8

Surveys

All of you, I'm sure, have been asked to participate in at least one survey. We get them in the mail, we get them via the telephone (especially at dinnertime), we get them on pull-out cards in magazines and journals, and sometimes we are even stopped near voting places and in malls, supermarkets, and street corners by persons wanting us to answer "just a few questions." Why are surveys so ubiquitous? The main answer is that they are the only research tool available to obtain certain kinds of information, namely opinions, preferences, beliefs, feelings, and other personal information. Surveys provide a way to describe a population in quantitative terms.

No matter what type of survey is being considered, the researcher should first establish a clear purpose because the purpose determines, or at least influences, the answers to many of the other concerns a survey researcher must deal with. A second important issue is selecting a sample that will be representative of the population of interest. A third issue is the design of the survey instrument, itself. Before I address each of these issues, I will briefly describe three types of surveys, discussing some advantages and disadvantages of survey research. At the end of the chapter, I will discuss some statistics that are commonly used to analyze the results in survey research.

TYPES OF SURVEYS

Surveys are often thought of in terms of paper questionnaires, which may be the most prevalent type. However, surveys are sometimes conducted online, over the telephone, and in person. In all of these types, the subjects or participants are usually people. However, one can also survey texts as I will discuss later in this chapter. But first, let's begin with the paper questionnaire.

Paper Questionnaires

Paper questionnaires are a relatively easy and inexpensive way to gather data. Sometimes, questionnaires are passed out at meetings to learn member preferences, as in preferences for programs in a particular organization. These surveys are usually rather informal, and the designers don't worry very much about whether the design of the questions will affect the validity of the results. In other situations, paper questionnaires serve a vital information-gathering purpose and represent a sizable investment, so designers think carefully about how various features of the questionnaire might influence the findings.

Paper questionnaires have certain advantages over other types of questionnaires. Because the questions on a paper questionnaire have no intonation, as is the case with phone or person-to-person surveys, they may be less subject to questioner bias. Second, paper questionnaires are less limited geographically because it costs a lot less to mail a survey than it does to send an interviewer to distant locations. Also, paper questionnaires involve a lot less work than phone or person-to-person surveys, and since paper questionnaires can be addressed, stamped, and mailed by untrained personnel, they are less expensive to administer than person-to-person interviews that require trained interviewers. Many paper questionnaires are even constructed so that the answers can be scanned electronically instead of tabulated by hand. Moreover, paper questionnaires provide more of a sense of anonymity for the participants than does a personal interview. Finally, paper questionnaires allow the respondent time to think over answers and choice of time and place for filling out the questionnaire.

On the other hand, if paper questionnaires are sent by mail, some expense is involved: the postage on the original mailing as well as the postage on the self-addressed envelope, enclosed to encourage respondents to answer. Mailed paper questionnaires also have the disadvantage of a low return rate—20–40%, according to Frankfort-Nachmias and Nachmias (1992). Because response rate was typically low in the past, researchers tended to accept responses as useable even though the rate was below 50% (Dillman, 1978); however, now many researchers seek strategies to improve response rates. (For a review of empirical research in this area, see Bradburn, 1983.) Other disadvantages to paper questionnaires are the limited amount of information that can be elicited because follow-up and clarification questions are not possible, as they would be in a personal interview. Also, mailing paper questionnaires may not produce a set of respondents that are truly representative of the population of interest. For one thing, a researcher cannot tell whether the returned questionnaire was filled out by the person it was addressed to or someone else. Furthermore, poor readers and busy persons may simply throw the questionnaire away.

Computer Networks

One way of cutting the expense of mailing the survey and tabulating the returned data is to use computer networks as survey research instruments. Computer-delivered

surveys have a number of other benefits according to Chou (1997). For example, computer-delivered surveys arrive faster as e-mail can be sent to anyplace in the world in just a few seconds, and the sender knows immediately whether the message arrived at the address intended. Further, computer-delivered surveys allow researchers to send the survey, receive replies, and read the data at their own convenience rather than having to get up in the middle of the night to phone someone in a different time zone.

However, two current and major disadvantages to computer-delivered surveys are the limited number of people who can be reached via a computer network, and the skill needed to set up a computerized delivery system (Chou, 1997). Also, I wonder whether persons with Web accounts want their mail filled with surveys. I know how irritated I get when I find a bunch of ads on my account when I log in: it takes too long to go through the list to see what I want to read. Furthermore, I know of instances when newsgroup postings overloaded an account to the extent that the sender could not get through. Perhaps some of the new mail-sorting software will help alleviate this problem, but then I suppose potential respondents could also use the mail-sorter to keep out surveys along with junk mail.

Person-to-Person

Person-to-person surveys can be conducted over the phone, in homes or places of work, or in public locations such as shopping malls. Such surveys often use a paper questionnaire for recording answers, but more and more telephone researchers are recording responses on computers, which certainly facilitates analyzing the data. In the interview-type survey, answers are often tape recorded for future analysis. Of course, participants must be asked if they are willing to have their answers tape-recorded.

Person-to-person surveys, whether personal interviews or telephone surveys have the advantage of allowing flexibility in question wording and order, as well as allowing follow-up questions and probes that can provide a richer depth of information. Such surveys can take advantage of the open-ended interview-type questions typical of exploratory research; and unexpected useful information can pop up during a personal interview or telephone survey. Moreover, person-to-person surveys allow more control over the order in which respondents answer questions—a factor which could be important to the results since some research shows that question order affects response (Balson, 1996). For example, Carpenter and Blackwood (1979) found that in questions using scales for answers, the first and last questions on the questionnaire received the highest and lowest scores on the scale. Additionally, some research indicates that person-to-person surveys have higher participation rates than telephone or mail questionnaires (Yu & Cooper, 1983)—person-to-person surveys certainly have the potential to include people for whom reading is a problem. A final advantage to person-to-person surveys is the speediness of collecting a response. Many times people procrastinate answering mail surveys or even hand-delivered surveys which require writing.

However, person-to-person surveys have numerous disadvantages, not the least of which is cost. Obviously, person-to-person surveys are expensive because they are labor intensive—a trained researcher must personally contact prospective participants and then personally collect the data from each one. If the surveying involves going to people's homes, the interviewer's safety is also an issue, especially in some urban areas.

One variation on the face-to-face technique takes advantage of the higher participation rate gained from the personal touch but involves less time for the researcher. In this combination technique, the researcher contacts potential participants personally at their front door, leaves a copy of the questionnaire, and makes arrangements to return later to pick it up (Babbie, 1990). However, with the rise in crime, many people are now reluctant to open their doors to strangers. One adaptation would be to contact potential participants over the phone or in a public place such as a shopping mall and then give or send them a paper questionnaire to mail back. One of my students is using a combination of paper and a face-to-face approach to collect data from persons in local hair salons. His research interest has nothing to do with hair care—in fact, it concerns preferences for geometric shapes. However, he selected hair salons because both men and women use them, people from most economic and age levels use them, and people using hair salons often have time to kill while waiting their turn. In this case, Harold introduces himself as a student working on a master's thesis and asks potential participants if they would take a few minutes to fill out a questionnaire on design preferences. Of course, Harold obtained permission from the hair salon owners before approaching their customers.

