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# SPSS BI Survey Tips

*A handy guide to help  
you save time and money  
as you plan, develop and  
execute your surveys*



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## Preface

Are you currently involved in survey research? Or, are you developing a survey for the first time? Regardless of your survey experience, *SPSS BI Survey Tips* is a handy guide that provides tips to help you plan, develop and execute surveys.

This booklet is divided into 16 sections that provide tips for different applications throughout the survey process. As you read, you will see a few symbols (described below) that will help you better understand the information in this booklet.



You'll see this symbol throughout the booklet. It gives a clear example to help illustrate the tip.

The <sup>s</sup> indicates that the figure is based on performing a survey on a very large population, such as a national survey.



This symbol denotes SPSS BI products that can help you perform a particular tip or specific survey application more effectively and productively. A comprehensive listing of SPSS BI products can be found on pages 32 and 33 of this booklet.

Words in **bold face** indicate a term defined in the glossary at the end of this booklet.

Keep *SPSS BI Survey Tips* by your side during the survey process and use it to help you save money, execute your survey in a timely manner and get the highest response rate.

If you have any other questions about conducting or analyzing your surveys, call your local SPSS office. We offer a variety of training and consulting programs to assist you. If you have any survey suggestions or ideas, please e-mail us at [suggest@spss.com](mailto:suggest@spss.com). Visit us online at [www.spss.com](http://www.spss.com).


## INTENTION

**Understand the reasons and background for your survey.**

### 1 Define the mission of your survey


Do you know why you and your organization want to conduct this survey? If so, you can use those reasons to develop your survey's mission. Once developed, you can refer to your mission throughout the survey process whenever you get stuck.

If you don't know why you and your organization want to conduct the survey, you may be collecting unnecessary data. Make sure there's a real purpose for this effort.

 *When questioning your organization, if you get an answer such as, "we do it every year," dig for the real motivation.*

### 2 Outline your research

Develop a plan to implement your mission. Be prepared to know which statistics to run, and what initial relationships and patterns you expect to find.


 *If you want to predict purchase patterns based on known demographic characteristics, you need to know which demographics you think may be relevant.*

## POPULATION

**You need to consider your population before you can develop questions and format your survey.**


### 3 Consider age

The age of respondents in your **population** affects their ability to pay attention or their capacity to understand.

 *A young child may be able to pay attention to your questions for as little as five minutes or may not understand all of the content. Or, older respondents may not understand new phrases or jargon.*

### 4 Consider the respondents' attention span

For telephone surveys, your audience may be unable to focus or unwilling to devote much time to an interview.

 *A consumer reached by telephone at home may be distracted by household activities or may be unwilling to give you more than 10 minutes.*

### 5 Consider gender

Are any of your questions gender-specific? Make sure your phrasing is directed at the right audience and is not offensive.

## SAMPLE SIZE

**Determining your sample size will help you decide which type of survey to use.**

### 6 Consider budget (and other resources)

Can you afford a large enough **sample** size to attain useful results? Do you have the resources available to make the calls, stuff the envelopes or tabulate the results?

There are software tools that enable you to determine critical variables (anticipated effect size, confidence, statistical power and sample size) before you spend valuable time and resources.



**SamplePower**

### 7 1,500<sup>s</sup> respondents should be your limit

There is usually no reason to survey more than 1,000 - 1,500 respondents. You will actually get shrinking returns on precision as the sample size goes up. While the precision of results gets better as the sample size increases, after 1,500, the increase in precision is negligible.

### 8 Sample size: a better guideline

If you have reason to expect a **strong effect**, then use a smaller sample size. Base the sample size on the minimum adequate sample size of important subgroups in the population. Many analysts suggest that there should be at least 100<sup>s</sup> cases in each subgroup. Although, if you use **crosstabulations** or some **nonparametric tests**, there are

procedures such as **exact tests** which work very well with small subgroups.

If possible, know what proportion of the population (in the real world) is in each subgroup and calculate the total sample size required.

Take into account the expected **non-response rate** of this population and increase the sample size by that factor.



