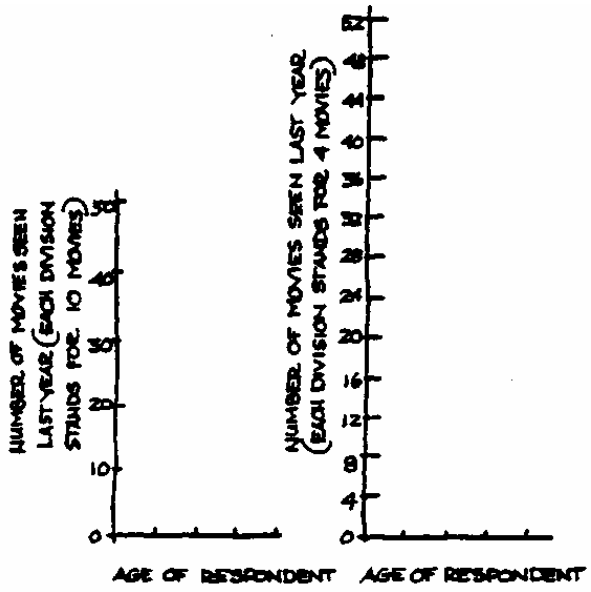
Rules for Constructing Bar Graphs

1. Label the vertical line (called the y-axis). Without a clear label you will not know whether the numbers refer to frequency of response, percent, money, or any other measure.

2. Label the horizontal line (called the x-axis). Without labels your diagram will be confusing or meaningless.

3. The points on the vertical line should start at '0' and should be spaced equally.

4. If you have a lot of information, you may want to 'scale' the y-axis. For example, let's say that people are asked to indicate the number of movies they've seen in the past 12 months. Some people may have seen as many as 50. Others may have seen only two. The y-axis (number of movies) could be very long if you use 50 large spaces. You could scale your responses in either of the following ways:

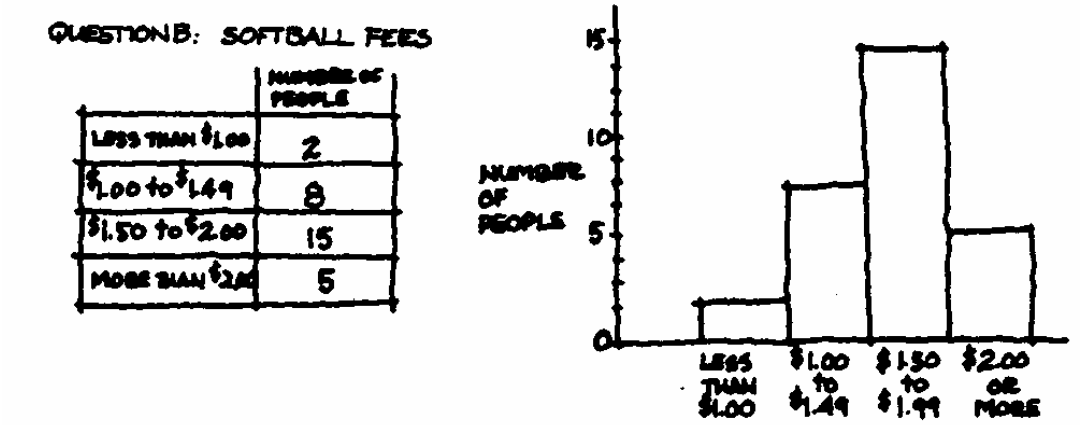


The way you choose to scale the y-axis depends on the information you collected. You want the clearest way to communicate. When you prepare the initial data table you will be able to see how to group the responses into intervals, or how fine a scale you will need to show both the minimum and the maximum number of responses in the space you have available in your report.

3. How to construct Histograms arid Polygons

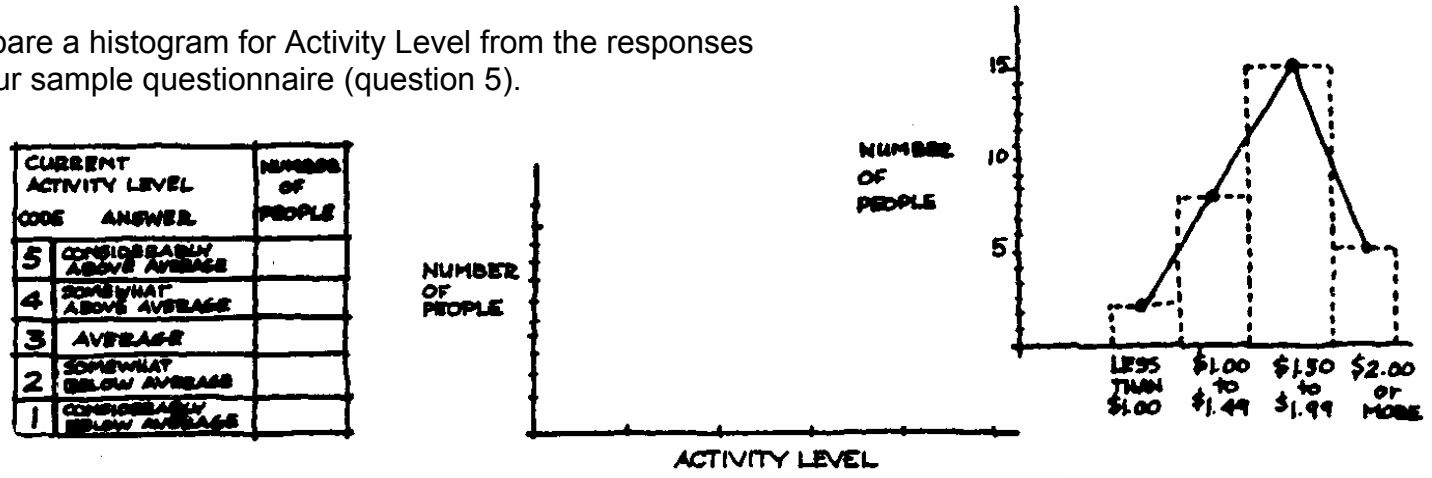
Histograms and polygons are used when there is a numerical sequence or order to the categories of response to the question. In our sample questionnaire, questions 2, 4, 5, 6, and 8 would all be visually displayed in histograms or polygons because they are ordinal or interval scales.

The rules and methods for constructing a histogram are the same as those for constructing bar graphs, with one difference. The vertical lines on the histogram are drawn with the sides of each bar touching each other to illustrate that the categories are sequential and have a logical, precise order.

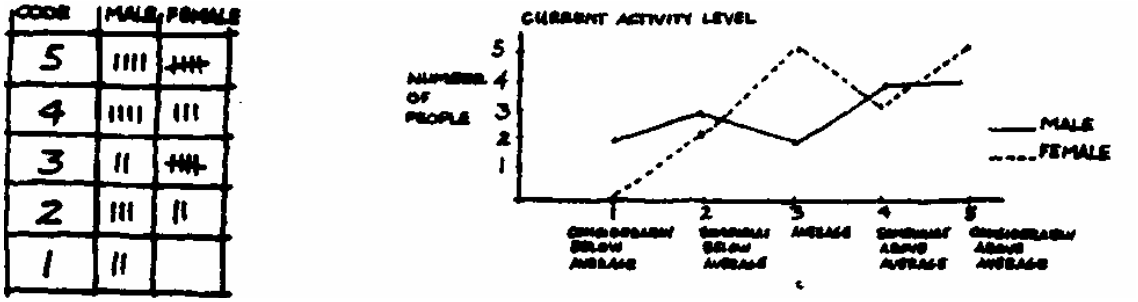


The points of a polygon occur at the mid-points of each interval. In the illustration below, the dotted lines are drawn in simply to show the relationship between the polygon and the histogram that could be drawn to represent the same results.

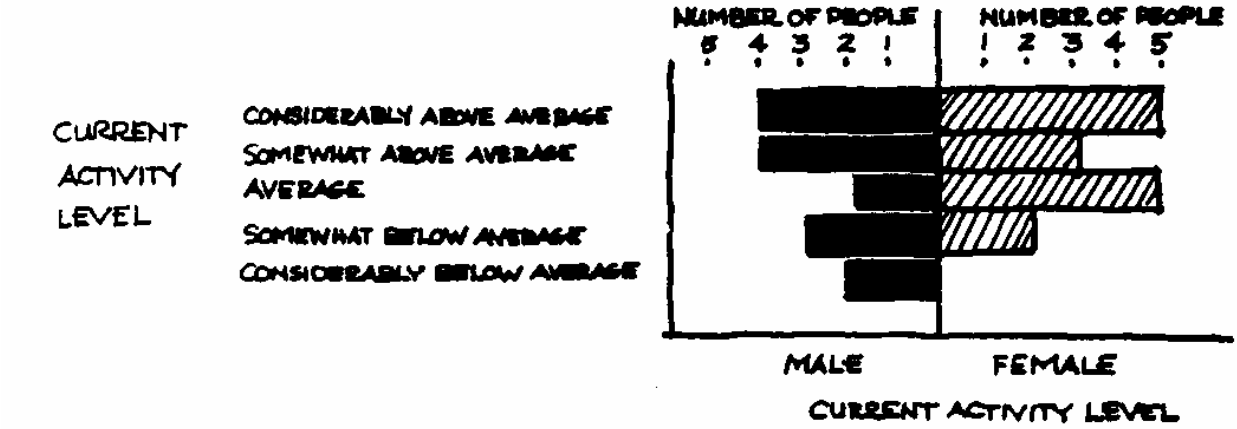
Prepare a histogram for Activity Level from the responses to our sample questionnaire (question 5).



You can also prepare a polygon of Activity Level for Males and Females.



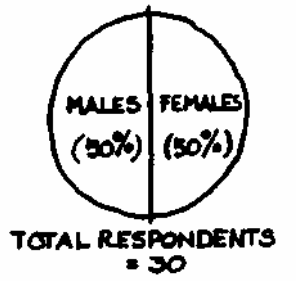
Or, it could be presented by two profiles (histograms turned sideways).



4. How to construct a Pie Chart

In bar graphs, histograms, and polygons, the heights of the bar or the point above the horizontal axis is used to indicate the frequency of particular responses (the number of persons giving a particular answer). In pie charts, these frequencies are represented by the size of each slice of pie - the area of the total pie that a particular response covers.

For example, of the 30 respondents to our questionnaire, 15 were male, 15 were female. Each sex made up to 50% of the total (15/30=50%). This fact could be represented by the following pie chart:

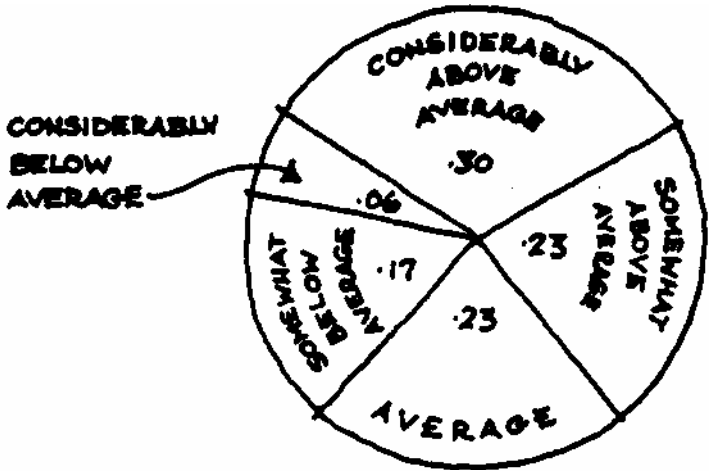


Of the total of 30 respondents, the activity levels were found to be:

		Number of Respondents	Proportion of Total
5	Considerably above average	9	9/30 = .30
4	Somewhat above average	7	7/30 = .23
3	Average	7	7/30 = .23
2	Somewhat below average	5	5/30 = .17
1	Considerably below average	2	2/30 = .06
TOTAL		30	30/30 = 1.00

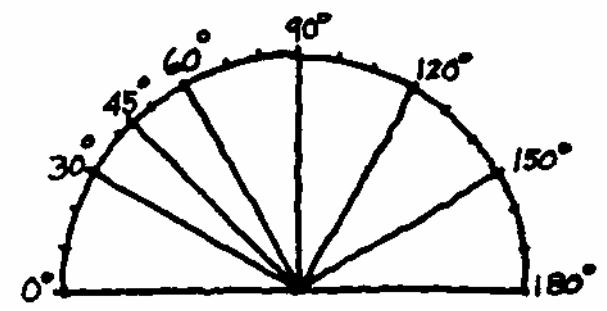
In the right-hand column of this table, the number of persons who answered in each category has been converted to a proportion. Nine people (of 30) were considerably above average. Expressed as a proportion of 30, 9 is .30 (9 divided by 30 = .30). 7 is .23 (7 divided by 30 = .23) and so on. When all the proportions are added they equal 1.00, except for some small 'rounding' errors.

Here is a pie chart representing the proportion of people indicating different activity levels.



One category (Considerably Above Average) was checked off by .30 (or 30%) of the respondents. This is illustrated by a slice of the circular pie that represents 30% of the total. Since there are 360° in the pie, a slice which takes up 30% will be 360° x .30 = 108°

Various angles can be measured accurately using a protractor.