An often mentioned disadvantage of person-to-person surveys is the possible effect of bias of the question-asker, either through posture or through intonation. Also, such surveys do not provide much assurance of anonymity for the participant. In fact, some participants in telephone surveys will hang up in the middle of the survey if a particular question bothers them—something that rarely happens in a face-to-face interview.

Telephone surveys used to be considered quite biased because many poor people didn't have phones, so the sample relied heavily on responses from the middle class or the rich. However, about 98% of U.S. households now have telephones, so telephone surveys are gaining in respect. One problem, however, is those persons who have unlisted numbers. To avoid omitting this section of the population from the sample, researchers now often use a digital dialing system. The basic idea is to use the first three digits common in an area and then choose the last four digits randomly from numbers 0001 to 9999. For example, in my neighborhood of Memphis, many phone numbers begin with 754, 755, and 756, so a researcher could use one of these numbers and then add four more numbers at random. Randomized dialing is accomplished quite easily with a computer-generated dialing program; however, some states have begun to regulate computerized dialing. An additional benefit of telephone surveys is that the data collectors can be monitored to reduce deviations

from the script and thus reduce possible bias whereas face-to-face data collections cannot unless a supervisor accompanies interviewers—a very expensive arrangement and one that would probably intimidate both interviewer and interviewee. Although participation rates are high for telephone surveys versus mail surveys, this trend could reverse as people get more and more fed up with telephone sales pitches intruding on their dinner hour or a favorite TV program. I was once told-off for phoning during a big football game. Finally, telephone surveys may involve several attempts to make contact at a particular number because of modern lifestyles in which both spouses work or are frequently away from home because of leisure activities.

Text Surveys

Text surveys do not involve living participants. Instead various texts (i.e., letters, manuals, novels, etc.) are examined in a systematic way with the data recorded on paper questionnaires. See Chapter 7 for a fuller discussion.

PURPOSE

Consideration of purpose plays an important role in the design of a survey. Sometimes surveys seem like the answer to an organization's problems; the reasoning is that an organization can better serve its members if the organization knows something about members' likes and dislikes. However, such surveys can bring unexpected problems to an organization, particularly churches and volunteer service organizations. Let me explain. Sometimes churches decide that they could get members more actively involved in the activities of the church if they knew what kind of activities the members were interested in. In such cases, members are urged to fill out a questionnaire which asks them what their talents are and what particular activities (choir, ushers, Sunday School teachers, etc.) they would most like to be a part of. Such a questionnaire implies that the church leaders will then ask the respondent to join the group he or she indicated. However, all too often the respondent is not contacted again for many months, if ever. One reason might be that the church choir is not really open to all volunteers but asks prospective members to audition for membership. Or maybe the ushers group is open only to male, long-time members of the church. In such cases, a survey does more harm than good. So if you are approached about designing an informal survey for an organization, you should discuss this problem with the organization's leaders and help them determine exactly what their purpose is and whether a survey will do more harm than good to their organization.

Purpose also determines the selection of the sample to be surveyed. In the case of informal surveys for clubs and volunteer groups, it is probably best to try to query the entire group of interest. Thus, techniques for obtaining a representative and random sample are not an issue. However, if the purpose of a survey is to determine

product satisfaction, then obtaining a sample representative of product users is vital. If the total population of users of a particular product is small, then choice of participants will probably be based on completeness rather than randomization. On the other hand, when the population of interest is large enough to make a complete survey unfeasible, then researchers must be concerned about random selection of participants. I briefly discuss some procedures for random selection later in this chapter.

Not surprisingly, purpose affects question content and design. I often notice a tendency on the part of students designing a questionnaire to include a question asking the respondent's gender (and often age) although neither have any relevance to the real topic of the questionnaire. I think this tendency arises from the fact that all of us see a lot of marketing surveys, and they always ask for such information, so we tend to assume such questions are just part of survey methodology. However, marketing experts ask questions about gender, age, income, and so forth in order to construct a buyer profile in order for them to design more effective advertising. On other projects, the researcher needs to ask whether such information is really pertinent to the main purpose of the survey. Leaving out such questions will not only shorten the questionnaire (and shorter questionnaires are more likely to be returned than longer ones), but it also avoids turning off a potential respondent who dislikes personal questions.

Additionally, purpose affects the layout of the questionnaire and the design of individual questions. Notice that marketing surveys almost always put sensitive questions last. If people encounter questions they don't like, they are more apt to give such information if they have already taken the time to fill out the rest of the survey. If your purpose is such that you really need sensitive information, you can often design the questions to be less formidable. For example, asking people to check a box next to a range of salary figures is less apt to irritate respondents than asking for the respondent's salary outright. The same principle applies to questions about age.

Another way that purpose affects question design is in the area of open-ended versus close-ended or check-off questions. Check-off questions are much easier to tabulate, but they are inappropriate for exploratory surveys that are often carried out in an area about which little is known. In such cases, it is better to use many open-ended questions rather than multiple choice questions because multiple choice limits possible answers to those that the researcher thinks are likely. Open-ended questions, on the other hand, can elicit information that the researcher may not anticipate, so they are especially appropriate for surveys of an area about which little is known. In designing open-ended questions, though, the researcher should take care to provide enough room for answers. I find that almost no one leaves enough room on forms for me to sign my name, and I don't write in a large script. One way to test the space you plan to allot is to ask people with different sizes of handwriting to actually try to answer your question. However, you should be aware that check-off boxes are easier for a respondent to complete, and so the response rate is apt to be higher when checking off boxes is all that is required.

Finally, research purpose affects the actual word choice. Question wording needs to be carefully examined for subtle bias and offense. Later in this chapter, we will consider question wording in some detail. For now, consider the effects of asking members of a local chapter of the Society for Technical Communication which they prefer: an upscale restaurant that caters to professional people or a neighborhood "ma and pa eatery." Of course, this question is slanted in favor of the classier restaurant by the reference to "professional people." The second choice is also slanted (negatively) by the word choice "ma and pa eatery" instead of "family-owned restaurant." When I encounter such poorly designed questions, I usually stop filling out the survey and throw it away in disgust. Most importantly, however, the question does not really find out much about the members' major concerns in regard to a meeting place. For example, it is possible that for many members, the main concern is safety i.e., is the restaurant located in a safe neighborhood with well-lighted parking? Here, either multiple choice or open-ended questions may give more information about members' concerns.