## SPSS Base, SPSS Exact Tests

### 9 Determining the appropriate sample size

One conservative formula you can use to determine the appropriate sample size,  $N$ , is where the error is simply the amount of error you are willing to tolerate for the estimate of a proportion or percentage. For example, if an error of 5 percent, ( $\pm 5$  percent) is acceptable, then we calculate required sample size as:

$$N = \frac{1}{\text{error}^2}$$

## SAMPLING TECHNIQUES

**Once you have determined the size of your sample, you can select the sampling technique that best fits your needs.**

### 10 A sample versus a census

A sample is a part of an entire population that possesses attitudes, opinions, habits or characteristics that you wish to study. A **census** includes an entire population. Consider the size of the population you're sampling, and then decide whether you want to survey a sample or a census.

$$N = \frac{1}{.05^2} = \frac{1}{.0025} = 400$$

### 11 Purposive sampling

Use non-probability, or **purposive sampling**, if you want to learn about people with special characteristics.



*You want to survey females between the ages of 18 and 25 who watch television at least 10 hours a week. Make sure you include all of the relevant characteristics and weed out groups that don't fit these requirements. Then, you can purposefully sample a group with special characteristics.*

Purposive sampling is often used for **focus groups**, **pretesting** and **pilot studies**. You shouldn't do statistical testing with a purposive sample, however.

### 12 Using every "nth" name

**Systematic sampling**, the easiest **random sampling** method, generates a multiple of a number: for example, every 5th, 10th or 34th name from a list. But beware of hidden patterns in your population list that could compromise the integrity of the sample. The patterns may include names sorted by frequency or recency of contact, geographic origin or similar company size.

### 13 Random digit dialing

Random digit dialing for telephone surveys enables interviewers to call unlisted, new and recently changed numbers.

### 14 Using more than one method

You may use more than one sampling method for your survey.



*You may do a simple random sample, but purposely over-sample one **stratum**: e.g., households with a certain level of income. With these additional data, you can perform two studies – one on the whole population and the other on a specific subset. This type of sample is called a **stratified sample**.*



*You can take equal numbers of various subgroups – former, current and new customers – to maximize statistical power in tests.*



## SamplePower

## METHOD

***There are two basic methods to conducting a survey: self-administered and interviewer-administered. Self-administered surveys include mail, Web and other written surveys. Interviewer-administered surveys include telephone and in-person surveys.***

### **15 Consider your budget**

Telephone interviewing can be more expensive than other surveys when you consider long-distance phone charges, wages for interviewers and supervisory costs (in-person interviews also incur many of these charges).

Mail surveys are more economical if you have a large sample or if your sample spans a large geographical area. Remember to consider the method of returning the mail survey. For example, including postage on return envelopes can increase expenses but also increase returns. One of the best ways to increase returns is to include an incentive, such as a small amount of money, with your mailing.

Web surveys can also be another cost cost-effective method. You'll save on postage, printing and wages for interviewers – and it's easy to analyze the information you've received in an electronic format.



### **SPSS Data Entry**

### **16 Consider speed**

Web and telephone surveys are the most timely method of surveying. The typical time frame for collecting data through a Web or telephone survey ranges from a few days to a few weeks, while a mailed survey can add at least a month to the process.

### **17 Methods for long surveys**

If you must ask a lot of questions, or expect the respondent to spend an hour or more with your survey, perform in-person surveys.

If you can't afford to perform in-person surveys, the second-best option is a self-administered survey.

A lengthy mail survey is more likely to be completed than a 20-minute telephone survey.

### **18 Consider the subject matter**

If questions are personal or require a lot of thought, written self-administered surveys are a good choice.

### **19 Consider all the methods**

You may want to consider some of the alternate forms of self-administered surveys, including Web, fax, kiosk and computer-assisted adaptive surveys. However, you need to consider if this method makes sense for the population you are surveying.



*Before you choose a survey type such as Web-based, make sure you're able to get a valid sample population with that method. For example, some populations – such as members of certain professional organizations or students at many universities – have Internet access. However, you can't assume that everyone has access to the Internet.*



*In order to get accurate results with Web-based surveys, avoid volunteer surveys where you cannot control who takes the survey. While these surveys are a popular feature on many Web sites, your results will be skewed with a self-selecting sample. For example, if you are trying to learn how many hours per day people surf the Web, heavy Web users will be more likely to respond than the average person.*



### **SPSS Data Entry**

## LENGTH

***The ideal length of your survey is dependent on the population and type of your survey.***

### **20 Consider length of survey for the type you're using**

Limit the length of your survey to encourage prospective respondents to participate. Consequently, phone interviews should run no longer than 10 minutes.