The following table will help you arrive at approximate figures to construct a 'roughly accurate' pie chart

PROPORTION	DEGREES
·05	18°
·10	36°
·30	108°
·45	162°
·50	180°

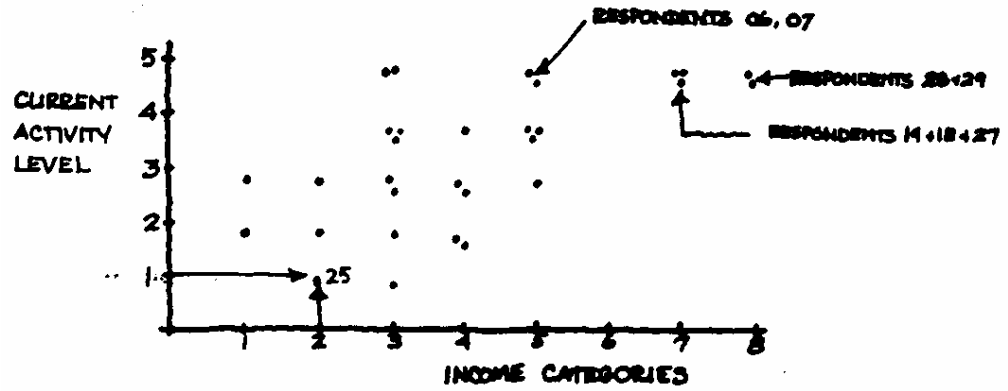
Proportions other than those shown can be estimated by adding together the values shown in the table. For example if you want to convert .69 to degrees, take the degrees for .45 plus 30 less .05. The answer would be: 162° + 108° - 18° = 252°.

5. How to construct a Scatterplot

Graphs, histograms and polygons display information in a way that groups together people who responded in the same way.

A scatterplot displays each person's response to two questions at the same time. Scatterplots are used to see if there is a correlation or relationship between two measures taken on the same person.

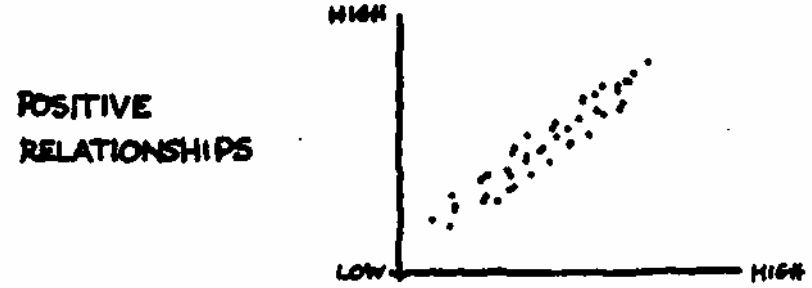
Research frequently asks if there is a relationship between factors such as age, sex, income, education level, and those of attitudes, performance, preferences, etc. Below is a scatterplot of income and Current Activity Level, constructed from our sample questionnaire coded on page 197.



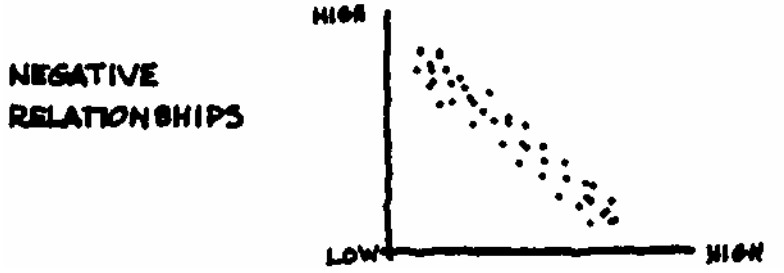
This scatterplot was constructed by placing a dot in the place that corresponds to the person's response category for income on the horizontal axis and that same person's response for Activity Level on the vertical axis. So, respondent 25 is located at the intersection of 2 on the x-axis and 1 on the y-axis.

Respondents 06 and 07 had the same responses, so after the initial dot (indicating one respondent) each additional respondent is added by a dot beside the first.

While the scatterplots you will draw from information collected are seldom as clear cut, the examples below illustrate how you can see if there is a relationship in one sample between the measurements (scores, responses) made on two variables. You can look at (eyeball) a scatterplot and see:



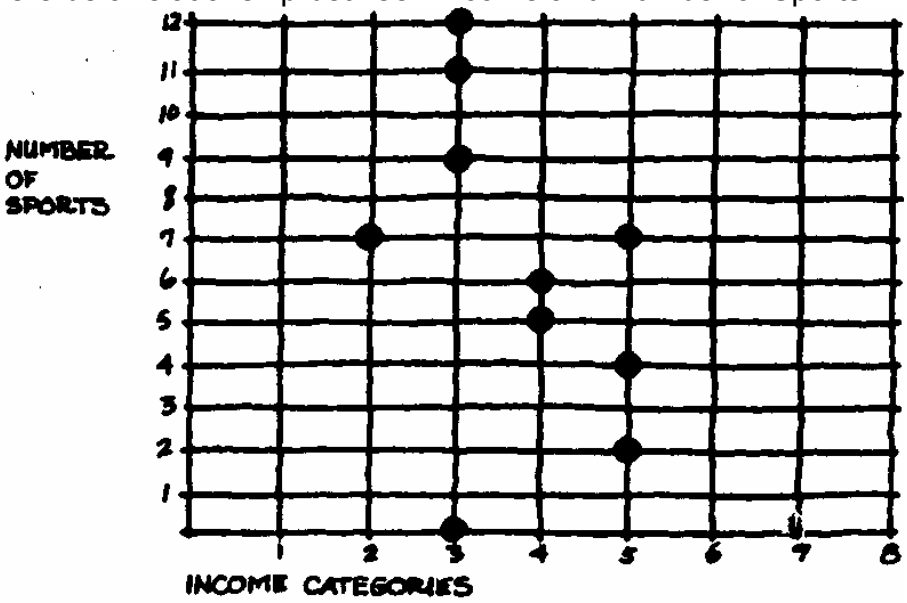
A positive relationship means that when someone has a low score on one variable, they also have a low score on the second variable, or conversely, that a high score on one variable occurs with a high score on the second variable.



A negative relationship means that a high score on one variable is associated with a low score on the other variable.

The above scatterplot indicates there is no regular or predictable pattern to the scores and. therefore, no relationship between the two variables.

Plot the data from the coding sheet for income (question 4) and Number of Sports Engaged in (question 6). We have plotted the first ten respondents. As you plot respondents' answers, ask yourself: Could there be a relationship between income and Number of Sports Engaged in?



You will find there is little pattern to the dots, therefore there is not likely to be much correlation. To calculate how much of a relationship there is between the two, you can use a special technique called linear correlation. it is described in detail in standard statistical texts.

These bar graphs, histograms, polygons, pie charts, and scatterplots allow you to describe and to summarize information visually. In the next section we-provide you with ways to summarize information and describe results numerically.

The purpose of doing these graphs or in conducting statistical tests is to aid decision-making. Once we have conducted a study of needs or attitudes we want to be able to take action on the basis of our results - even if that action is to assure ourselves that our programs are OK and that nothing need be changed. Having a clear picture - a graph - can help us to understand how a great many measures from many people are related. A clear picture can also summarize very simply the range of opinions and the majority views of people.

CALCULATING AVERAGES

If you hear someone tell you an average but they don't give you information about the distribution of scores (how the scores vary), you won't know what the average means. Here is an example of just such a case.

Suppose you conduct a survey of community attitudes toward a summer recreation program. You use a 5-point scale (1 representing 'Very Dissatisfied'. 5 representing 'Very Satisfied'). You discover the average was around 3.0 - Neither Satisfied Nor Dissatisfied. You might conclude either that people were fairly apathetic to the program or that there were about as many Satisfied or Dissatisfied persons so their scores tended to cancel each other out. Based on this single result, the average, what action would you take, if any?

You could do nothing, or you could consult other records (such as dropout data) for more information about the community. You could also consider taking a new sample and asking the same set of questions because simple sampling 'errors' may have produced an invalid picture.

Now suppose you were told about the distribution of scores. There were no attitude scores which fell at 2, 3, or 4 on the 5-point scale. People were either 'Very Satisfied' or else they were 'Very Dissatisfied'. The average will not change - it will still be 3.0 but now you know something about the strength of the feelings and that far from being apathetic, the community is split with strong positive vs. strong negative reactions. Would you treat the results of the survey in the same way now? Would your actions be different?

In this case you would probably go out and conduct personal interviews with people who represented both extremes of attitude. What you would be looking for would be ways of changing the program so that those with negative attitudes would find it more attractive without eliminating anything that the 'positive group' feels strongly about.

This section describes how to calculate averages. The next one, Variability, treats the question of the distribution of scores.

When you refer to the average amount of money spent, or the average number of times something occurred, you are using a descriptive statistic called a measure of central tendency. In fact, there are three types of averages: the Mode, the Median and the Mean. This section describes each of these types of averages and shows you how to calculate them.

- The Mode is the response that occurs most frequently.
- The Median is the point that divides your distribution of scores in half: 50% of the respondents fall below the median and 50% fall above the median. The median is the value at the middle of all the scores.
- The Mean is the number obtained by dividing the sum of all the responses by the number of responses given. This is the common 'average'.

Let's assume you asked 15 people the following question. 'About how many kilometers do you drive each day to go to and from your workplace?'

Here is a hypothetical set of answers: 10, 30, 18, 10, 0, 30, 25, 30, 34, 0, 21, 30, 0, 50, 6 (km).
Let's put these into a table:

Number of km driven each day	Number of persons giving this answer	Cumulative frequency
0	3	3
6	1	(1+3) 4
10	2	(2+4) 6
18	1	(1+6) 7
21	1	(1+7) 8 ◀ MEDIAN
25	1	(1+8) 9
30	4 ◀ MODE	(4+9) 13
34	1	(1+13) 14
50	1	(1+14) 15
	N = 15	

The most frequently occurring score is 30 km. It occurs 4 times out of the 15 answers given. Sometimes two (or more) scores occur, each with the same high frequency, in this case the scores are said to be bi-modal (two modes) or multi-modal (many modes).

The score that divides the set of 15 scores in half is the 8th score. As you see this is a score of 21 km.

The mean, which is what most people call average, is calculated by dividing the sum of a set of scores by the number of scores. Using the data from our earlier table we can see that the sum of the scores is 294. (The Greek letter ∑ (Sigma) is used to represent 'the sum of').The number of scores (N) is 15. Therefore our average or mean is 19.6 km.

X(km)
0
0
0
6
10
10
18
21
25
30
30
30
30
34
50
∑X=294

$\sum X = 294$

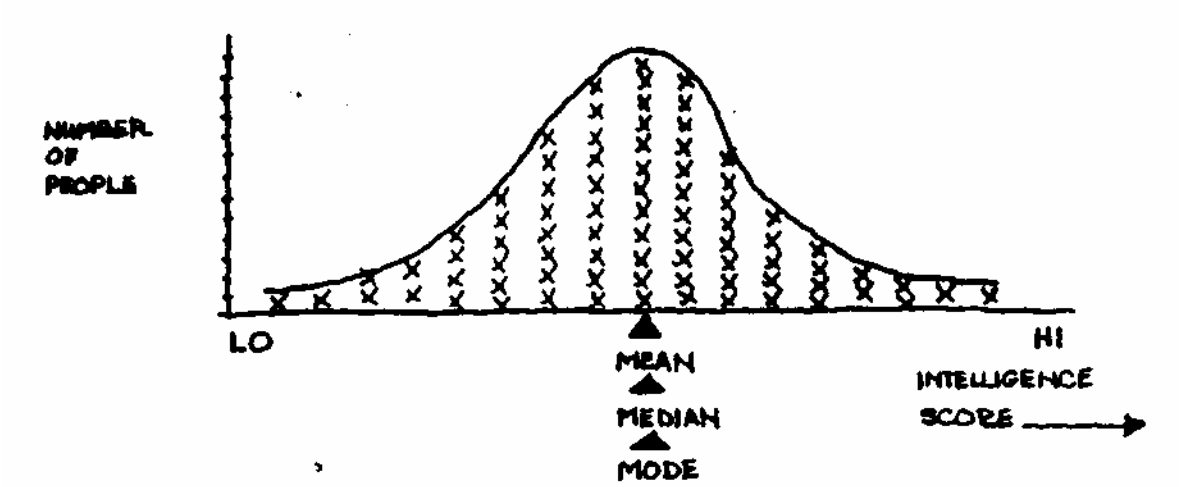
$N = 15$

$\text{Mean} = \frac{\sum x}{N} = \frac{294}{15} = 19.6 \text{ km}$

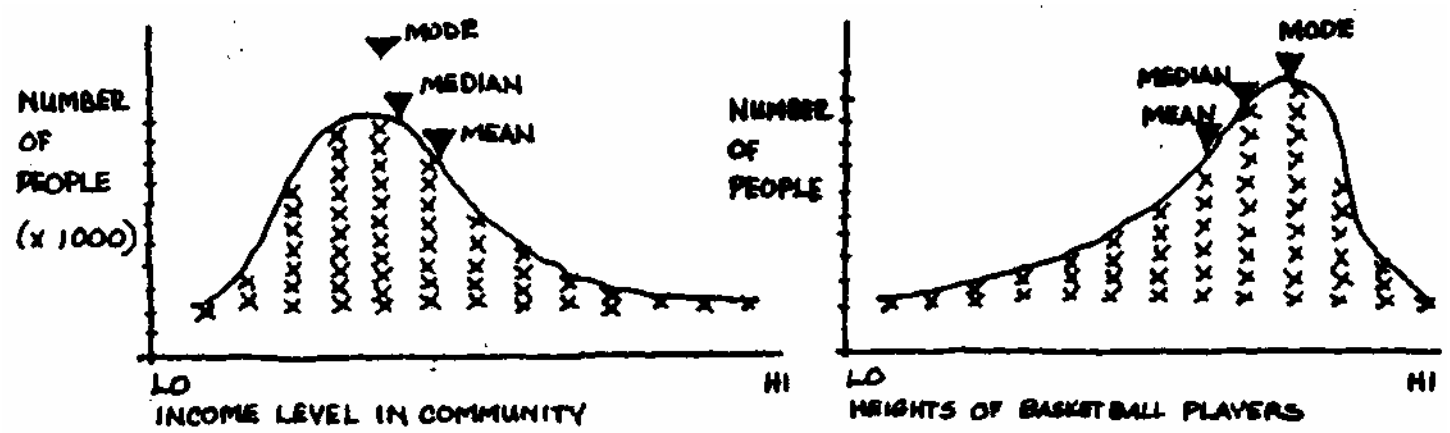
(20 km, rounded)

So, the three averages for this set of data are all different). The mode is 30 km. The median is 21 km. The mean is 20 km.