SAMPLING

Sampling techniques depend on the researcher's purpose, of course, so in the discussion of the various types of sampling, I do not intend to imply that any one method is superior to the others. Still, it is helpful in understanding the types of sampling if we first divide them into two categories: probability and non-probability sampling. The main difference is that random selection is used in probability studies; that means that every member of the population of interest has an equal chance of being selected (you may want to review the discussion of the importance of random selection in Chapter 4). Probability sampling does have one advantage over non-probability sampling in that the researcher can calculate the level of confidence in the findings. Level of confidence is a statistical term which is similar in meaning to level of significance; a level of confidence of .05 means that only five times out of 100 would identical surveys produce different results. However, it is not always necessary to calculate a level of confidence, especially in an exploratory study. Because some purists don't grant the same validity to non-probability types of sampling, you must be careful to state just how you selected your sample.

Before reviewing the four types of probability sampling and three types of non-probability sampling, I want to first remind you of the difference between a sample and a population. Researchers usually select a sample when the population of interest is too large to question every single member. Instead, researchers use various techniques to select a smaller sample of the population of interest, being careful that the sub-group or sample is truly representative of the total population. For example, if you were doing research about characteristics of technical communicators, it would be impossible to find a list that contains the name and address of every technical communicator in the world. Even if you defined your population as technical

communicators in the United States, you still wouldn't be able to find a comprehensive list because the largest list of technical communicators in the United States is probably the membership list of the Society for Technical Communication (STC) which would be only a partial list because not every technical communicator joins the STC. Therefore, researchers always have to settle for available lists. Even so, researchers must be careful about how they decide to use a particular list. For example, the membership list of STC, although it contained 18,423 names as of July 1996 (personal communication), also contains names of members from other countries. If the researcher is interested only in technical communicators in the United States, he or she will have to weed out the names of those whose address is outside the United States.

In other cases, deciding on a good source is not so easy. For example, suppose your population of interest is the American public. You can't rely on voter registration lists because many Americans don't ever vote; you can't rely on telephone books because some Americans don't have phones—or have unlisted numbers. I could give more examples, but I think you see the problem. Most researchers, then, try to define their population of interest in terms of an available source of participants. In the list that follows, I give a brief definition of sampling methods.

Probability Sampling Techniques

These techniques are the most stringent types of random sampling. They should definitely be used if a certain level of confidence is important to the research project.

Straight random sampling. This technique is no different from the random sampling discussed in earlier chapters. The main goal is to avoid bias in selecting participants so that every member of the target population has an equal chance of being selected. One method for obtaining a random sample is to assign a number to every name on the list, and then use a random number table to draw out the members of the sample. (For an example of a random number table, see Chapter 4.) If the population is not too large, you could put slips of paper containing names of people in the population into a hat, shake them up, and then draw out the number you need for your sample. But if the population is this small, you might be better off to try to do a complete survey.

Systematic random sampling. This technique is somewhat easier than straight random sampling because you don't have to use a random number table. Instead, you decide what percent of the population of interest you want to sample (e.g., 10% of a population of 100), then choose a beginning location at random (e.g., the third name on the list), and then choose every nth (in this case, tenth) name. Before deciding to use a systematic random sampling strategy, you need to be sure that your source list isn't organized in some way that will result in a biased sample. Babbie (1973) describes the case of a researcher using a military roster. Because the people

on these rosters are listed by rank within units, it would be possible that your nth number corresponds to a certain rank. For example, if each unit contained ten soldiers with the unit sergeant in the first slot and the unit corporal in the second slot and you take every tenth name beginning with the second, your sample will be all corporals. Even if you begin with the fifth name, your sample will still be biased because it will include no sergeants or corporals.

Stratified random sampling. This technique is another type of probability sampling which tries to control for sampling error by arranging the original list into categories so that the distribution of a particular group in the population of interest will be closely replicated in the sample. For example, suppose your population of interest is a university campus which is 60% male. To make sure that your sample is 60% male, you would need to list the students by gender, then select every nth male from the list of males until you reached 60% of the sample size you want; then you would use the same techniques to select a 40% sample of participants from the list of females.

Cluster sampling. This technique is often used when no master list of the population is available, but lists do exist for various groups. For example, if you wanted to survey technical writing students in the United States, you would not be able to find one list that includes them all. However, you might be able to ask colleges and universities that have technical writing programs for lists of students in those programs. Then you might find that you have a huge list of names. To reduce the work involved, you would be better off to first select randomly a certain number of colleges and universities from the list of those having technical writing programs. Then, you could randomly select names from the lists provided by those colleges and universities.

Non-Probability Sampling

These sampling techniques are used in circumstances where probability samples cannot be obtained or where levels of confidence are not that important. A researcher should choose one of these types when it better suits his or her research goals. At the same time, the researcher must be very careful about generalizing beyond the sample.

Convenience sampling. This technique is sometimes called accidental sampling. A researcher will often choose convenience sampling when he or she has no way to obtain a list of members of a certain population. As I explained earlier, there is no list of people who could be labeled "general public." So convenience sampling surveys are often conducted at convenient locations such as a shopping mall, a certain busy intersection, or a laundromat because the researcher hypothesizes that these locations will be used by the general public. To do a convenience sample, a researcher goes to one of these locations and asks passers-by to participate.

Purposeful sampling. A researcher will often choose purposeful sampling to select a sample that has the characteristics (usually experience, but it could also be gender, age, education, etc.) necessary to answer questions about a certain matter or product. For example, a manufacturer may want to know how customers have reacted to a change of design in equipment, but there may be no list of purchasers available. In such a case, researchers might go to a store selling the equipment and ask customers who come in whether they own the equipment in question. The researchers then might ask the first ten who claim to own the equipment if they would mind answering a few questions about it. Similarly in educational settings, students are often surveyed about programs, facilities, and product preferences. If the researcher wants to know students' attitudes about the library's online search system, the logical group to ask is those students who try to use the system. These opinions would be representative only of the students at a particular library.

Snowball sampling. A researcher will often use snowball sampling in those rare cases when the population of interest cannot be identified other than by someone who knows that a certain person has the necessary experience or characteristics to be included. For example, it would be really hard to find a list of writing students with dyslexia or a list of technical communicators who have lost their job through downsizing. However, if the researcher knows one such person, that person may be able to suggest another person with a similar problem or experience, and thus one participant leads to another.

DESIGN ISSUES

In designing survey instruments, three issues must be considered: the format or layout of the instrument, the types and wording of the questions, and the scales used for the answers. In each of these areas, the survey designer must keep in mind the potential participant because these three areas will heavily influence whether a questionnaire recipient will take the time to answer the questions and return the questionnaire. Some research indicates that certain types of people are more apt to participate than others. For example, the more education a person has, the more likely he or she is to fill out a questionnaire. One obvious reason is that, for well-educated people, reading survey questions is an easy task. For other potential participants, the reading task may seem onerous. Thus, one basic principle of the design is to keep the survey attractive, with an easy-to-read and easy-to-do appearance (LaGarce & Washburn, 1995).