Face-to-face interviews can continue for an hour or longer

Self-administered surveys should not exceed four pages for most populations.

Web surveys shouldn't require participants to have to take multiple steps to answer each questions.

- 21 Balance length and information** With a shorter survey, you should get a higher response rate and reduce the chance of error and *missing data*. However, you will also get less information from your respondents and may have a less comprehensive study.

## QUESTIONS

***The key to a successful survey is to ensure that your questions are concise and easy-to-understand and give you valid and reliable information.***

- 22 Keep the questions short** Try to keep each question under 25 words so they remain short and easy-to-understand.

- 23 Don't lead with responses** With interview surveys, avoid beginning questions with a phrase like:

"Do you very often, frequently, seldom or never..."

Since people pay attention to what they hear first, respondents listening to a question with this structure will focus on the choices, and not the question.

- 24 Avoid loaded questions** Loaded questions discredit your results. Edit your surveys to steer away from questions like:

"Many doctors recommend exercise as a way of maintaining good health. Do you agree?"

However, other questions have more subtle errors that can sway respondents. The example below illustrates how phrasing can affect a question.



*Consider how responses might vary to the following questions:*

*"Do you think the president is doing a good job of handling foreign policy?" or*

*"Please rate how the president handles foreign policy."*

*The second version has more balanced phrasing.*

- 25 Avoid double-barreled questions** Double-barreled questions ask for opinions about two subjects at the same time.

"Are you satisfied with the amount and kind of information you receive from your benefits administrator?"

When you receive the answers, you won't know which part of the question the respondent is answering. Are they responding to the *amount* of information or the *kind* of information?

- 26 Don't antagonize your respondents** Give respondents a way out of answering questions to which they might feel there is a "right" answer. Respondents are more likely to respond if they feel their answer is socially acceptable.



*"Did you vote in the last election?" is more likely to alienate a non-voter than, "There are many reasons why people might not vote in a given election. Sometimes they are ill, or very busy, or have to take care of an emergency. Thinking back to the last election, did you happen to vote?"*

- 27 Give your respondents a chance to remember** Respondents may have a hard time remembering details about past behavior.

Give them time to "think back" if you are conducting a phone or in-person survey.

Ask them to check personal records.



Help them fix a time period in their minds by referring to events or specific dates rather than “in the past five years.”

**28 Consider using open-ended questions**

**Open-ended** questions can give you a lot of important feedback and details about your respondents. Today, there are techniques available that make reliable analysis of open-ended survey responses fast and efficient. With these tools, open-ended responses help you learn a great deal about your respondents’ attitudes, perceptions and opinions.

**29 Where to place open-ended questions**

If your survey is divided into sections, placing open-ended questions and responses at the end of a section may give you more flexibility and more room for verbatim responses.



**SPSS Data Entry**

**30 Analyzing open-ended questions**

There are two types of open-ended questions. With one type of question, you have a predetermined list of answers that you expect to receive.



*A question might be, “Which breakfast cereals have you eaten in the past month?” In this example, you already know the breakfast cereals on the market, yet, have not supplied a list for the respondent.*

When analyzing responses, you can assign a code for each response, instead of typing in each name. You also want to assign codes for answers that you might not have expected.

You might get the answer “toast,” something you don’t consider a breakfast cereal. However, that answer might affect your overall results, especially if more than one person has the same answer.

The other type of open-ended question has multiple combinations of answers.



*Asking the question, “Do you have any additional comments about our product?” will generate comments that are not so quickly classified. In order to better analyze the*

*results, you can develop a list of categories into which the comments are sorted. After sorting, you will have an idea of how many people had positive or negative comments about different attributes of the product.*

**31 Coding responses**

Coding responses to open-ended questions can be time-consuming and may require data entry personnel who have a good understanding of the subject matter. Also, software tools can automate the tedious tasks involved in coding responses and reduce to hours what used to take days.

**RESPONSE CHOICES**

**If you provide a scale or choice of answers for the respondent, it’s important that the provided answers accurately reflect the respondent’s intended response.**

**32 Likert scales: offer a middle choice?**

The Likert scale is a ranked list of responses, often five or seven, ranging from one pole to an opposite pole.

Many researchers include a middle response option in a scale. The middle answer offers a comfortable response for subjects who have legitimately divided or neutral opinions.



Or, if you prefer to force respondents to make a choice, you can use a four-point scale that offers no middle choice.