How can three averages of the same information be different? Are they always, different? Can they be the same? The mode, median, and mean tend to be identical when the distribution of scores is quite regular-or balanced (sometimes called a 'normal distribution' or a 'bell-curve').



However, when the distribution is not symmetric or balanced, as shown below, the three 'averages' are not equal. This will be true whenever the distribution is distorted, or 'skewed' like these:



Obviously, the measure you use to express the average can be much different depending on whether you use the mean, the median, or mode. When you read reports of research be sure to check which average is being quoted. They are all true, or valid, but each tells you something different about the results.

- The mode tells you the most frequent score.
- The median tells you the middle score.
- The mean tells you the arithmetic average.

Earlier we calculated the mean by adding all the scores and dividing by the total number of scores. Sometimes the original information is obtained in categories such as ordinal or nominal scales. Mere is how a mean is calculated for such grouped data.

Suppose you collected information from 30 people about their use of leisure time. In answer to the question, 'How many times have you paid to attend an outdoor sports event in the last 12 months?' you obtain the following answers:

Number of times attended outdoor sports event	Number of Persons
Never	3
1 - 5	2
6 - 10	5
11 - 15	6
16 - 20	8
21 - 25	4
26 - 30	2

What is the mean number of (paid) sporting events attended?

Since the data in this table are obtained in small ranges or intervals we use the mid-point of each interval for our calculations. For the 'Never' category we use the value zero.

Our data table now becomes:

Mid-point (X)	Frequency (f)	f(X)
0	3	0x3 = 0
3	2	3x2 = 6
8	5	8x5 = 40
13	6	13x6 = 78
18	8	18x8 = 144
23	4	23x4 = 92
28	2	28x2 = 56
Totals:	N=30	$\sum f(x)$ = 416

The mean is $\frac{\sum f(x)}{N} = \frac{416}{30} = 13.87$.

We would say the mean is 14 (rounded) or that the mean is in the range 11-15.

You will often see attitude scales and ranked data summarized by calculating the mean scores. For example, question 5 in our sample questionnaire asks respondents: 'How would you describe your current activity level?' The responses are given below in the box.

RESPONSE CATEGORIES	CODE VALUE X	FREQUENCY f	FREQUENCY x VALUE f(x)
Considerably below Average	1	2	2
Somewhat below average	2	5	10
Average	3	7	21
Somewhat above average	4	7	28
Considerably above average	5	9	45
			106

MEAN = $\frac{106}{30}$ = 3.5

The mean score is 3.5 or halfway between the scale values for the 'average' and ‘somewhat above average’ categories.

A technical note: Notice that in calculating a mean in this way each code value is treated as though it was a score similar to a rank (ordinal scale value) or a numerical measurement (interval scale). Since the response categories are only names (nominal scale), some researchers argue that you should only use the mode to represent the average response. However, since the categories are ordered around the 'Average' category then the median seems quite appropriate to use too. The mean can be calculated but if you do so then it's important to recognize the assumption you're making: that the 'distance' between each response category and the one next to it is the same. You need to ask yourself whether that's reasonable. Is the 'distance' between the category 'Somewhat below average; and 'Average' the same as the distance between 'Somewhat above average’ and 'Considerably above average'? If you believe it is, and some researchers accept this assumption, it's reasonable to use the mean to represent the average attitude on this type of scale.

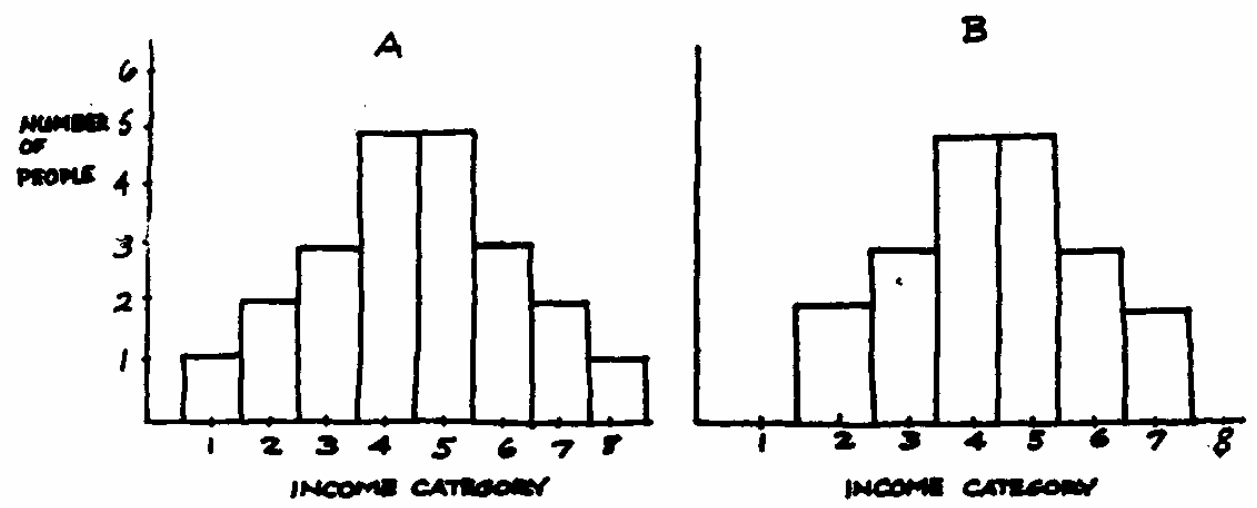
VARIABILITY

Variability deals with how you look at differences among scores.

In the previous section we dealt with three ways to calculate the average of a number of scores. When we use the mean, the median, or the mode we are using a measure of 'central tendency.' That is, a number that tells us something about the most representative score or the score in the middle of a group of scores. Frequently, however, we also want to say something about the degrees of spread or the amount that our results vary from one another. Two measures of variability are:

1. The range of scores
2. The standard deviation among scores.

Look at these two distributions of scores.



Let's say, for arguments sake, that the income categories represented the following dollar amounts.

Income Category	Income to Nearest $
1	10,000
2	12,000
3	14,000
4	16,000
5	18,000
6	20,000
7	22,000
8	24,000

If you were to calculate the mean, the median and the mode for both distributions you would obtain precisely the same results:

	Distribution A	Distribution B
Mean	$17,000	$17,000
Median	$17,000	$17,000
Mode(s)	$16,000 and $18,000	$16,000 and $18,000

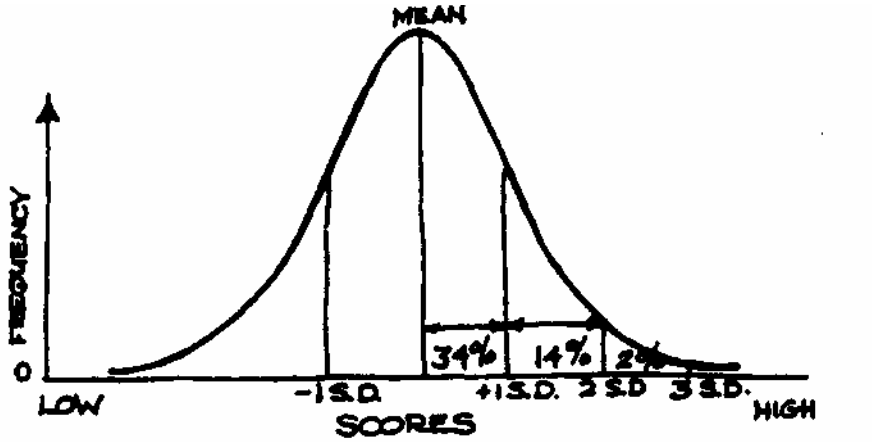
These figures clearly tell us something about the similarity of the two distributions but nothing about their differences. Why? Because the mean, median and mode measure central tendency. The real differences between the distributions are not in how the scores cluster around the centre, but in how they are spread out. That is, how the scores differ from one another.

1. The range

The simplest measure of this difference is the range of scores. The range is expressed by citing the highest and the lowest scores in the distribution or by actually subtracting them. Thus, the range for distribution A is $10,000 to $24,000 ($14,000) while the range for distribution B is $12,000 to $22,000 ($10,000).

2. The standard deviation (S.D.)

Another very commonly used measure which describes how the scores in a distribution are spread out is a number called the standard deviation (S.D.). When you are dealing with what is termed a 'normal' distribution, the standard deviation tells you something very precise about the shape of the distribution.* if the S.D. is very small then the distribution is tall or peaked: if the S.O. is large, then the distribution is flat. In all normal distributions the S.D. tells you what percentage of the scores fall between the mean and ±1 S.D., or ± 2 S.D., or ± 3 S.D.



In all normal distributions:

34% of cases lie between the mean and 1 S.D. from the mean.

14% of cases lie between 2 S.D. and 1 S.D.

2% of cases lie between 3 S.D. and 2 S.D.

50% of cases (approximately) lie between 3 S.D. and the mean.

As you can see, the standard deviation divides up a normal distribution in equal-sized slices along the horizontal axis. Six standard deviations cover nearly 100% of the cases (50% on each side of the mean).

Now, if we add the range and the S.D. to our comparisons of the two distributions we may learn something about how they differ.

	Distribution	
	A	B
Mean	$17,000	$17,000
Median	$17,000	$17,000
Mode	$16,000 - $18,000	$16,000 - $18,000
Range	$10,000 - $24,000	$12,000 - $22,400
1 S.D.	($14,000)	($10,000)

These figures tell you that the two sets of income scores are identical in terms of their central tendency. However, the incomes in Group A tend to cover a larger range than in Group B and they tend to peak more around the mean (i.e. they have a smaller S.D.)

* Ref: Walker. H. M. and Lev. J. Statistical inference. New York: Holt Rinehart and Winston. 1969. (3rd ed.).

COMPARISONS AND RELATIONSHIPS

In this section we discuss some common questions asked in the analysis of research results:

1. How do you compare percentages?
2. How do you compare the averages of two groups?
3. How do you look at the relationships among scores?

We will not present the calculation methods for the statistics used in such analysis but we will identify the principles you need to know. How to calculate some of the commonly used measures is described in detail in a companion manual to this one. It is called a 'Statistics Booklet' and others can be found in standard references such as the one cited on page 222.

1. How do you compare percentages?

Study the following table of research results.

	Number of People in sample	Number who agree with policy change	Percentage of sample who agree
Group 1	100	50	(50/100) 50%
Group 2	12	6	(6/12) 50%

One common tendency is to compare the two percentages from the right-hand side of the table. When you are dealing with samples of such different sizes (100 vs. 12) this could lead to misleading conclusions.

When we say that 50 people out of a sample of 100 agree with a statement we can be fairly certain from statistical theory that in the population from which the sample was drawn the percentage would range from a low of about 40% to a high of about 60%. (We can be 95% sure of this. tool). However, when 6 people out of a sample of 12 agree with a statement, then the percentage of the population agreeing with the statement could be as low as 20% or as high as 80%).

In other words, the population percentage estimated from group 1 could be as high as 60% and the population percentage estimated from group 2 could be as high as 80%. The estimate from group 1 could be as low as 40%, whereas the population from which group 2 was drawn could be as low as 20%. These are huge differences and so the two groups cannot be compared in this way.

There is a two-part moral in this example:

> Comparing percentages is risky when you deal with small samples.
>
> Comparing percentages is even more risky when they are based on different-sized samples.

Our best advice is to refrain from comparing percentages in such cases. If you must, then consult a table that will show you how much in error you might be in estimating the population percentages* A method of testing to see whether two proportions are different is presented in the 'Statistics Booklet' which is a companion to this manual.

2. How do you compare the averages of two groups?

In some research, you may wish to compare the means from two samples to see whether they are really (statistically) different. There are two situations where this is common and these can be illustrated as follows:

• You measure the performance of two groups of children who receive different forms of swimming instruction. You then want to find out if the average performance score with one type of instruction is significantly different from the performance with the other type of instruction. Or, you may want to find out whether the boys' performance is significantly different from the girls' performance.

In both cases you are comparing scores derived from two independent groups. That is, a group receiving method A vs. a group receiving method B; or boys vs. girls. (Other comparisons are also possible, e.g. method A for boys only vs. method B for boys only.)

• You measure the attitudes of a number of people towards a particular community service both before and after a fund-raising campaign. You want to determine whether the campaign resulted in a change of attitudes for this sample of adults.

In this case you want to see if there was a change within each person, or whether the average post-campaign score is significantly different from the average pre-campaign score. Here, the two sets of scores come from the same people rather than from two different samples as in the swimming instruction experiment.

In both of these situations a test of difference is required. The procedures for these tests are outlined in 'Statistics Booklet' where the Sign test and the t-test are presented in detail.

3. How do you look at relationships among scores?

Much of the research in recreation and leisure is not concerned with differences among scores. Instead, it focuses on relationships among variables. For example, we may ask:

• 'Among adults of Citytown, is frequency of attendance at cultural events related to socio-economic status?'

• 'Among first generation non-English speaking immigrants, it there a relationship between ability to learn English and age?'

* See Walker and Lev (Table VI) or Flielss. J.L. Statistical Methods for Rates and Proportions. Toronto: Wiley-Interscience. 1973.

• 'Is adult participation in sports related to earlier participation in team sports in high school?'

There are two basic types of relationship involved in these questions. First, if one variable changes does another variable change with it? This is a measure of correlation. This is illustrated when we ask whether frequency of attendance is related to socio-economic status or whether ability to learn is related to age. Second, we might ask about association. That is, does the presence of one variable tend to be associated with the presence (or absence) of another variable? Such is the situation when we ask if adult participation in sports is related to some earlier form of participation.

SUMMARY

This chapter identified three major ways of describing the data you collect. Tables, graphs and other diagrams, and averages provide quick ways to summarize a lot of information.

Range and standard deviation were described in the section on variability. Finally, the basic concepts of correlation and association were introduced in discussing how to look at comparisons and relationships among scores.