Format

First impressions are extremely important whether it is a job interview or the format of a questionnaire. For example, research has shown that the use of color or unusual

covers may increase response rate (LaGarce & Washburn, 1995; Matteson, 1974; Nederhof, 1988). Further, potential participants are busy people who will hesitate to take on a task that looks like it will take a lot of time. Therefore, some questionnaire designers try to keep the questionnaire short—even just one page if possible—thus, they need to consider carefully whether a particular question is critical to the research purpose. On the other hand, Dillman claims that if the questionnaire is less than 12 pages, the length will not affect the response rate (1978).

White space makes a document look easy to read, whereas dense paragraphing makes the task look difficult. Leaving sufficient white space further reduces the number of questions that can be asked, so designers have to work to achieve a balance between the amount of text and the amount of white space. One way to provide space for both content and white space is to edit questions to make them as succinct as possible. On the other hand, question brevity must not be achieved at the expense of question clarity.

The ease of response is often a critical factor in survey design because potential participants will throw away the questionnaire or procrastinate if the survey looks as if it will take very much time to fill out. Writing even a couple of words takes longer than putting a check mark in a box, so one way to make a questionnaire look easy-to-do is to use check boxes where possible, especially near the beginning of the questionnaire. Check boxes are better than blank lines because when participants mark a choice in a vertical list of blank lines, it is often not clear which line they mean to mark. Certainly the questionnaire designer can do much to help participants mark their answers in the correct place if grouping and dividing design principles are used. For example, the check box or line should be placed very close to the related answer and separated by white space from other possible related answers. Note that in Figure 8-1, a respondent may choose the wrong space because the possible answers run together. A better arrangement would be to place the possible answers in a vertical list with a box placed very close to its answer.

Whichever check-off or circling design you choose, the design will have the advantage of looking easy to use. If short answers are required, it is better to put them at the bottom or on the second page so that the initial impression is that little effort will be needed to participate. If the system for answering the questions is obvious, then fewer instructions will be needed, so more white space will be available.

To summarize, design of questions and the layout of the questionnaire can affect the willingness of participants to fill out the questionnaire. Therefore, you might want to use the checklists in Figure 8-2 to evaluate and revise a draft questionnaire.

Question Order

Most experts advise putting an interesting question first to capture attention. In fact, Sheatsley (1983) claims that some questionnaire designers begin with a throw-away question for this very purpose. Certainly the first question must be non-threatening,

A. Which is your highest degree?
_____BA; ____MA; _____PhD

B. Which is your highest degree?
___BA
___MA
___PhD

C. Which is your highest degree?
BA
MA
PhD

FIGURE 8-1 **Possible Designs for Multiple Choice Questions**

easy to understand, and easy to answer. Subsequent questions should be grouped so that one question leads logically to the next. The respondent's task is made easier if several questions in a row use the same question design, for example a Likert Scale. However, if all the questions are of the same design or on the same topic, respondents tend to get bored and less careful with their answers. Perhaps a useful rule of thumb is Miller's "Magical number seven, plus or minus two" (1956). Although Miller was exploring the limits of short-term or working memory, his findings may also apply to the line where interest shifts to boredom (this issue, itself, is worth studying!). Sheatsley (1983) suggests using transition statements to indicate a shift in topic if the questionnaire is long and includes several topics.

Another rule of thumb for question order has already been mentioned: put sensitive or difficult-to-answer questions near the end so that a level of trust has been built with the respondent through the easy earlier questions.

Finally a questionnaire designer usually arranges questions so that the more general questions come before the more specific ones. This arrangement keeps the specific questions from influencing the answer to the more general question, and when a broader question precedes a question asking for specific details, the broader question gives the respondent a context for considering the more particular question (Dillman, 1978; Sheatsley, 1983). However, the reverse may be preferable if the researcher wants the respondent to have more opportunity for considering a complex issue and its various parts before making a decision on a more general level.

Checklist for Designing Questions

1. Be sure that the reader knows how the questions are to be answered. For example, if the reader should use a number 2 lead pencil, say so up front.
2. Use plain English. For example, don't say "consume" if you can use "eat" or "drink." Don't use double negatives.
3. Avoid acronyms unless you are sure they are part of your reader's usual vocabulary or the context makes them clear. For example, using NASA in questions about space exploration may be OK, but using NASA in relationship to population trends in Houston could cause confusion.
4. Avoid emotionally charged words and leading questions. For example, "Does the writing exhibit ignorance of commonly accepted grammatical conventions?" There is no need for the word "ignorance"—some errors could be accidents due to haste.
5. Step carefully between concreteness and vagueness. A question such as "How many hours a day do you use a word processor?" could cause a difficulty if the respondent doesn't use a word processor very often. You might be better off to ask respondents to indicate level of use on a scale between "very infrequently" and "very frequently."
6. Limit each question to just one issue. Avoid double-barrelled questions such as "Is your office equipment up-to-date and easily accessible?"
7. Avoid direct questions about sensitive or personal issues. Instead offer answers with a choice of ranges for questions about age, salary, and personal spending habits.
8. Take advantage of pattern recognition by using the same pattern for similar questions. For example, if in one question you use a rating scale with "very frequently" on the left and "very infrequently" on the right, in a subsequent question keep the higher amount on the left and the lower on the right, as in: highly satisfied.....highly unsatisfied.

Check List for Question Order

1. Make your first question one that obviously relates to the purpose of the survey.
2. Put easy-to-answer questions before hard-to-answer questions.
3. Put general questions before specific questions.
4. Put questions about famililar topics before those about unfamiliar topics.
5. Put sensitive questions last.

FIGURE 8-2 **Checklist for Designing and Ordering Questions**

QUESTION TYPES

A researcher has many question types to choose from: bipolar (e.g., yes or no), multiple choice, rank order, fill-in-the-blank, essay, and so on. In general, survey questions can be divided into two categories: open- and closed-ended questions. The primary concern should be to choose the kind of question which will most likely obtain the information you want and which will create the least work for the respondent.

Closed-Ended Questions

Closed-ended questions are advantageous to both the researcher and to the respondent. Respondents tend to like close-ended questions because they can be answered quickly and easily. Researchers tend to like them because they are easy to tabulate. Closed-ended questions include bipolar, contingency, and multiple choice.

Bipolar questions provide the respondent with just two choices, such as "yes" or "no," "male" or "female," and so forth. However, one must be careful when deciding to use a bipolar question: are there really only two possible answers? For example, members of Congress sometimes want to know how the voters in their district feel about various budget items such as defense spending and welfare. When the survey asks the voters which of two items it would be better to cut, defense spending or welfare, the question puts the respondents in an unfair position because maybe they believe neither should be cut. So, in selecting question design, a researcher should be sure that bipolar questions are used only for truly dichotomous issues such as gender, home ownership, and the like.

Another problem with bipolar questions is that they may not elicit the really important information on a particular issue. A good example is a question about owning a computer. You may really want to know whether a technical communicator owns a computer or not; however, that question tells you nothing about whether the technical communicator uses his or her computer for word processing or what tasks the respondent uses a word processor for.

Contingency questions are often used following bipolar questions to pursue an issue beyond its obvious level. A contingency question consists of a filter or sorting question and a follow-up question. For example, for the filter question, a researcher could use a bipolar question about calculator ownership, and then a follow-up question about calculator usage:

Do you own a calculator? ☐Yes ☐No

Which of these tasks do you use your calculator for? (Check all that apply)

When contingency questions are presented on a computer, there is little chance for the respondent to get lost because the computer will display the follow-up question only when a respondent has indicated "yes" for the sorting question. On a paper questionnaire, however, the designer will have to tell the respondent which question to answer next. Some designers use text (e.g., "If you answered yes, please go to question 9"), and others use visual cues as illustrated in Figure 8-3.

Multiple choice questions help a researcher in two ways: first they are easy to tabulate, and second, they can stimulate a respondent to consider some possible choices that he or she might otherwise not have thought of. And multiple choice questions are usually easy for respondents. A good way to discover good possible choices when designing multiple choice questions is to brainstorm for possible concerns, choose the most likely, rank order them, and then select a reasonable number

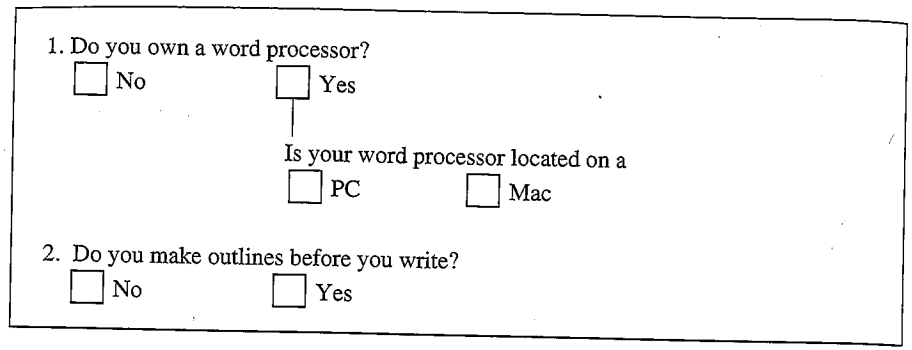

FIGURE 8-3 **Using Visual Cues to Direct the Reader**

of the most important ones to use as choices in the question. Questionnaire designers can save themselves some work in the analysis phase if answers in a multiple choice list are designed so that the respondent circles the number accompanying his or her choice because these numbers can easily be entered into a computer analysis program. However, the questionnaire designer must make sure that only one number will be perceived as relating to a possible choice by placing the number very close to the answer it pertains to. Another problem with numbering choices in a list is that the arrangement of choices in a numbered list may imply that the number one answer is better or more important than the number four answer. Some designers try to avoid this problem by changing the order in the list of possible answers so that in some questionnaires an answer, "memos," for example, is first on the list in 20 questionnaires, second on the list in 20 other questionnaires, third on 20 more, and so on. Although this system does avoid placing memos in a prominent position that could bias answers, it also, of course, defeats one of the main purposes of numbering answer choices: making the answers easy to tabulate.

Open-Ended Questions

These questions can be either fill-in the blank or long-answer. Because they require respondents to actually write something down, some respondents will not participate, usually because open-ended questions appear to take more effort, but also sometimes respondents will not participate because they feel insecure about their handwriting. Open-ended questions also create problems for researchers because they are frequently hard to tabulate. Their main advantage is that they do not limit the possible answers that may be given. However, open-ended questions are not questions designed so broadly that they try to catch any and all information on any possible topic. Instead, good open-ended questions are based on what is known and

unknown; in other words, they are grounded in theory (Strauss & Corbin, 1990) or based on what has been learned from prior research. The two main types of open-ended questions are fill-in-the-blank and essay questions; however, these options are the extremes of a continuum ranging from one-word to brief phrases, to complete sentences, to even longer, more carefully constructed answers.

Fill-in-the-blank questions are as not as intimidating to most respondents as long-answer questions are, and they are often fairly easy to tabulate. The major problem is designing the amount of space needed for respondents to write in their answers. For example, I often get membership renewal forms that ask for my home phone, my office phone, my FAX number, and my e-mail address. Often these questions are all put on one line with the same amount of blank space for each. However, I need space for only ten numbers and two dashes (total = 12) for the phone and FAX numbers, but I need space for eight characters for my last name alone in my e-mail address, plus another 10 letters and one period for the address string after my name (total = 19). Design mistakes like this sometimes happen when a researcher uses a template which is set up to divide the space on a line equally rather than proportionately according to what might be written in the space.

Essay or long-answer questions are a good choice when the researcher is doing an exploratory study because they limit responses only by the amount of white space allotted for the answer. Again, it is a good idea to user-test the questionnaire design. You may find that one question tends to elicit much longer responses than another and therefore needs more space for respondents to write in. On the other hand, too much white space can make the questionnaire look as if it will take a lot of work to fill out, so respondents may procrastinate or throw it away.

When exploring a new area with a survey, you will probably want to use the grounded theory approach and rely on numerous open-ended questions (Strauss & Corbin, 1990). Much as explorers of new geographical territories use theories to guide their work (following a river upstream will lead you to its source or to its tributaries), researchers exploring new frontiers in composition or technical writing use theory as a guide to question content. For example, Leon Heaton and I recently investigated possible answers to Charles Sides' (1994) question about where technical communication is going as a discipline. One of the issues Sides raises is where technical communication programs should be located in the university structure in order to maximize their potential. To learn more about the preferences and experiences of teachers of technical communication, Heaton and I surveyed technical communication professors, using both rating questions to gather information on perceptions about current locations, and open-ended follow-up questions to probe the depth of feelings involved and possible reasons for them. For example, one question asked how much respect professional communication professors are given by colleagues in other areas in the department. This question provided a rating scale for answers. The next question asked respondents to comment on or explain their answer. By using the second open-ended question, we hoped to learn more about circumstances contributing to negative and positive attitudes of colleagues. Understanding the underlying circumstance

could help program planners create environments where technical communication programs could flourish, either in their current locations or in new locations. However, we did not directly ask respondents "why?" because sometimes people haven't given very much attention to why they do things—perhaps they do something out of habit. Asking "why" directly forces respondents to come up with an answer even if they don't really know why they said or did something, so respondents may offer the first reason that pops into their mind and it may not have any real connection to their true motive. On the other hand, providing space for "comment" on an answer gives the respondents a chance to give reasons, or tell a story as an illustration, or even comment on the wording of the question. Such responses can provide a wealth of information not otherwise available to a researcher.