A companion to this manual called 'Statistics Booklet' includes a description and instructions for calculating the following commonly-used measures:

Section 1
Testing Relationships

Selecting the Right Test Pni
Coefficient Ø Spearman Correlation r_s
Chi-squared X^2

Section 2
Making comparisons

Selecting the Right Test
Sign Test
t-test
Test of Proportions

Chapter Eleven
Presenting Research Results

INTRODUCTION

IDENTIFY THE RECEIVER GROUPS

ANALYZE THE INFORMATION NEEDS OF EACH GROUP

SELECT THE REPORTING METHOD AND TREATMENT OF INFORMATION

1. **Formal written reports**
2. **Informal written reports**
3. **Presentation meetings**
4. **Discussion group meetings**

SUMMARY

CHAPTER
11 Presenting Research Results

INTRODUCTION

In this chapter we look at how the results of needs-assessment research should be presented. This is not merely a question of choosing between graphs and tables, or of using statistics rather than descriptive writing. Presenting results is part of a complex communication process. We will analyze this process to help you select the best possible way to communicate what your research has revealed.

To begin with, let's look at what the communication process is all about. Think of it as getting a message from here to there - from one person or group to another person or group. There is always at least one sender and at least one receiver. For the sender, there are always these questions to answer:

- Who are the receivers?
- What information do the receivers want? What information do I think the receivers have?
- How much information should I give?
- By what methods will the receivers best receive the information they want and t e information I should give to them?
- How should the information be presented?

The primary questions for people who want to communicate research results are very similar to the questions which any sender of information asks.

These are the questions we'll address in our discussion of how research results should be presented. We have organized the discussion according to the three basic steps you take to plan the presentation of any information:

- Identify the receiver groups
- Analyze the information needs of each receiver group
- Select the reporting method and treatment of information

IDENTIFY THE RECEIVER GROUPS

In Chapter 1 when we discussed the process of identifying the purposes of your research, we pointed out the importance of Knowing:

Who is asking for the research?

Who else will want the research results?

Who will be affected by the research?

And, in relation to each of these groups, we said it was important to consider:

What do they want to know?

How will they want to use the information?

The answers to these questions will give you several groups of people who could want the research results. In addition, by the time you have conducted the research, there may be several other groups who will also want the research results. For instance, there may be people in the research sample or others who have heard about the research you are conducting.

The question then becomes, which of all these identified groups should get the research results, how much information should each group get, who should present the information, and how, and when should each group receive the information prepared for them?

During the initial planning stages, the researchers and the people requesting the research will have decided specifically who will get a report. This 'contractual audience' usually consists of the decision-makers who commissioned or approved the study. In addition, many researchers insist that those who participate in the study (the sample) be given access to at least a summary of the results, if not the entire report.

Let's, look for a moment at the importance of communicating results to the sample and to people within an agency or organization. Perhaps the best way to realize the importance of these groups is to consider the possible consequences of not presenting them with the research results.

If the people who have been surveyed have any interest at all in the content of the survey, or if the issues in the survey are at all close to their hearts, their reactions to not receiving feedback will probably include:

• Suspicion. How come we aren't finding out what's in the research? This in itself can contribute to anxiety. They may make up their own versions of why they aren't receiving the information. There are plenty of organizational studies which show that when people don't know what information was collected, they tend to imagine what might have been collected and what the reactions from the top of the organization might have been.

• Skepticism. In our experience, if the people who were surveyed don't get feedback, negative feelings arise not only about the organization, but also about the researchers and the whole act of being 'researched'. In the future, the willingness of people to participate in anything related to the content of that research may also be affected.

• Cynicism. This attitude about decision-making and decision-makers can lead people to question the credibility of the final research-based decisions. When feedback isn't provided to the participants so they can see the relationship between the decision and the actual data to which they and people like themselves contributed, they tend to reject the decision and to assume that it was done by administrative 'flat' or some kind of arbitrary process that didn't involve them.

So, in terms of people accepting and understanding the reasons for decisions, which is the credibility of the decisions themselves, feeding back the results that led to these decisions is key to the process of obtaining commitment, or if not commitment, at least understanding.

There are a number of conditions under which you probably would not want to feed back results. Most of these cases involve situations in which the decision-making process is still in progress. To feed back interim results to participants may result in a premature reaction from them. Decision-makers may be collecting data from a number of different sources, and if you give back results to only one of those sources. It may result in hostility, apprehension, or resistance. In some situations you must look at the total decision-making process and all the kinds of information that will contribute to the process before you feed back anything to anybody.

This can be a ticklish area because, in the name of protecting people, information is sometimes withheld. Perhaps a better solution in terms of organizational or community decision-making is to tell people why they aren't getting any information at the moment, what information they can expect to receive, and when they should expect it.

Now back to figuring out all the possible receiver groups. Why bother? Because each group of receivers may have different information needs, and may need a different type of report. So, after identifying each receiver group you need to consider each one's specific information needs.

ANALYZE THE INFORMATION NEEDS OF EACH RECEIVER GROUP

The method of presenting research results should be tailored to each receiver group. This means that how something should be communicated (that is the format, the medium, the language) and what should be communicated must be developed specifically for the audience who will receive it.

It's pointless to prepare elaborate statistical tables that can't possibly be understood by the people who will be reading the report. In some cases it may be much more valuable to present direct quotes that represent the result of a large number of interviews than to present categories and complex statistics. In fact, while we were doing the research that led to this book, we found that many people are aware that research of special interest to them exists, but when they tried reading it they decided they'd never understand it. So, they've stopped looking for information and they are 'reluctant to undertake research themselves. This doesn't have to happen; reports can be presented in such a way that people can understand them. To do this, researchers must pay attention to the special information needs of each type of receiver group.

Therefore first look at why each group might want the research results, and what information they would need to satisfy their purposes. Below, we sketch out six potential receiver groups.

1
The people who asked for the research probably want to use the results as a basis for decision-making or problem solving. They will want to know all the results, as well as how the research was conducted.

2
The decision-makers. If they were the ones who requested the study, may want the same information as above; If they were not part of the group that requested the research. It's possible they don't want the results at all. In this case, the researchers may have to look for ways to stimulate interest among these decision-makers

3
The research sample may want to know the results of the study for any number of reasons, a desire to compare their opinions with the others in the sample; a desire to see how the research will influence policy or action, a need to get some kind of 'pay-off for their effort and time; simple idle curiosity.

4
Other members of the agency or organization may be curious about the results simply because their interest has been aroused by the presence of a questionnaire or interviewers they may be concerned about possible changes in policies or priorities, or they may want to use the results in their own planning and priority-setting.

5
If the research will have implications for staff of an organization or the residents of a community. It is extremely important for the researcher to consider the impact of the information. If they need to know what the findings are before a decision is made, it is important to present these findings early, and clearly. Margins of error, confidence levels, and the strengths and weaknesses of the sample should be explained in a way that everyone can understand. We want to emphasize that if the results are to be accepted as valid, then you need to know what fears and suspicions or hopes your receivers have about the research and the outcomes. If you know these, you can address yourself to them directly.

The media are always a potential audience. Press, TV, and radio journalists are always interested in finding 'insights' into community structure and values; they are usually interested in reporting on attempts to survey the needs of any minority or disadvantaged group: and they always. It seems, want to know how much the study cost.

In preparing any research report for any receiver group, you will have a lot of information that you could communicate. What you must do is to separate the necessary information from information that would be nice to know but which is not necessary.

Once a lot of time and energy has been spent on collecting information, there is a tendency to want to report every bit of it to everyone. Often research turns up interesting relationships or facts that provoke discussion or speculation. One way to guard against producing a report full of interesting details and irrelevancies is to ask whether what is being selected is an answer to the original purpose of the research. If it is, then it fits the need-to-know category if it is not directly related, then it's likely in the nice-to-know category.

Here's an example of the first part of the planning table we used to identify what information to give to whom after we did a needs assessment in the province of Ontario.

PLANNING A RESEARCH REPORT

Who are the receiver groups?	Why do they want the information	What do they need to know?
Funders of the study	To decide what materials on research should be provided and how they should be provided	• Who was-in the sample • What the sample said they needed • Detailed content recommendations Detailed recommendations on style and delivery of needed materials • Costs of recommendations
Samples		
(a) Contact people	To know what happened to the information they provided.	• Summary of what they said
(b) People who came to meetings	To know the time they gave was valued	• Summary of major recommendations

Try your study here:

Who are the receiver groups?	Why do they want the information?	What do they need to know?

SELECT THE REPORTING METHOD AND TREATMENT OF INFORMATION

Having looked at why different groups might want the research results, and what specifically each group needs to know, you are now ready to choose how you will present your research results.

As the author of a research report, you have the potential to be as traditional as a scientist writing a lab report (purpose, methods, results or observations, and conclusions) or as innovative as a multi-media kit producer. Mere is a short list of the ways in which research results can be recorded:

1. Formal written reports
2. informal written reports
3. Presentation meetings
4. Discussion group meetings

When you choose your research method, you took care to choose one that would be sensitive to your research sample and sensitive to both subtle indicators of dissatisfaction and to strong indicators of satisfaction. Since your data collection methods had to be this sensitive and flexible, your reporting methods should be equally appropriate to your receivers and to the type of information you want to convey.

1. Formal written reports

The format of a formal written report generally includes a statement of the purpose of the study, the method of collecting the information, *a* description of the sample, the research results, analysis, a summary, and conclusions. Often, the cost and the source of funds are added to save the time that could be taken in answering inquiries. Formal studies often include graphs, statistical tables, etc., as a shorthand way of describing information.

Even when you are writing a format report, you should consider the audience's reading level - can it handle complicated phrases and tables? An expression such as '4/5 of the sample liked the new plan' will not be understood by a surprising number of adults: it would be better to say 'four out of five people interviewed like the new plan'. Another consideration is the receiver's ability to understand graphs and charts. Whatever you say in a graph or a table you should also summarize in prose in the text. The headings on tables and graphs should be clear and accurate.

How to express results in press releases for community newspapers is well described in two booklets. PR Primer, and The Printed Word. Both are published by the Ministry of Citizenship and Culture. Government of Ontario, and will be useful to community groups involved in planning, writing, and publishing printed materials.

2. Informal written reports

Informal written reports include such methods as transcripts of portions of interviews, participants' diaries, photographs of participants or facilities, sketches or drawings. Unless the receivers of your report specify a strictly formal report, there is no reason why you can't integrate informal types of presentation into a traditional report. For example, making the statement that, 'graffiti on the recreation centre walls expressed a strong negative feeling towards authorities.' or that group X at a recreation program 'appeared to lack the motivation necessary to participate in the activities.' may be true. it is a complex way of stating something. These statements could be made more effectively by using a photograph that shows the recreation center walls, or the participants in the recreation program.

Informal reports can be used in public media. In one Canadian city, the sponsoring agency of a research study wanted to alert people to some research results and stimulate their involvement and further action. The agency developed a questionnaire to be placed in the local newspaper that asked 'How many people do you think answered 'yes' to the following questions?' People who read the story then had a chance to mark down their own guess about the research results. On another page, they were able to check their guesses with the research results.

3. Presentation meetings

Presentation meetings can include audio-visual aids such as audiotapes of excerpts from interviews, videotapes of situations or places, as well as overhead projectors and flip charts. In any meetings, you must keep your audiences involved. Some of the methods described below, under discussion group meetings, may be incorporated into formal presentations — providing your receivers will accept and benefit from the techniques.

4. Discussion group meetings

A presentation meeting can be turned into a dialogue by presenting people with a number of written questions Have them write their own responses, and then compare these to the actual research results. Another way to create discussion is to structure people into task teams to study different results and then to invite their comments and conclusions.

Different reporting methods can be combined. Written research reports can be sent out to people prior to meetings, a newspaper report can invite people to a workshop, etc. Choose the best combinations to communicate your results in relation to your research purpose and the audience.
There is one form of presentation that can best be described as a research debriefing or a consultation. The essence of this method is that the people who requested the research (and possibly other audiences) are brought together and the entire research study is reviewed. The purpose of the research is stated clearly so that those present understand the intent of the project. Next, researchers describe the various planning steps, the development of instruments, the design of the sample, and the methods of data analysis. Finally, all the available data with whatever summaries, charts, photos, etc., are set out for the group to examine.

There may be no final report in the above process, instead there might be agreement on the most important and relevant findings. Sometimes the people who asked for the research may decide to collect more information on areas that came up during the course of the research. Other times, the people who requested the research may simply ask for a few written pages on specific areas.

To return to the example from a needs assessment study we did, we chose to do a traditional report for the funders of the study. The sections of the 200 page report were:

Purposes of the Report
Background
Methodology
    Sample
    Interview Schedule
Analysis
    Key issues
    Short-term implications
    Long-term implications
Recommendations
    Short-term internal
    Long term
    Developmental plan
    Evaluation plan.

For our contact people we used the telephone to convey our thanks, to summarize the information we presented in our report and to respond to their questions. We also sent them a copy of the information which we sent to people who formed our sample and who attended meetings with us. To our sample we sent a two page report. It included a 'thank you', a description of the method we used, the sample size, the most frequently stated needs, and the four major recommendations which we made on the basis of our study.

Now, for your situation, what information will you present to whom? How will you present it?

PLANNING A RESEARCH REPORT				
Who are the receiver groups?	Why do they want the information?	What do they need to know?	How should the information be presented (written, meetings, telephone, etc.)?	Should anything be added to what they need to know?

SUMMARY

In this chapter we have talked about presenting research results by concentrating on three factors: the research purposes, the audience for the research, and the form of the report. Our intention was to show that all of these should be logically related and consistent with each other.

In conducting needs-assessment research, you will often find that the actual collection of your data takes more time than you predicted and that you may, therefore, have less time than planned to prepare your research report or teed back your research results. This is especially true if the planning of the report has been left to the end of the process. We urge you to be thinking about and planning the form of your report at the same time as you're doing the earlier, essential tasks such as designing your questionnaire, locating your samples, and collecting your data. In this way you can guarantee careful attention to some of the important factors we have mentioned: who needs to receive what, what are their expectations and possible fears about the results, what are their reading levels and research sophistication, and will a report or meeting communicate best. Knowing the answers to these questions allows you to be relevant, clear, and efficient.