One problem with open-ended questions is that the data are often hard to tabulate. The discourse analysis procedures described in Chapter 7 can help with this task, the main objective being to create and use categories to sort the answers given by the respondents. For example, in the survey Heaton and I conducted of technical communication professors, we followed almost every ranking question with an open-ended invitation for respondents to write their comments. To categorize the answers to one of the questions, first Heaton and I decided to use a very simple procedure with only three categories: mainly a positive attitude, mainly a negative attitude, and attitude neither mainly positive nor negative. We could then assign a number to each of our categories and statistically compare the answer with that given in the rating question to test the validity of responses.

To verify the coding, I coded 10% of the replies chosen at random and then compared my coding with his. Even with this careful procedure, we found ourselves confronted by some quandaries. For example, how would you code this response: "Some of the department views us with benign neglect, and some see us as vocational, but the younger faculty respect our contributions and envy our placement record"? On the one hand, Heaton and I could say that this statement contains one negative ("see us as vocational") and two positives ("benign neglect" and "the younger faculty respect...and envy [us]"). Thus, we could code this response as mainly positive. However, is "benign neglect" really a positive? Furthermore, if there are only two younger faculty out of 15 faculty in this department, how positive is the remark about younger faculty?

Another problem with open-ended questions is how to choose which answers to use to illustrate trends when writing up the results of the research. For example, Heaton and I plan to use the responses to our open-ended questions as sources of explanatory quotations when we discuss our findings. Thus, we hope to make our findings more alive to our readers. So should we choose the most typical response even though it is dull and formulaic, or should we choose a response that is a bit atypical, but more vivid? There are no easy answers. As I explain in Chapter 12, researchers must stay as true to the data as possible, but they also need to use quotations that will help their readers see the point.

INFORMATION TYPES

When trying to determine which question type is most suitable, it is helpful to consider what type of information you really want to collect. For example, do you really want to know whether a person owns a computer or how the person uses a computer? Some question types are better suited to some information types than others; I will point out possible matches between question and information type as I discuss each of four information types below.

Characteristics

Sometimes a survey researcher is looking for characteristics or attributes of a person, thing, or event. Some examples are personal characteristics such as gender, age, and level of education. Other examples are academic program characteristics such as semesters or quarters and graduate or undergraduate; location characteristics such as urban, suburban, or rural; and job characteristics such as temporary or full-time. Check-off boxes for bipolar or multiple choice questions work very efficiently for this type of information when you already know which characteristics are important for your purpose. Even if you already know most of the characteristics associated with your research topic, you may want to use an occasional open-ended question to flush out characteristics not yet identified by other researchers or your own reasoning.

Whether you use open- or closed-ended questions, you can usually count on the answers to the questions about personal characteristics to be accurate. However, when respondents are asked for characteristics of a program, a policy, or some construct a bit distant from personal experience, their answers may vary in accuracy depending on how much they really know about the construct. In this case, answers from several marginally knowledgeable respondents can still paint a fairly good picture of the area under investigation.

Practices or Behaviors

Sometimes survey researchers want information about those activities that the respondents take part in, but questions could be asked about behaviors that respondents have heard about. Of course the more closely related the respondent is to actual participation in the area of interest, the more accurate the answers are likely to be. Sometimes researchers include questions that will help them evaluate the accuracy of answers to other questions. For example, if the respondent is a new member of an organization, he or she cannot be expected to know as much about typical behaviors in the history of the organization as those who have been long-time members. Therefore, the researcher will include a question about how long respondents have been a part of some group. I believe that if accuracy of the answer is important, then an open-ended question is best; however, sometimes multiple choice questions using ranges of years are adequate for the researcher's purpose.

Some examples of behaviors and practices in the field of writing include the classes that professors teach, the types of writing that a technical communicator works on, the types of research the respondent has carried out, the number of hours worked per week, the frequency of attendance at professional conferences, and so on. When typical activities are already known (e.g., types of writing produced would probably include memos, letters, reports, proposals, etc.), a multiple choice question would work well to learn which activities the respondent participates in. However, if the question is how much time is spent in the various activities, then you might want to consider whether a fill-in-the-blank question with a space beside each activity would work better than individual questions with a rating scale for each possible activity. If little is known of the typical activities, then a very open-ended request such as "Describe a typical day's activities" would be best.

Beliefs

This kind of information is almost impossible to obtain by any research method except interviews and surveys because the researcher is looking for a respondent's perception of reality; in other words, questions probing for this type of information are probing for facts, not opinions and attitudes. Perhaps the distinction will be clearer if we consider some examples. For example, students could be asked a question like this:

> Is your teacher knowledgeable about writing practices in engineering?
> Yes___ No___

This question does not ask for an opinion as to the teacher's ability to teach; nor could the researcher use the answers to this question to claim that the teacher is or is not knowledgeable about writing practices in engineering. What is learned from this question is what the student believes to be a fact about the teacher's knowledge.

You may wonder why this distinction is important, so let's consider some uses of the information obtained from such a question. For one thing, if your respondents are engineering students and if they have expressed dissatisfaction with the course, this question could help locate a possible source of dissatisfaction. It might be the case that the teacher has actually studied a good bit of engineering writing, but that she has not communicated this fact to her students. Therefore, one way to increase student satisfaction with the course would be to disseminate information about the teacher's knowledge of engineering writing. Or let's consider another imaginary case in which the management at a firm was making plans to hold a one-day writing seminar for employees. If the planners want to know which day and time would least interfere with work, they could survey the employees asking questions like this:

> Circle the day of the week when a seminar in writing for engineers would least interfere with your work: M T W TH F

Attitudes

This kind of information is also hard to elicit with any research method except interviews, surveys, and focus groups, although one can sometimes make inferences about opinions by collecting information about behaviors. For example, if you have some way of keeping track of which movies a person has attended over a period of time, you might make some inferences about kinds of movies that person likes. However, if you can ask a person directly about his or her likes and dislikes, you might have a more accurate picture. Information about attitudes and opinions can be explored with a wide variety of question types. For example, you could ask a respondent to compare two products in various ways: its ease of use, its relative cost, the results obtained from its use, and so on. Or you could ask respondents to rate a product on those features. A Likert Scale is very useful when probing attitudes and opinions, as in this example:

> My college coursework adequately prepared me for the work I'm doing now.
> strongly agree___ agree___ disagree___ strongly disagree___

Attitudes and opinions are often elicited with scale-type questions because the intensity of the respondents' attitudes is important. For example, a researcher could want to know how a respondent feels about the issue of non-sexist language. In this case a researcher could design a question with a Likert Scale of level of agreement for response to a statement such as "The use of sexist language offends me." Or a researcher could ask technical communicators to rank order a list (including sexist language) of the most serious breaches of etiquette in the field. Yet another way to determine attitudes is to create a set of cards, each containing a quotation (invented or real) which typifies an attitude or a circumstance (e.g., "We don't need a secretary—all secretaries do is sit around giving themselves manicures"). Respondents are asked to sort these cards into categories such as sexist versus non-sexist attitude, or offensive versus inoffensive remark. Some scales that other researchers have found useful are given in Figure 8-4. You might also want to review the information on scales in Chapter 5.