Statistics Booklet

A companion to: "Enjoying Research? A 'How-To' Manual on Needs Assessment"

Diane Abbey-Livingston
and
David S. Abbey

Statistics Booklet

Introduction

This booklet shows how to calculate some of the most commonly used statistics in recreation and citizenship development. While we have not attempted to cover all popular techniques, we have tried to cover a wide range of approaches to analyzing research results.

You may never have to calculate any statistics to interpret your own results, but we suggest you read through this booklet so you will be in a better position to understand the research of others and the claims they make, based on that research.

Learning the Language

There is no way to avoid special language ('jargon', some would call it) when you deal with research and analysis. We've tried to keep it to a minimum, but it is essential that you be familiar with a few of these special terms.

Statistic. A statistic is a way of describing (in numbers) some feature of your research results. In most recreation and leisure research, results are obtained from a sample of people rather than from a total population. Statistics are based on the results of these samples.

Significance. The word 'significance' has a special meaning in research. When a research result is said to be significant, it does not mean the result is important. It means the research result probably did not occur just by chance.

Significance Test. Whenever we do research with a sample of people - ask them questions, or observe their behavior, or analyze files about them - we obtain results. We need to ask "How valid are these results?"; could they be due to chance?

There is a little book called 'How to Lie with Statistics'. The trick is, not how to lie, of course, but how to make the best valid statements about the research and needs assessment which you do. Valid statements depend not only on statistics but also on how your sample was selected and the ways in which questions were asked.

For example, we might observe that the attitudes of parents towards paying a fee for their children's use of the local baseball diamond seem more positive after a public meeting on the issue. 'But', you might ask, 'is the shift in attitude that's indicated in our research real? Couldn't it be just a chance thing? A temporary shift?'. To rule out the possibility that the shift was just due to chance, you would calculate a statistic and determine the significance of the results you obtained. When you calculate the significance of a result, you are determining what the chances are that your results are different from zero. So, if you were to say there is a 'significant change in parents 'attitudes' you would be saying the change was not equal to zero. Sometimes we call these significant results 'real' results.
Significance tests are carried out to assure ourselves that we would likely get the same, or nearly the same, results if we repeated our research many tines with different samples of people or data from the same population.

Significance Level. A significance level is the same as betting odds at the race track. When we say a statistic is 'significant' we usually say it with some caution and some optimism. Since we can never be absolutely (100%) sure of the results we would get if we repeated our research many times, we generally state our conclusions with a certain level of confidence — 'There is a significant change in parents' attitudes'. in most recreation and leisure research, results are usually stated with the expression added 'at the 95% level' or '95% confidence level'.

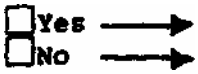
This means the researcher has compared his statistic to certain published tables and is 95% sure his result is sufficiently large that it's unlikely to actually be zero.

The 'significance level' is a figure that also expresses our pessimism. if we are 95% confident that our statistic is not zero then we are also saying that 5% of the time we are likely wrong. That is, we may say we have a real or significant relationship but in fact we .don't have one. This is the risk in doing research. Sometimes we draw wrong conclusions. To minimize the chances of being wrong, we sometimes compare our results to tables that show not only the 5% confidence level, called the .05 level, but also the .01 level. This level means we might be wrong only 1% of the time. We can be even more sure of our statement if we want to, but the .05 level is the one used most often.

Note: Significance does not mean importance. often we obtain significant results that don't matter. A significant difference or a significant relationship in research data does not mean that the relationship is an important one. All if does mean is that the result is probably not zero. it probably didn't occur by chance. You have to decide whether the result - significant or not - is important. Statistics can't tell you that.

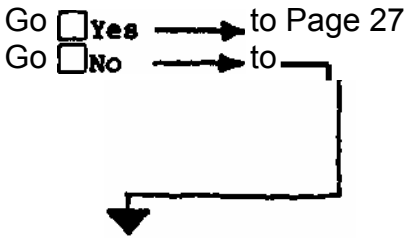
SECTION 1
Selecting a Statistical Test for your Research

Question it Do you want to know whether two sets of results are related to each other?



Go to Page 7
Go to Question 2

Question 2; Do you want to know whether two sets of scores are different from one another?



This booklet presents six of the commonly used statistics in recreation and citizenship development. If you are not interested in testing for either relationships or differences in your research results, then it is likely that additional readings or the use of a statistics consultant would be useful. Several useful references are also provided at the end of this booklet.

SECTION 1

Tests of Relationships

There are dozens of statistical tests and procedures that can tell you whether two or more sets of results are related to one another. In research a set of results is called a variable. A variable can be: The age of someone responding to a questionnaire, his or her sex, his or her income, or education level, or preference for a particular activity. It could be the distance traveled on a vacation, or size of family, or disposable income, or anything in which you have an interest.

The following statements are taken from actual research projects. Each is a description of a relationship that the researcher wanted to comment on:

> '...age, education, and socio-economic status do, in this study, influence participation in leisure time activities to some degree...'
>
> '...free admission seems to be insignificant relative to participation.'
>
> '...those with lower levels of education ware less involved in leisure activities.'
>
> '...most of those who were involved in any organized recreational program were involved in physical rather than social-cultural or creative programs.'
>
> 'A significant relationship was found between an adult's past experience of serving as a youth leader and participation in...education activities.'

In this section we will look at different measures of relationships. Each measure is used when you have particular types of variables to be related to one another. The set of questions on the next page will help you select the appropriate statistical test.

Selecting the Right Test of Relationships

Question 1: Ace you dealing with two dichotomous variables?*

☐Yes → Go to Page 8 (Phi Coefficient)
☐No → Go to Question 2

* A dichotomous variable is one that has only two values:
yes/no
agree/disagree active/inactive
and so on

Question 2: Are you dealing with two sets of scores each of which can be ranked?*

☐Yes → Go to Page 15 (Spearman r_s)
☐No → Go to Question 3

* Two ranked sets of scores night look like this:

Family	Annual Income	Ranked Income	Cost of Holiday	Ranked Cost
Brown	$25,000	1	$2,500	1
Green	22,100	2	1,000	3
Smith	21,000	3	500	5
North	16,000	4	2,000	2
Shapiro	14,000	5	750	4
O'Reilly	8,000	6	250	6

Question 3: Are you dealing with frequencies of two variables that can be put into a 2 x 2 table?*

☐Yes → Go to Page 20 (Chi-Squared Test)
☐No → Go to Page 5, Question 2

* For example:

Active in Curling?

	Yes	No	Total
Number of men	12	38	50
No. of women	6	44	50
Total	18	82	100

The Phi Coefficient Ø

The phi (pronounced 'fee' as in 'fee, fi fo, fum') coefficient is a useful and simple way of answering a number of research questions about the relationship between two variables. Let's say you want to know whether any of the variables in column A is related to any of those in column B.

Column A	Column B
a. Age	f. Willingness to volunteer
b. Sex	g. Use of cultural resources
c. Income	h. Participation in sports
d. Rural-urban	i. Activity level in community
e. Education level	j. Number of leisure pursuits

(We're not suggesting any of these pairs of variables should be or are related. However, in your research you might have a situation in which these or similar pairs of variables are of interest.)
All you have to do to use phi is to categorize research results into one of two classes (we've labeled them 0 and 1). For example:

Variable	Categories 0	1
a. Age	Under 30	30 or over
b. Sex	Male	Female
c. Income	Under $10,000	Over $10,000
d. Rural-urban	Rural	Urban
e. Education level	Less than Gr. 11 completed	Gr. 11 or more
f. Willingness to volunteer	Not willing	Willing
g. Use of cultural resources	Less than 4 visits per year	4 or more visits per year
*h. Participation in sports	Scores "Low" on inventory	Scores "High" on inventory
*i. Activity level in community	Scores Low on inventory	Scores High on inventory
j. Number of leisure pursuits	Below median for group	At or above median for group

*In (h) and (i) it is assumed that participation level and activity level are operationally defined by means of an inventory or check list that is designed to be consistent with the research objective of the study in question.

How to calculate Phi Ø

Step one:

Prepare a data table. Let's assume our research objective included looking at the relationship between (d) age of our respondent and (f) hisor her willingness to volunteer for community projects.

To prepare this table each respondent in our sample (in this case we are assuming a small sample of only 20 persons) is listed according to his or her 'respondent number'. These first numbers can be assigned in any order to the respondents' questionnaires. (it is important to keep the same number for the same respondent throughout your analyses - this aids checking.)

Next, for each respondent we score him or her on each of the two variables, assigning a 0 or 1 for each. in our sample scoring system 'Under 30' is scored 0, "30 or over" is scored 1, 'Not Willing' is 0, and 'Willing' is 1.

Respondent Number (Sample of 20)	(a) Age		(f) Willingness to Volunteer	
	Under 30	30 or over	Not willing	Willing
	0	1	0	1
01	0		0	
02	0			1
03		1		1
04	0		0	
05		1		1
06		1		1
07		1		1
08	0		0	
09	0			1
10		1		1
11	0		0	
12	0		0	
13	0			1
14	0		0	
15		1		1
16		1		1
17		1		1
18	0		0	
19		1		1
20		1	0	
Number in each category	10	10	8	12

Look at the line for respondent 01. The 0 in the 'Under 30' column indicates respondent 01 is under 30 and the 0 under 'Not Willing' indicates that this person is not willing to volunteer.

In the line for respondent 16 we see that this respondent is 30 or over (1 in column '30 or over') and that he or she is willing to volunteer (1 in column 'Willing').

What can we tell from this table? A little. By counting up the number of times 0 and 1 occur in each column we can see that there are 10 persons in each age bracket and that among these, 8 are Not Hilling to Volunteer but 12 are Willing.

Now, consider the research question: is there a relationship between the age of the respondent and his or her willingness to volunteer for community projects?
Step two:

Prepare a relationship (or contingency) table. A contingency table is used to record the coded variables from the list in step one. For example, respondent 01 scored 0 on variable (a) (Age, and 0 on variable (f) (Willingness to Volunteer), therefore this person's response will be entered in the upper left hand square or 'cell' (see below). We have completed the contingency table using the respondent's number to illustrate the placement of each individual score.

		Variable (f) 0 Not Willing	1 Willing	Total
Variable (a)	Age			
	Under 30 0	01, 04, 08, 11, 12, 14, 18	02, 09, 13,	10
	30 and over	20	03,05,06,07, 10,15,16,17, 19	10
	Total	8	12	

(When you actually do the calculating, a tally or check mark would be used instead of the respondent number).

	0	1		0	1	Total
0	~~1111~~ 11	111	0	7	3	10
1	1	~~1111~~ 1111	1	1	9	10
Total				8	12	

What do we know from this table? Two or three things seem to be clear. First, most of the entries are in two cells (0,0) and (1,1). Second, there is only one case when a 1 on Variable (a) occurs with a 0 on Variable (f). In other words, in only one case is someone over 30 Not Willing to Volunteer. Third, while most of those under 30 are Not Willing, three of them say they are Willing. It appears as though willingness to volunteer is related to age of the respondent.

Now, how do we test the significance of this relationship? Given 20 respondents who produce this kind of contingency table, how likely is it that this is only a chance outcome? For example, here are two other contingency tables that could have resulted from simply assigning 0 and 1 at random in the data table, while still keeping the totals (called 'Marginal Totals') the same, i.e. 10 'Under 30', 10, '30 or over'; 8 Not Willing, 12 Willing).

		Not Willing 0	Willing 1	
Under 30	0	4	6	10
Over 30	1	4	6	10
		8	12	

Table A

		Not Willing 0	Willing 1	
	0	8	2	10
	1	0	10	10
		8	12	

Table B

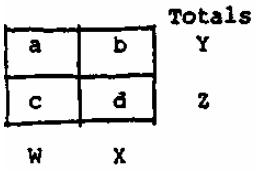
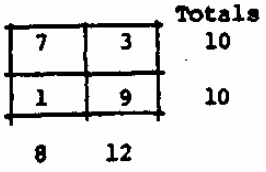
In Table A there is absolutely no relationship beyond what you would expect by chance. Half of those who are not willing to volunteer are under 30, half are 30 or older; half of those willing to volunteer are under 30, half are 30 or older.

In Table B there is an obvious relationship - all those who are not willing are under 30, and nearly all of those who are willing are 30 or older.

Step three:

Calculate Phi (Ø). There are six steps to this calculation. They are summarized on the left and illustrated on the right.

*Note: Use a hand calculator to calculate the square root, or find the answer in a reference book such as: H. Arkin and R. R. Colton, Tables for Statisticians, College Outline Series. (Barnes and Noble, Inc., 1950).

		
1.	Multiply a x d	Multiply 7 x 9 = 63
2.	Multiply b x c	Multiply 3 x 1 = 3
3.	Subtract the second from the first result = (a x d) - (b x c)	Subtract 63 - 3 = 60
4.	Multiply W x X x Y x Z	Multiply 8 x 12 x 10 x 10 = 9,600
5.	Calculate the square root of the result of step 4 = $\sqrt{W \times X \times Y \times Z}$	Calculate $\sqrt{9,600}$ = 97.4*
6.	Divide the result of step 3 by the result of step 5 $\phi = \frac{(a \times d) - (b \times c)}{\sqrt{W \times X \times Y \times Z}}$	Divide 60 by 97.4 $\phi = \frac{60}{97.4} = .62$

Step four:

Evaluate Ø. Is the result of out calculation significant? Could it have been obtained by chance? Consult the table on page 14. It illustrates how to calculate a 95% confidence interval for a measure of relationship such Ø. The 95% confidence interval means that 95 times out of 100 we would expect the relationship we calculate to be between a particular upper and lower value that we can calculate. If the confidence interval includes the value, we have a significant relationship. In our example (where Ø - .62) the 95% confidence interval for 20 cases is +.22 to +.83. (The table shows the confidence limits for a correlation (Ø) of .60. We used more detailed tables for Ø - .62 but the values shown can be used for most purposes.) In other words, with 20 cases our value of I might actually be as low as +.22 or as high as +.83.

Conclusion; There is a relationship between Age and Willingness to Volunteer. We can make this statement with 95% confidence. How strong is the relationship? This is a tricky question. A general rule of thumb used by researchers is:

Size of correlation	Strength of relationship
From 0.0 to .30	low
From .31 to .60	moderate
From .61 to 1.00	high

The larger the value of 0 the more one variable is predictable from the other. if the relationship between Age and Willingness to Volunteer had been 1.0 then knowing a person's Age would mean that we could predict perfectly whether or not s/he would Volunteer. On the other hand, if the value of 0 were 0 then we could not predict anything about volunteering given a person's age.

A correlation of +.22 is in the low range, while a correlation of +.83 is in the high range. A safe statement would be 'There is a moderate correlation between Age and Willingness to Volunteer'. Sometimes, researchers use the statistic and include the probability associated with the statement. In this case they would add, '(0 = +.62, 95% confidence limits +.22 to +.83)' or '(0 = +.62, p<.05)' . The last part of the addition (...p<.05) means the probability of being wrong (i.e. the probability that the correlation is 0) is less than .05 or 5%.

How to find the 95% confidence interval
for Phi (Ø)

Step 1. Find the value of Ø in Column 1 (if your Ø is negative then the plus and minus signs in the table are all reversed.)

Step 2. Find the number of observations or cases you have in your analysis at the top of the table.

Step 3. Look across the row where you found your value of Ø and down the column where you found the number of cases in your analysis.

Column 1	10	20	50
.95	.80 to 1.00	.90 to .99	.94 to .96
.90	.60 .98	.75 .97	.83 .94
.85	.45 .97	.64 .94	.75 .91
.80	.33 .95	.55 .92	.67 .88
.75	.22 .94	.45 .89	.60 .85
.70	.10 .92	.37 .87	.54 .82
.65	.03 .90	.28 .84	.47 .78
.60	-.05 .88	.20 .82	.40 .75
.55	-.12 .86	.14 .79	.33 .72
.50	-.18 .84	.07 .77	.26 .68
.45	-.25 .83	0.0 .74	.20 .65
.40	-.30 .80	-.05 .70	.15 .61
.35	-.35 .78	-.11 .67	.08 .57
.30	-.40 .76	-.16 .65	.03 .53
.25	-.43 .73	-.22 .62	-.03 .49
.20	-.47 .71	-.25 .58	-.08 .45
.15	-.50 .69	-.31 .55	-.13 .41
.10	-.54 .67	-.35 .52	-.18 .37
.05	-.57 .64	-.40 .47	-.23 .32
0	-.60 .60	-.44 .44	-.28 .28

*Note: If the number of observations in your analysis lies between 10 and 20 use the figures for 10 observations to be ultra-safe. Use the figures for 20 observations if you have between 20 and 50. if you have 100 or more cases you may wish to consult a statistics text such as Statistical inference by H.M. Walker, and J. Lev., Holt Rinehart and Winston, 1953.

Spearman Correlation (r_s)

The Spearman correlation can be used when you want to find out if there is a relationship between two ordinal variables. In simple English, when you have scores on each variable instead of a simple Yes : No, Male : Female or High : Low. In many cases divisions of scores into High : Low are simply short-cut ways of treating a variable that actually has a range, in order to relate it to a dichotomous or two-point scale such as Agree : Disagree or two categories such as Male : Female. (The proper correlation when one variable is dichotomous and the other is a scale, is either a 'rank biserial' or a 'point biserial'. Both are dealt with in other standard statistics texts listed in the Bibliography of this booklet.)

Imagine that you want to see if there is a relationship between any of the variables in Column A with any of those in Column B.

Column A	Column B
a. Age	f. Number of days of holiday taken per annum
b. Number of years of schooling	g. Donations to youth centre
c. Income per annum	h. Community involvement
d. Annual entertainment budget	i. Distance traveled for major vacation
e. Participation in local sports	

In our example, we will use income per annum and Distance traveled for major vacations. (In an actual research project you might only obtain income data in broad ranges. The figures given here are created to illustrate the ranking procedure.)

What might we expect? (a) That high income earners travel furthest because they can afford to? (b) That high income earners can afford more recreational pursuits throughout the year and therefore travel shorter distances? (c) That there is no relationship? If the outcome is (a) it is a positive correlation; if the result is (b) it is a negative correlation and in (c) there is a correlation of 0.

How to calculate Spearman (r_s)

Step one:

Prepare a data table. We have prepared the table in three parts to illustrate the recording of the information on each variable.

Part 1

Respondent Number (Sample of 20)	Total Family Income (x)	Rank of Income 1 to 20	
01	$12,621	13	
02	9,993	4	
03	13,825	14	
04	14,500	15	
05	8,326	2	
06	12,321	12	
07	16,005	16	
08	10,00[illegible]	5	
09	8,000	1	← Lowest income given
10	12,050	11	lowest rank of 1
11	10,007	6	
12	24,000	20	← Highest income given
13	9,226	3	highest rank of 20
14	18,225	17	
15	19,821	18	
16	10,421	7.5 = 7*	
17	10,421	7.5 = 8	
18	10,900	9	
19	11,003	10	
20	21,550	19	

* There are elaborate ways of handling tied ranks and there are also simple ways. Choose the simple ones. They involve random methods such as flipping coins so that a Heads is given the higher of the tied ranks; or deciding that if two or more persons are tied at some rank, then the name with the fewest letters is given the highest rank; or the respondent number is used to break the tie with the lower number being given the lower rank, etc.

Part 2

Respondent Number (Sample of 20)	Distance Travelled (y)	Rank of Distance 1 to 20	
01	850 km	12	
02	625	5	
03	1,350	16	
04	1,400	17	
05	520	2	
06	990	13	
07	1,700	18	
08	600	4	
09	500	1	← Lowest distance travelled given lowest rank of 1
10	700	9	
11	675	7	
12	2,000	19	
13	525	3	
14	1,000	14	
15	1,200	15	
16	680	8	
17	650	6	
18	710	10	
19	790	11	
20	2,100	20	← Greatest distance travelled given highest rank of 20

The next table calculates any differences in the ranks assigned to each respondent on each variable.

x is the rank for Income

y is the rank for Distance

Part 3

Respondent Number	Rank on x	Rank on y	Difference (d) Rank x - Rank y	Squared Difference d^2 = d x d
01	13	12	1	1
02	4	5	-1	1
03	14	16	-2	4
04	15	17	-2	4
05	2	2	0	0
06	12	13	-1	1
07	16	18	-2	4
08	5	4	1	1
09	1	1	0	0
10	11	9	2	4
11	6	7	-1	1
12	20	19	1	1
13	3	3	0	0
14	17	14	3	9
15	18	15	3	9
16	7	8	-1	1
17	8	6	2	4
18	9	10	-1	1
19	10	11	-1	1
20	19	20	-1	1
			Total d^2 =	48

Step two:

Calculate r_s. There are six steps in this calculation. They are summarized on the left and illustrated on the right.

1. Add all the d^2 terns and multiply this total by $6 = 6d^2$	6 x 48 = 288
2. Multiply the number (n) of respondents or cases by itself, and subtract 1 from the result $= (n^2 - 1)$	(20 x 20) - 1 = 399
3. Multiply the result of step 2 by n $= n\ (n^2 - 1)$	20 x 399 - 7,980
4. Divide the result of Step 1 by the result of Step 3 $= \frac{6d^2}{n\ (n^2 - 1)}$	$\frac{288}{7,980} = .36$
5. Subtract the result of Step 4 from 1.00 $r = 1.00 - \frac{6d^2}{n(n^2-!)}$	r = 1.00 - .36 = .64

Step three:

Evaluate r_s. The result of this example is almost identical to the one obtained for Ø in the previous example. The sane interpretations would be in order: There is a moderate to high positive correlation between annual income and distance traveled for a major vacation (r_s = +.64, p < .05). The 95% confidence level for r_s can be obtained as shown below:

95% Confidence Level for Spearman Correlation (r_s) from different sized samples

Size of Sample (number of paired observations)	Minimum Value of r_s significant at 95% confidence level
4	1.00
5	.90
6	.83
7	.71
8	.64
9	.60
10	.56
15	.44
20	.38
25	.33
30	.31

Chi-squared Test (X^2)

The Chi-squared test (chi is pronounced as 'sky' - without the "s") is similar to the Ø correlation because it deals with data that can be put into categories. It is more flexible though; it can handle as many categories as you have for any number of variables. X^2 is useful in evaluation studies when we want to compare frequencies in different categories between two programs or between different groups taking the same program.

Here is an example of how X^2 is used. Suppose you draw two samples of 100 each from a community in order to do some research. You want to assure yourself that the samples are equivalent on a number of criteria. These might be age, sex, ethnic grouping, etc. Let's look at the last factor, ethnic composition, to see how an X^2 would be used.

First, a contingency table would be prepared which showed the ethnic composition for each sample:

	Sample		Totals
Ethnic Group	1	2	Totals
Jewish	20	18	38
Italian	17	20	37
West Indian	13	18	31
Central European	12	11	23
Oriental	8	13	21
Others	30	20	50
Totals	100	100	200

Next, an X^2 would be calculated. The X^2 is then compared to a published table which gives the 1% and 5% confidence Levels for various sizes of X^2 for contingency tables of different sizes. Finally, you can decide whether there is any basis for saying that the two samples differ by more than you would expect by chance during the selection of the sample.

Here is another illustration: 60 people are interviewed after attending a particular fitness program (Program A). The program is then changed in some way, and another sample of 60 people is interviewed after completing Program B. The interview contained a question that asked, 'How satisfied were you with the overall quality of the program you just completed?'

Very satisfied	1
Satisfied	2
Neutral	3
Dissatisfied	4
Very Dissatisfied	5
No opinion	6

The results were as follows:

Category of Response	Program A	Program B	Total
1	5	10	15
2	10	15	25
3	30	8	38
4	9	7	16
5	6	17	23
6	0	3	3
Total	60	60	120

Is there a relationship between the answers to the question concerning satisfaction and the particular program that was experienced? It is clear that Program B has more positive (satisfied) evaluations, but it also has more negative ones as well. Are there any real differences in the two sets of results? X^2 answers this type of question. (If you follow the calculations outlined in the next five pages you will find that the two groups give significantly different sets of answers to the question of how satisfied they are; $X^2 = 23.9$.df = 5, $p<.05$).

How to calculate Chi-squared (X^2)

Step one:

Prepare a data table of observed frequencies. To simplify our calculations we'll use a contingency table with only six cells. We want to know whether two groups differ in terms of three very broad age groupings. The number in the upper left hand corners of each cell is simply for identification, it will cone in handy later.

Age Category	Group 1	Group 2	Totals
Under 30	1 20	2 30	50
30-64	3 50	4 130	180
Over 64	5 30	6 40	70
Total	100	200	300

Step two:

Calculate expected frequencies. The X^2 test is based on comparing what we actually observe in the contingency table with what we would expect to observe.

In our example, we observe 20 out of 100 persons in Group 1 belong to the under-30 age category. This is 20%. But, in Group 2 we observe 30 out of 200 persons in this age category. This is 30/200 = 15%. What should we expect, 15% or 20%? The difference seems to be due to which group we look at. Instead of looking at individual groups we could use the figures for the total of both samples which is 50 persons — the total of the first row of the contingency table.

Using the marginal totals we would expect 50/300 persons in the Under 30 category. This fraction (50/300) is equal to 1/6 or 16.6%. In other words, for a sample of 100 people (Group 1) we would expect 16.6 x 100 = 16.6 persons under 30 years of age; in Group 2 we would expect 16.6 x 200 = 33.2 persons under 30. Of course we can't have .6 of a person or .2 of a person but if we keep these decimal fractions the calculation of X^2 is more accurate.

Let's summarize how to calculate the expected frequencies.

1. Get the marginal totals for each row of the contingency table (e.g. 50, 180, and 70).

2. Get the total of all the rows (or all the columns). This is the grand total (e.g. 300).

3. Find the ratio or fraction which each marginal total is of the grand total (e.g. 50/300, 180/300, and 70/300).

4. Use the fractions from step 3 to calculate the expected frequencies for each row by multiplying the column (group) total by the row fraction. Step 4 is done as follows:

		Group 1	Group 2	
Age Category	Under 30	1 $100 \times \frac{50}{300} = 16.6$	2 $200 \times \frac{50}{300} = 33.4$	50
	30 - 64	3 $100 \times \frac{180}{300} = 60.0$	4 $200 \times \frac{180}{300} = 120.0$	180
	Over 64	5 $100 \times \frac{70}{300} = 23.4$	6 $200 \times \frac{70}{300} = 46.6$	70
				300

Step three:

Calculate X^2. This is a six-step procedure:

1. Prepare a new table that shows the observed and expected frequencies for each cell in the contingency table.

Cell No.	Frequencies: Observed O	Frequencies: Expected E
1	20	16.6
2	30	33.4
3	50	60.0
4	130	120.0
5	30	23.4
6	40	46.6

2&3. Extend the table by calculating the difference between O and E for each cell (O minus E) and then squaring the difference (O - E) x (O - E).

Frequencies

Cell No.	Observed O	Expected E	(O - E)	$(O - E)^{2}$*
1	20	16.6	+3.4	11.56
2	30	33.4	-3.4	11.56
3	50	60.0	-10.0	100.00
4	130	120.0	+10.0	100.00
5	30	23.4	+6.6	43.56
6	40	46.6	-6.6	43.56

* Note: When you square a number the result is always positive.