- always . . . . . frequently . . . . . seldom . . . . . never
- excellent . . . . . good . . . . . fair . . . . . poor
- too much/many . . . . . too little/few. . . . . about right
- better. . . . . worse . . . . . about the same

FIGURE 8-4 **Some Scales for Measuring Attitude**

MOTIVATING RESPONDENTS

Probably the biggest problem facing survey researchers is the response rate. For example, in 1985 Paul Anderson reported that the response rates in most surveys of writing in the workplace ranged below 50% (Anderson, 1985). On the other hand, Dillman (1978) reported an average response rate of 74% on surveys using his "total design method," with none of the 48 surveys achieving lower than 50%. These surveys were on a range of different topics from attitudes toward Native Americans to characteristics of truckers; however, the majority were sent to residents in one state—Washington, and the research was undertaken 20 years ago before people became fed-up with surveys.

Much research has been conducted to learn the factors which influence response rates. For a good review of some of this research, see Yu and Cooper (1983). Response rates seem closely tied to motivation, so survey designers need to consider ways to increase the motivation of potential participants. The following list gives some suggestions for motivating potential participants.

Create a Credible Image

As I said earlier, the proliferation of junk mail and scams by telephone or mail has sorely tested potential participants' willingness to believe that a survey is what it claims to be. For example, I often receive a telephone call from someone claiming to be conducting a survey only to learn as the conversation progresses that the person on the phone wants to sell me magazines. I have also received mail questionnaires purporting to be doing research in some medical problem such as cancer; then at the end of the survey is a statement along the lines of, "Please consider enclosing a check to help us continue to find ways to cure cancer."

Thus, a survey researcher must be concerned to present evidence of legitimacy and credibility. One strategy is to write a cover letter on letterhead from a reputable organization associated with the research such as a department in a university or a government agency. Then, the questionnaire must present a professional appearance; a good desk-top publishing software package can often help a designer develop a questionnaire that meets this standard. Finally, the design of the questions can create the appearance of professionalism. For example, compare the first and second versions in Figure 8-1: version B looks more professional than does version A.

Appeal to Altruism

Without question, surveys impose on participants' busy lives. Therefore a survey designer has to convince a potential participant that the survey is worth the time it will take. Most people want to help a good cause, so a survey designer has to clearly point out (probably in the initial moments of a conversation on the phone or in person, or in a cover letter, but maybe also briefly at the top of the questionnaire) the purpose of the survey and the good cause that will be aided by the participant's response. Dillman (1978) suggests that pointing out a problem in an area of interest to the respondents is a good way to enlist their participation. I find that most people are willing to help students, so I encourage my students to include in their statement of purpose the fact that they are a student. However, Dillman cautions that the general public may perceive dissertation research as esoteric, and of little practical use (1978). Most importantly, as Sheatsley (1983) suggests, you should tell the truth about the purpose of the survey. Those survey designers who are not students can explain how the results will help in making something better: a program, a public policy, a product, and so forth. Finally, you could say something to convince the potential respondents that their participation is very important to the project. Dillman (1978) recommends that the cover letter should explain that the respondent is one of a very small number of people who were selected to represent a specific population, such as taxpayers or the people of a particular community. If the researcher wants only a certain segment of the population, e.g., adult females, to fill out the questionnaire, the restriction should be clearly stated and a reason given.

Design an Easy-To-Do Appearance

As I explained above, most people are busy. If the survey appears easy-to-do, potential respondents are more likely to participate. Earlier in this chapter, I explained how question design and layout can make the questionnaire look easy-to-do. Another way to convince potential participants that the survey is easy-to-do is to tell them how long it has taken others to do it. Of course, you will need to test the questionnaire or interview procedure with at least three persons to estimate the amount of time that participation will take.

Providing a self-addressed, stamped envelope, of course, is essential for mail surveys. No one wants to take the time to find an envelope, address it, and hunt a stamp for it. For a telephone survey, the interviewer could possibly state just how many questions (if fewer than ten or so) will be asked. In the case of a questionnaire which has to be filled out with a number 2 lead pencil, the researchers might be wise to include tiny pencils that the respondent can use.

Promise (and Deliver) Anonymity

Even if the issue is not a touchy one, some potential respondents don't want to go on record with personal information, behaviors, beliefs, and attitudes. Sometimes students ask me if they can't code the questionnaires or return envelopes in some way so that they will know which potential participants responded. The students aren't proposing to distribute the information they receive so that it can be connected to the person who gave it; rather they want to know who to send follow-up materials to, or they want to know whether all their responses came from one segment of their intended sample. While both motives seem good, I believe that if you promise that

the respondent will be anonymous, then you must deliver on that promise. Other researchers try to avoid the issue by promising "confidentiality." In a legalistic sense, a promise of confidentiality may allow the researchers to use a method of identifying the respondent; however, I still believe that no researcher should use a hidden method of identifying the respondent when promising "confidentiality" or "anonymity." On the other hand, Dillman (1978) claims that identification numbers can be used if the system is clearly explained in the cover letter, along with an assurance that the respondent's name will never be attached to the questionnaire.

Adopt a Personal Tone

One way to create a personal tone is to use a personal address for the envelope and cover letter: "Dear Angela Smith" versus "Dear Writing Teacher." Word processors make this step fairly easy with Mail Merge features. Putting the name and address directly on the envelope instead of on address labels also creates a more personal tone—but at some additional cost if your printer cannot handle envelopes. Another way to achieve a personal touch is by using the word "you" in the cover letter where possible (for more on the "you attitude" in letters see Houp, Pearsall, & Tebeaux, 1995, pp. 325–327). A more personal note can also sometimes be achieved when the researcher explains how the respondent's name was selected.

Offer a Reward

Some researchers have found that offering a small reward can motivate potential participants to respond (Denton, Tsai, & Chevrette, 1988; see also Yu & Cooper, 1983). I remember once receiving a dollar bill with a survey—an expensive reward if the survey is being sent to very many people. Of course, one dollar is not really adequate pay for the time the respondent will have to use, but one dollar is large enough to make many respondents feel guilty if they use the dollar without filling out the survey. I suppose guilt also plays some role in enclosed rewards such as a magnet for the refrigerator or a coupon for a discount at a store, but not much.

Some academic researchers offer to share their findings with respondents, and this strategy often works when the respondents are academics who are interested in the production of new knowledge. However, sending reports of all the data to those respondents who indicate an interest can be expensive if many pages are involved. Also, this type of reward means that respondents who wish to receive a copy of the findings will have to relinquish their anonymity and provide a return address.