4. Divide each $(0 - E)^2$ by E for that cell = $\frac{(0 - E)^2}{E}$

Cell No.	Frequencies O	Frequencies E	(O - E)	$(O - E)^2$	$\frac{(O - E)^2}{E}$
1	20	16.6	-3.4	11.56	11.56/16.6 = .74
2	30	33.4	+3.4	11.56	11.56/33.4 = .35
3	50	60.0	-10.0	100.00	100.00/60.0 = 1.67
4	130	120.0	+10.0	100.00	100.00/120.0= .84
5	30	23.4	-6.6	43.56	43.56/23.4 = 1.86
6	40	46.6	+6.6	43.56	43.56/46.6 = .93
					Sum = 6.39

5. Calculate X^2

Add up all values of $\frac{(0 - E)^2}{E}$

X^2 = Sum of $\frac{(0 - E)^2}{E}$ $X^2 = 6.39$

6. Calculate 'degrees of freedom'

Calculate df, a figure based on the number of rows (r) minus 1, and the number of columns (c) minus 1, of the contingency table. The formula for df is the same regardless of the size of the contingency table. It is always equal to (the number of rows - 1) times (the number of columns - 1).

$df = (r - 1) \times (c - 1)$

$df = (3 - 1) \times (2 - 1)$
$= 2 \times 1$
$= 2$

Step four:

Evaluate X^2. Consult the following table (page 26) which shows the 5% significance levels for various df's from 1 to 30. In our example we would use the line for df = 2. if our X^2 is as large or larger than the value given in the column marked '5% level' i.e. 5.99, we can say that there is a significant difference between the X^2 we obtained, and one we might expect by chance alone. Or, we could also say that the observed frequencies in our example are significantly different from one another. That is, the age distributions for the two samples or groups were not equivalent ($X^2 = 6.39$, $p. < .05$).

Values of X^2 which
are significant at the 5% level

df degrees of freedom	X^2	df	X^2
1	3.84	16	26.30
2	5.99	17	27.59
3	7.81	18	28.87
4	9.49	19	30.14
5	11.07	20	31.41
6	12.59	21	32.67
7	14.07	22	33.92
8	15.51	23	35.17
9	16.92	24	36.42
10	18.31	25	37.65
11	19.68	26	38.89
12	21.03	27	40.11
13	22.36	28	41.34
14	23.69	29	42.56
15	24.99	30	43.77

SECTION 2
Selecting the Right Test
of Differences

• Question 1: Are you dealing with two sets of scores* from the same individuals?

☐Yes → Go to Page 30 (Sign-test)
☐No → Go to Question 2

*The scores can be either:

Quantitative			or	Qualitative				
Participant	Pre-test	Post-test		Pair	Group 1		Group 2	Which is better?
A	16	20		1	A_1	vs	A_2	A_1
B	18	18		2	B_1	vs	B_2	B_2
C	14	17		3	C_1	vs	C_2	C_2
D	19	18		4	D_1	vs	D_2	D_1
Are the two sets of scores the same or different?				Are the two groups equivalent?				

• Question 2: Are you dealing with two sets of scores* each from a different group?

☐Yes → Go to Page 36 (t-test)
☐No → Go to Question 3

* Group 1	2
28	32
16	16
14	13
58	61

Is there a difference in the average scores of the two groups?

• Question 3: Are you dealing with percentages* (or proportions) representing two possible answers?

Go to Page 42 (Test of proportions)
Go to Page 5, Question 2

☐Yes → * 42% of Group 1 Agree with issue
☐No → 61% of Group 2 Agree with issue

Do the groups differ?

Tests of Differences

In Section 1 we looked at ways to describe and to test the significance of relationships between pairs of variables. In this section, we look at ways of testing for differences between sets of measures. We will present only a few of the many ways of assessing differences. In our experience many (not all) basic questions in research and evaluation studies can be answered using one of these few techniques. If your study demands additional or different analyses we suggest using a consultant and/or referring to one of the texts listed at the end of this section.

Significance. The basic question to be answered in this section is, 'When is a difference significant?' In other words, when is an observed difference so much greater than what you would expect by chance, that you decide it is real? Or, put another way, could the difference you found between two groups (or two sets of scores) be easily 'explained away' on the basis of chance, or sampling error, or other random factors?

Here is an example of how this question might arise:

A local Parks and Recreation Board conducted a survey of community attitudes towards various community centres. The level of satisfaction was measured through a series of attitude questions and a Total Satisfaction Score was obtained for each of several samples from the city. The average Satisfaction Scores for these samples were:

Sample	Avg. Satisfaction Score
Male Teenagers (n=18)*	12.0
Female Teenagers (n=22)	14.0
Male Adults (Under 65) (n=30)	20.5
Female Adults (Under 65) (n=42)	25.6
Male Seniors (65+) (n=20)	17.8
Female Seniors (65+) (n=24)	24.0

* n is the number of persons interviewed.

Here are other ways of presenting these data:

Sample	Avg. Satisfaction Score
Males (n=68)	17.5
Females (n=88)	22.3

or

Teenagers (n=40)	13.1
Adults (n=72)	23.5
Seniors (n=44)	21.2

What would you conclude about these average scores? Would you be willing to say:

(a) Females have a higher satisfaction score than males? yes ( ) no ( )
(b) Adults have higher scores than teenagers? yes ( ) no ( )
(c) Adults have higher scores than seniors? yes ( ) no ( )
(d) Female teenagers have higher scores than male teenagers? yes ( ) no ( )

The answer to each of these questions is 'Yes' for (a) 22.3 is greater (higher) than 17.5; for (b) 23.5 is greater than (13.5), etc. But, how confident do you feel about saying that Female Teenagers are more satisfied than Male Teenagers (14.0 vs. 12.0) when you can see the other pairs of averages have a much larger difference: for example Adults vs. Teenagers (23.5 vs. 13.1)?

Could the difference between the two teenager groups be due to factors in the interview, or the smaller number of responses; or factors other than the sex differences between the groups?

A difference is a difference. BUT a difference might not be a significant difference. If you can 'explain away' the difference on the basis of random or chance factors, then it's not a significant difference.

Importance. A difference might or might not be significant (statistically). Whether the difference is significant or not you have to decide if it's important. Sometimes, a 15% difference in a research study of attitudes couldn't matter Less; but, it you were testing a drug, a 15% difference in 'cures' could be of enormous importance, or if you were attempting to improve a high jumper's maximum jump, a 15% difference would be sensational.

Sign-test

The 'sign' test is so named because when we use it we ignore the size of differences between scores; instead we look only at the direction of the difference. For example, here are two small sets of scores:

	Scores		Difference
Individual*	Set 1	Set 2	(Set 2 - Set 1)
Smith	12	26	+14
Jones	18	18	0
Brown	21	19	-2

*In this example, we have assumed there are three individuals, each with two scores. The example could also have used groups, or classes of individuals.

To use the sign test, we ignore the original sets of data; we ignore the actual differences (14, 0, 2) and use only the signs (+ and -). In this way we lose a lot of information but we gain a very simple technique that can be quickly applied.

How to calculate a sign-test (for 25 or fewer outcomes)*

Step one:

Prepare a data table

Individual	Scores		Differences	Sign
	Before Program	After Program	(After Score) - (Before Score)	of Difference
01	22	18	-4	-
02	13	17	+4	+
03	18	22	+4	+
04	26	21	-5	-
05	25	25	0	Discard
06	17	25	+8	+
07	14	10	-4	-
08	13	16	+3	+
09	18	18	0	Discard
10	19	23	+4	+
11	12	13	+1	+
12	10	18	+8	+
13	18	19	+1	+
14	11	8	-3	-
15	26	27	+1	+
16	15	17	+2	+
17	16	19	+3	+
18	12	19	+7	+
19	11	17	+6	+
20	18	15	-3	-

Step two:

Perform the sign test.

1. Eliminate ambiguous or equivalent results — discard the 0 for individuals 105 and 109. This leaves a total of 20-2 = 18 outcomes to be used in the analysis.

2. Sort the outcomes.

Count the number of + signs = 14
Count the number of - signs = 4
Check the total 18

3. Note the smaller category of outcome

Number of + signs = 14
Number of - signs = 4 Smaller category = 4

* For more than 25 outcomes see page 34.

Step three:

Evaluate the result.

1. Note the number (n) of outcomes used in the analysis = 18
2. Note the size (x) of the smaller category of outcome = 4

3. Decide on your significance level. Usually a 5% level is used. If on the basis of your sign test, you conclude that one set of scores (or one group) is different from the other, you may be wrong 5% of the time (in other words you have a 1/20 chance of drawing a false conclusion). On the other hand, you will be right 95% (19/20) of the time.

4. Use the following table to see whether your result is significant at the 5% level. This table tells you whether you have a significant difference in either direction; that is whether scores increased significantly or decreased significantly as a result of the program, or whether School A's students were better than School B's and so on.

Sign Test for 25 or Fewer Outcomes

Number of outcomes (n)	Smaller category (x) cannot be larger than values given below for significance
5	0
6	0
7	0
8	0
9	1
10	1
11	1
12	2
13	2
14	2
15	3
16	3
17	4
18	4
19	4
20	5
21	5
22	6
23	6
24	6
25	7

) n for our example is 18 — (1) — (2) → Compare this value to our value of x

5. Find the number of outcomes (n) in the table. This is marked (1) in the table.

6. Go across the table at this point to the maximum value for x. This is shown by the arrow (2). The value at this point is 4.

7. Observe that the value for our example is x = 4. Therefore, the value of our smallest category is not greater than the tabled value for 18 outcomes even though it is the same as the tabled value.

Conclusion: There is a statistically significant difference between the two sets of scores. We can make this statement because we obtained a very unlikely set of outcomes. If the scores before and after the program were random then we would expect a 50:50 split in + and -.

For 18 outcomes we would expect: nine+ and nine-, by chance alone. A result of fourteen+ and four- is quite unlikely by chance. We conclude that there is a significant difference and we can make this conclusion with a 5% chance of error.

How to calculate *a* sign-test (for more than 25 outcomes)
Follow steps one and two so you have

n: the number of outcomes and
x: the size of the smaller category.

There are now five more steps to perform, which yields a statistic called z.

Step three:

Calculate z

(Let's assume that n = 26 and x = 6)

1. Multiply x by 2	6 x 2 = 12
2. Add 1 to this result	1 + (6 x 2) = 13
3. Subtract this result from the number of outcomes n - (2x +1)	26 - 13 = 13
4. Calculate the square root* of n = $\sqrt{n}$	$\sqrt{26}$ = 5.1
5. Divide the result of step 3 by the result of step 4 $\frac{n - (2x + 1)}{\sqrt{n}} = z$	$\frac{13}{5.1}$ = 2.55 = z

Step four:

Evaluate z

The significance levels for z are as follows:

z	Significance Level
1.96	.05 (5%)
2.58	.01 (1%)

Our obtained z score is greater than 1.96 which is the size of z required to be significant at the 5% level.

Therefore, we can conclude that for 26 outcomes, with 6 in the smaller category there is a significant difference in the two sets of scores (or sets of evaluations).

* Note: Use a hand calculator to calculate the square root, or find the answer in a reference book such as: H. Arkin and R. R. Colton, Tables for Statisticians, College Outline Series. (Barnes and Noble, Inc., 1950).

Note: In the sign test example that begins on page 30 , we have used quantitative (numerical) scores. However, the sign test will also work with qualitative (judgment-based) results. The data for the analysis could consist of + representing 'better than', 0 representing 'equal' and - representing 'worse than'. In this case the data table might be based on a series of judgments or comparisons about members from two different groups. For example, suppose there was a competition between two schools in a subject such as debating, or in a skill such as rhythmic exercises. Also suppose there were 20 students from each school and that they debated in pairs against one another (or demonstrated their skills), one from school A followed by one from school B. After each pair of debaters (or gymnasts) completed their presentation, a judge (or group of judges) decided which member of the pair was best, or whether the two were equal.

The data table would look like this:

Pair	Judgment of quality
A_1 vs B_1	-
A_2 vs B_2	+
A_3 B_3	+
A_4 B_4	-
A_5 B_5	0
etc.	etc.

Note: + means B is judged to be better than A.

- means A is judged to be better than B.

0 means A and B are equivalent

To complete the sign test calculation, follow from step 2, Page 31.

The t-test

The t-test is one of the most frequently used statistical tests in research. It is designed to test the significance of the difference between two means (averages) when we have scores or measures for two groups of individuals. These scores or measures may involve such factors as ages, or weights, or the results of some performance test. We may wish to know if the difference in the average score for the group is statistically significant.

In many cases we could use the sign test described earlier but it ignores the sizes of the differences between pairs of scores. The t-test uses all the data, not just the direction of the difference. Also, in the sign test, the groups must be of the same size. The t-test can be used to test for differences of means between groups of unequal size.

Let's assume we have the following results from two groups of golfers. Each score represents the best round played during the qualifying round of a tournament. We want to know whether there is a significant difference between the groups because one group has been involved in a special training procedure using videotape. The other group had the same number of practice rounds and amount of instruction, but did not use the VTR.

	Best Qualifying Score		
	Group 1 (Using VTR)	Group 2 (Normal)	
Jones	72	73	O'Toole
Bardolini	78	80	James
Smith	83	71	MacGregor
Green	69	67	Schwartz
Black	80	81	Greenglass
White	75	74	Webster
O'Henry	74	85	Hennessey
Dimitrik	72		
D'Agosto	70		

We will call the VTR group the Experimental group and the 'Normal' group the Control or Comparison group. This helps identify their scores as E scores and C scores.

How to calculate a t-test (A step-by-step 'cookbook' approach)

Step one:

Prepare a Data Table

E		C	
Group 1 (using VTR) Score (X_E)	Score Squared (X^2_E)	Group 2 (Normal) Score (X_C)	Score Squared (X^2_C)
72	5184	73	5329
78	6084	80	6400
83	6889	71	5041
69	4761	67	4489
80	6400	81	6561
75	5625	74	5776
74	5476	85	7225
72	5184		
70	4900		
Totals			
$*\Sigma X_E = 673$	$*\Sigma X^2_E = 51,176$	$\Sigma X_C = 531$	$\Sigma X^2_C = 40,821$
number of E (VTR) scores = 9 ($n_E = 9$)		number of C (Normal) scores = 7 ($n_C = 7$)	

In this data table we show not only the 'raw' scores for the two groups (E) and (C) but also the square of each of these scores. Each column of figures is also tallied.

Step Two:

Calculate t

1. Calculate the mean for each group
    a. Take the sum of the E scores and divide by the number of scores

$$\bar{X}_E = \frac{\Sigma X_E}{n_E} \qquad \frac{673}{9} = 74.78$$

* Σ is the Greek letter Sigma. It stands for addition or summation.

ΣX_E means: the sum of all the X_E scores

ΣX_E^2 means: the sum of all the squared X_E scores

$(\Sigma X_E)^2$ means: the square of ΣX_E

b. Take the sum of the C scores and divide by the number of C scores.

$$\bar{X}_C = \frac{\Sigma X_C}{n_C} \qquad \frac{531}{7} = 75.86$$

2. Calculate the actual difference (d) in means

$$d = \bar{X}_E - \bar{X}_C \qquad d = 74.78 - 75.86 = -1.08$$

The Experimental group (the VTR group) had an average score which was 1 stroke less (better) than the Control group (the "Normal" group). Is this observed difference greater than what we would expect by chance?

3. Calculate the expected or chance difference (84) in means. (In this calculation we create a number that is called the sampling distribution of the means. It tells us what size difference between the means we might expect by chance alone. It is based on the number of persons in each group and on the way their scores differ from each other).

a. Subtract 1 from each n

$(n_E - 1)$ $\qquad 9 - 1 = 8$

$(n_C - 1)$ $\qquad 7 - 1 = 6$

b. Add $(n_E - 1)$ to $(n_C - 1)$

$= (n_E + n_C - 2)$ $\qquad 9 + 7 - 2 = 14$

c. Divide 1 by each n

$\frac{1}{n_E}$ $\qquad \frac{1}{9} = .111$

$\frac{1}{n_C}$ $\qquad \frac{1}{6} = .167$

Add the results

$\frac{1}{n_E} + \frac{1}{n_C}$ $\qquad .111 + .167 = .278$

4. Calculate a term called the variance (s_E^2) for each group.

$$s_E^2 = \frac{\Sigma X_E^2 - (\Sigma X_E)^2 / n_E}{n_E - 1}$$

Each step in calculating this brute is shown on Page 39.

a. Take the sum of the X_E^2 scores — (a) $\Sigma X_E^2 = 51,176$ (see Data Table on page 37)

b. Square the sum of the X_E scores — (b) $(\Sigma X_E)^2 = 673 \times 673 = 452,929$

c. Divide this last number by n_E — (c) $\frac{(\Sigma X_E)^2}{n_E} = \frac{452,929}{9} = 50,325$

d. Subtract the result of (c) from (a) — (d) $\Sigma X_E^2 - \frac{(\Sigma X_E)^2}{n_E}$ = 51,176 − 50,325 = $s_E^2 = 851$

Repeat the above for s_C^2

$$s_C^2 = \frac{X_C^2 - (\Sigma X_C)^2/n_C}{n_C - 1}$$

(a) $\Sigma X_C^2 = 40,821$

(b) $(\Sigma X_C)^2 = 531 \times 531 = 281,961$

(c) $\frac{(\Sigma X_C)^2}{n_C} = \frac{281,961}{40,280}$

(d) $\Sigma X_C^2 - \frac{(\Sigma X_C)^2}{n_C}$ = 40,821 − 40,280 = $s_C^2 = 541$

5. Multiply s_E^2 by $(n_E - 1)$

Result in Step 4 times result of Step 1

$s_E^2 \times (n_E - 1)$ 851 x 8 = 6808

6. Multiply s_C^2 by $(n_C - 1)$

   Result in Step 4 times result of Step 1

   $s_C^2 \times (n_C - 1)$ $\qquad$ $541 \times 6 = 3246$

7. Add the results of Steps 5 and 6

   $s_E^2 (n_E - 1) + s_C^2 (n_C - 1)$ $\qquad$ $6808 + 3246 = 10054$

8. Divide result of Step 7 by results of Step 2

   $$\frac{s_E^2 (n_E - 1) + s_C^2 (n_C - 1)}{(n_E + n_C - 2)}$$

   $$\frac{10054}{14} = 718$$

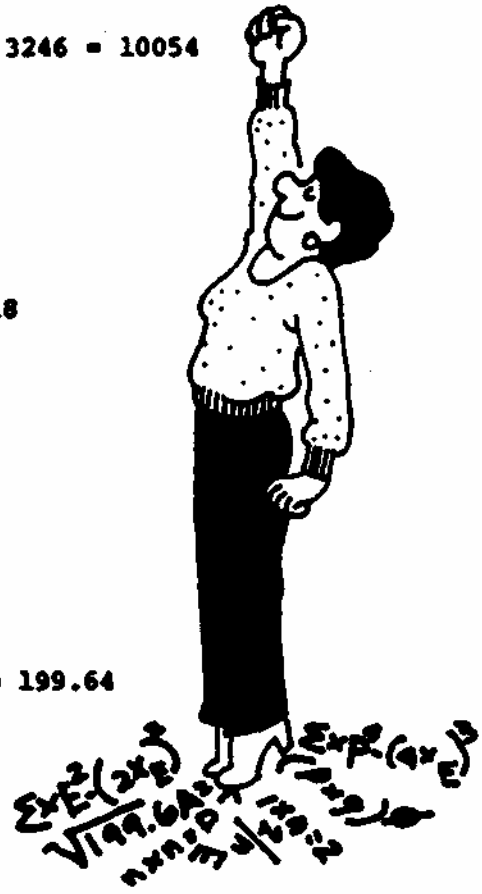
9. Multiply result of Step 8 by results of Step 3 to obtain s_d^2 =

   $$\frac{s_E^2 (n_E - 1) + s_C^2 (n_C - 1)}{(n_E + n_C - 2)} \times \left(\frac{1}{n_E} + \frac{1}{n_C}\right)$$

   $718 \times .278 = 199.64$

10. Take the square root of the result of Step 9

    $\sqrt{s_d^2} = \sqrt{199.64} = 14.13$

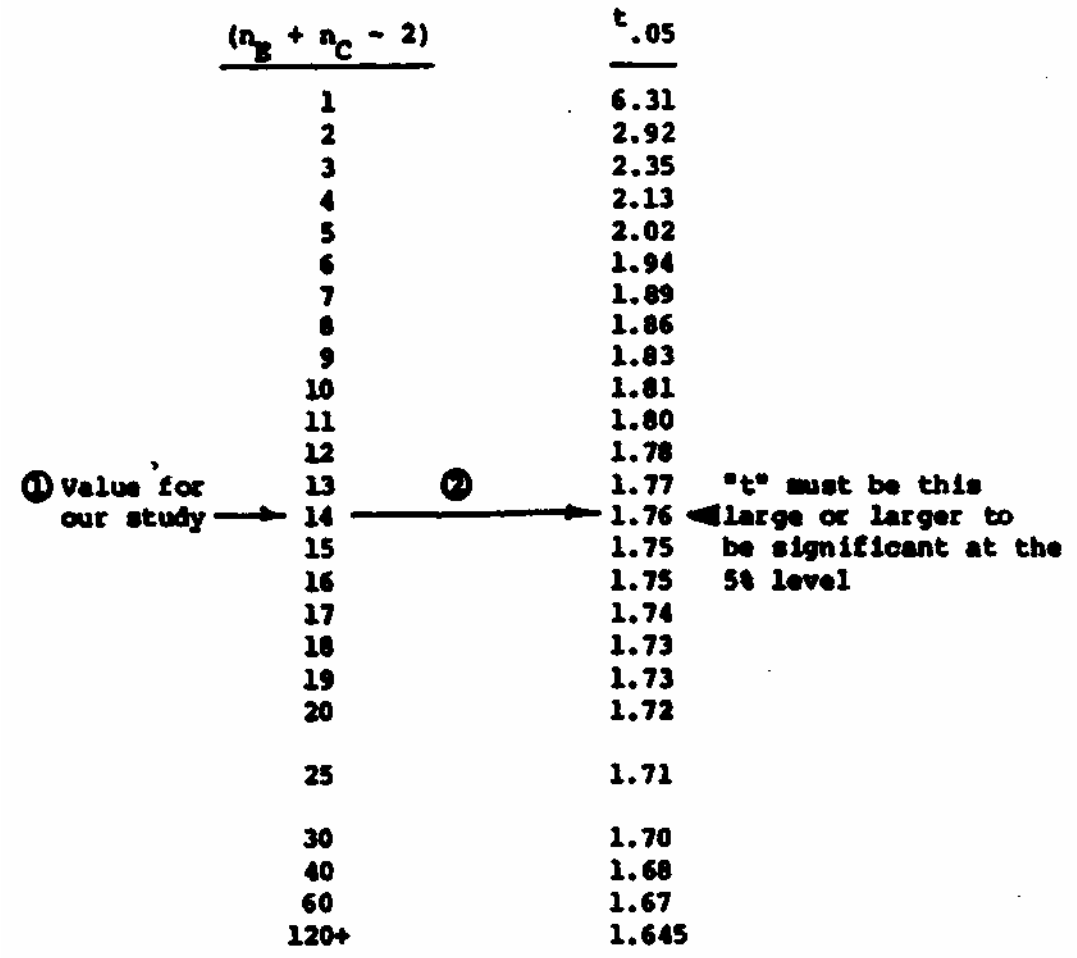


4. Compare the obtained difference in means to the expected difference

$$t = \frac{d}{S_d} = \frac{\bar{X}_E - \bar{X}_C}{S_d} \qquad t = \frac{-1.08}{14.13} = -.07$$

Notice that in calculating t we compare observed difference in means to expected (or chance) differences. This is similar in some ways to comparing 0 (observed) frequencies to E (expected) frequencies in calculating X^2.

Step three:
Evaluate t. Consult the following table:



We enter the table from the left at the row equal to the value of Step 2 in our calculations (i.e. $n_E + n_C - 2$) (Technically, this is referred to as the 'degrees of freedom' for our test). Opposite this value is the size of t which is significant at the .05 level. Anything smaller than this value (1.76 in our study) is not significant.

We conclude, therefore, that the difference in means between our two groups is not statistically significant. The average difference of 1 stroke could just as easily have occurred by chance as by the influence or impact of the VTR training program.

Difference in Proportions

Frequently, we run into a situation where we want to know if two proportions or percentages are different. Example 1. We might have two subsamples, say those 25 years or older and those under 25 years of age. Suppose we asked their preference for various recreational activities and found the following results:

	Age of Respondent		
Involved in:	Younger (Under 25)	Older (25 or over)	Total Sample
Indoor Activites	25	37	62
Outdoor Activites	50	53	103
Totals	75	90	165

Converting this data to proportions (i.e. 25/75; 37/90,etc.)we obtain the followino table:

	Age of Respondent			
	Under 25	Over 25	Total	
Activities:				
Indoor	.33	.41	.38	(62/165)
Outdoor	.67	.59	.62	(103/165)

The research question is, does the proportion of those under 25 who prefer indoor activities (.33) differ from the pro-portion of older respondents who prefer indoor activities (.41)?

Example 2.

Another example might involve two groups who are asked if they favor program A or program B. The data would look like this.

Program Favored:	I (Sample of 22)	II (Sample of 13)	Total Sample
A	12 (.54)	8 (.62)	20 (.57)
B	10 (.46)	5 (.38)	15 (.43)
	22 (1.00)	13 (1.00)	35 (1.00)

For these examples we can substitute some letters for the sample sizes and the proportions as follows:

	Group 1	Group 2	Combined 1 & 2
A	P_1	P_2	P
B	q_1	q_2	Q
Size of group	N_1	N_2	N

P_1 is the proportion of Group 1 who gave A as an answer
q_1 is the proportion of Group 1 who gave B as an answer
P_2 is the proportion of Group 2 who gave A M an answer
q_2 is the proportion of Group 2 who gave B as an answer

P is the proportion of Group 1 and 2 combined who gave A as an answer
Q is the proportion of Group 1 and 2 combined who gave B as an answer
N_i it the number of people in Group 1
N_2 is the number of people in Group 2
N is the number of people in both groups combined ($N_i + N_2$)

To test the difference between P_1 end P_2 (Example 2)

1. Calculate the difference in the proportions p_1 and P_2	
$(P_1 - P_2)$	.54 - .62 = -.08
2. Multiply P x Q	.57 x .43 = .245
3. Multiply the result of Step 2 by N	
N (P x Q)	35 x .245 = .06
4. Multiply N_1 by N_2	22 x 13 = 286
5. Divide the result of Step 3 by the result of Step 4	
$\frac{N\ (P \times Q)}{N_1 \times N_2}$	$\frac{.06}{286}$ = .0002097
6. Calculate the square root of the result of Step 5	
$\sqrt{\frac{N(P \times Q)}{N_1 N_2}}$	$\sqrt{.0002097}$ = .014
7. Calculate z by dividing the result of Step 2 by the result of Step 6	
	$\frac{.245}{.014}$ = 17.5

Evaluate the result

We encountered z before in the sign test for situations where we had 25 or more outcomes. The significance levels are the same:

z	Significance Level
1.96	.05 (5%)
2.58	.01 (1%)

It is clear that our z is much greater than the value of 1.96 needed for significance at the 5% level. We conclude, therefore, that there is a significant difference in the proportions of the two groups which prefer indoor activities.

Note: We could have used a X^2 test on this type of data to see whether age level was related to type of activity preferred. The X^2 would actually test both sets of differences at the same time, i.e. differences in proportions preferring indoor activities AND differences in proportions preferring outdoor activities.

The result of a X^2 test would be phrased as a significant relationship. The test for proportions focuses on the significance of the difference between parts of the data table.

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1 Enjoying Research

Table of Contents

Section 2 of 2