Do a Follow-up

Sending out a follow-up postcard has been shown to almost double the response to mail questionnaires (Dillman, 1978). Furthermore, follow-up postcards can be sent without compromising anonymity. In this case, the researcher sends the same postcard

to everyone on the original mailing list. The postcard thanks those who have already responded and pleads with those who haven't. Where anonymity is not an issue, some researchers send a follow-up postcard only to those who have not yet responded and also send a later follow-up mailing with another copy of the questionnaire. Dillman (1978) recommends sending a follow-up postcard within a week of the first mailing, a letter after three weeks, and even a third follow-up after seven weeks, if needed. The postcard and letters jog the memory of a recipient who intends to respond but who has laid the questionnaire aside for the moment.

TEST THE QUESTIONNAIRE

Even though I've now written almost a whole chapter about designing questionnaires, let me assure you that I would never send one out without testing it in two or three ways. First, I would ask a colleague who is knowledgeable about research methods to look over a draft for clarity and ease of use. If the subject of the questionnaire is complex, I might also ask a subject matter expert to look it over for clarity. Finally, I would actually test the questionnaire by asking persons typical of the population of interest to either fill out the questionnaire while I watched or to participate in a trial interview. I would have a copy of the questionnaire or interview guidelines with me so that I could make notes on it if my test participant hesitated someplace or asked me a question. Also I would note the time my test participants needed to fill out the questionnaire. Knowing the average length of time needed means that the researcher can be specific in the cover letter when she or he tries to assure potential participants that filling out the questionnaire won't take too much time.

QUANTITATIVE ANALYSIS OF THE DATA

Most survey researchers use quantitative procedures for analyzing the data they have collected. These procedures are fairly straightforward for data collected with check-off boxes or circle-the-number answers. However, even when researchers have used open-ended questions, they will often want to convert the answers into quantifiable data by categorizing the answers so that data can be described succinctly, and so that comparisons and predictions can be made. In this section, I will first discuss the presentation of frequency data; then I will briefly review measures of central tendency and their presentation. Finally, I will describe a type of statistical analysis often used with survey data: Pearson product-moment correlation.

Frequency Data

Frequency data, the type most often collected by surveys, simply means how many respondents chose a particular answer or fit a particular category. These data are

often presented in tables because tables of raw data take up much less space than sentences containing raw data. Tables also help readers interpret the data; readers can quickly compare amounts in one cell with amounts in another. To help in the interpretation of frequency data, researchers often present the percentages along side the raw data. In a table of frequency data, the larger set of categories is often arranged down the left side and the smaller set across the top, no doubt due to the fact that book and journal pages are longer than they are wide. For example, if you collected data about types of cars owned by men and women, it would make sense to list the types of cars (a long list) down the left side and the gender categories across the top.

Researchers often order these categories from that with the largest number of respondents at the top to that with the smallest number of respondents at the bottom, but there really is no rule specifying order for categories not related by rank. For example, if your categories were regions of the United States, it would not matter whether you put Northeast or Northwest at the top of the list. On the other hand, if you were listing educational level, you would not put B.A. first, Ph.D. second, and M.A. third.

Measures of Central Tendency

Survey researchers often report their results using measures of central tendency. These were described in Chapter 5, so a brief definition of each will probably suffice at this point. The mean is the average. In a survey, for example, you could determine the mean salary of technical communicators by adding up the salaries reported by the respondents and dividing that number by the number of respondents. The median is the half-way point on that list of salaries: 50% of the salaries would be above the median and 50% below. The mode is the number that appears most frequently on the list. These data are usually presented in sentences in the text, but they could also be presented in tables if tables would be more concise.

Analysis of Correlation

This statistical procedure is used to determine the degree of relationship between two variables—e.g., if the amount of one variable goes up, does the amount of the other variable go up to a similar degree? For example, a survey researcher might want to know whether people who drink beer also tend to mow their own grass (at least, this isn't an eyelash example). In this case, one question on the survey would ask respondents to estimate the number of 12 ounce cans or bottles of beer they drink each week. Another question later in the questionnaire could ask respondents to check one of three answers:

_____ I pay someone else to cut my grass
_____ I cut my own grass
_____ Not applicable

To learn if there is any correlation between the two behaviors, the researcher would use only those questionnaires in which respondents chose one of the first two grass cutting options. Then the researcher would assign a numerical value to the two options—perhaps assigning the digit 1 to the first option and digit 2 to the second. An analysis of correlation would then show whether the two sets of data match: high (number of beers) with high (option 2); and low (number of beers) with low (option 1) to a degree that wouldn't happen by chance. Note that even if we found a high correlation between these two sets of data, we could not infer that one caused the other—i.e., drinking beer does not cause a person to cut his own grass. Causal inferencing gets tricky though when we consider that if a person who likes beer cuts his grass on a hot day, that person might drink more beer that day. You can read more about causal analysis in Chapters 5 and 6.

Correlation as an Indicator of Internal Validity

Quantitative researchers are often concerned about the validity of their findings, as was explained in Chapter 3. Survey researchers often test the validity of the questionnaire by analyzing the degree of correlation between two questions. To illustrate, let's suppose that in an early question, respondents were asked to indicate their level of satisfaction about working conditions and in a later question respondents were asked to rate their level of satisfaction with office machinery provided. In a way, these two questions are asking much the same thing, only one is more specific than the other. Therefore if respondents' answers were quite different for these two questions, the reliability of the survey is questionable. On the other hand, if the answers are correlated (respondents who indicated satisfaction with working conditions also tended to indicate satisfaction with office machinery provided), then one could assume that the survey is uncovering reliable information about the satisfaction of workers.

Correlation as a Predictor of Performance

Educational researchers often use a correlation analysis to determine if a relationship between two variables is strong enough to predict performance in one variable based on the amount of another variable. One example is standardized tests such as the SAT and ACT. High scores on these have been shown to correlate significantly with performance in college classes. In writing research, analyses of correlation are sometimes used to help assess how well a certain test will predict behavior in a certain class. For example, we ought to find a positive correlation between the results of tests of verbal skills and grades in a writing course, but we may not because other causal factors, such as motivation, maturity, teacher effectiveness, and so forth, are also involved.

Thus, analysis of correlation can be used to indicate areas where follow-up research to isolate causes would be appropriate. Just because two variables are highly correlated does not mean that one causes the other. No doubt a statistical analysis of the relationship between shoe size and height would show a positive correlation;

however, that does not mean that large feet cause one to grow taller. A positive correlation (+1) simply means that respondents who have a high score in one factor are very likely to have a high score in a related factor, and vice versa. A negative correlation (–1) means that respondents who have a high score in one factor are apt to have a low score in another factor. Zero correlation means just that—there is no relationship between the factors. To determine causal relationships, researchers often use a Chi Square, ANOVA, or *t* tests—procedures discussed in Chapter 5.

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Strategies for Empirical Research in Writing

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