It’s important to note that these items are not always “interval-scaled” – meaning, for example, the distance between “strongly agree” and “agree” is the same as “agree” and “neither agree nor disagree.” Treating such variables this way can lead to biased statistical results by

skewing the weighting of each response. However, there are statistical packages that can correctly do statistical analysis of such items.



### **SPSS Categories**

#### **33 “Don’t know”**

Should you offer “Don’t know” as a response option or not? By including it, you provide a response choice for respondents who genuinely “don’t know.” However, including this alternative enables some respondents not to state an opinion.

Research has shown that using “Don’t know” doesn’t affect the relative proportion of other responses. You also might find patterns in the groups of people who respond “Don’t know” to specific questions.

Statistical software can help you find and understand patterns in the respondents who answer “Don’t know” if they share similar characteristics.



### **SPSS Base, SPSS Missing Value, Analysis, AnswerTree**

#### **34 “Couldn’t say” or “Not applicable”**

Depending on the question, you could offer respondents the option to not answer, if their opinion is not grounded on experience. Then the respondent can tell you, “I couldn’t say,” or “Not applicable,” rather than “I don’t know.” By giving the respondent the opportunity to give a more precise answer, you will gain more information about your respondents.

Statistical software can help you find and understand patterns in the respondents who answer “I couldn’t say” or “Not applicable,” if they share similar characteristics.



### **SPSS Base, SPSS Missing Value, Analysis, AnswerTree**

## **FORMAT**

***A poorly formatted survey can deter people from responding and can also give skewed results. Make sure you create an aesthetically pleasing document that is easy to understand and follow.***

#### **35 Borrow from the pros**

You don’t necessarily have to start from scratch when developing your survey. You can borrow style from the large, well-known surveys such as the United States’ NORC’s (National Opinion Research Center’s) General Social Survey. Or, use survey research books that provide examples for business, academic or government environments. If the Gallup organization groups income categories in a certain way, those breaks may be good for your survey, too. In addition, use questionnaires in your specific industry as examples to emulate.



### **SPSS Data Entry**

#### **36 Leave enough space for comments**

If you add a space for respondents to make comments, make sure you leave enough room for them to write.

#### **37 Aesthetic considerations**

The presentation of a written survey can either encourage or deter a person from responding. Make sure your survey is inviting by:

- Including plenty of **white space** so the document does not appear intimidating
- Including color, if possible, but no more than two colors
- Using no more than two typefaces

#### **38 Don’t forget to give instructions**

To ensure that your respondent doesn’t get confused, at the beginning of a written self-administered survey, tell the respondent what instrument (pen, pencil) to use. At the beginning of each section, give instructions on how to respond to the questions. Also, don’t forget to tell the respondent how to return the form when it’s completed.



**39 Give respondents examples**  
On printed surveys, show respondents:

- How to fill in their address
- How to shade-in a circle
- How many circles or boxes to mark

**40 Interview in sections**  
With telephone or in-person surveys, ask respondents questions in chunks to reduce their fatigue and to keep them focused on the subject. Include pauses and announce the beginning of each section.

**41 Make your presentation look professional**  
Spending the extra time and money to produce a document shows that you take your research seriously. Likewise, your respondents will take the same attitude. If the survey is several pages, print the survey as a booklet. If you staple several pages together, you risk losing pages that get torn off.

For Web-based surveys, don't go overboard on the latest technology. Surveys that take too long to download or that require the most current versions of Web browsers will likely lose participants.

**42 Distinguish questions from answers**  
Make it as easy as possible for your respondents to fill out the survey.



*Put questions in upper- and lower-case and responses in bold.*

*Did you purchase a car in the last year? (Please circle one choice)*

**YES NO**

**43 Don't use lines**  
If you use open-ended questions, don't supply lines for writing responses. The lines limit the amount of feedback you'll receive and don't allow for different-sized handwriting. Instead, leave plenty of white space.

**44 Use checkboxes rather than blanks**  
Make it obvious where the respondent is supposed to make marks so it's easy for respondents to complete the survey. You can use:

- Boxes ☐
- Parentheses ( )
- Brackets [ ]
- Circle ☐
- Or another form of enclosure rather than a blank.

## PRETEST

***You shouldn't cut corners by eliminating the trial phase. There will always be problems that can be spotted only through pretesting, and it may be too late to fix them once the survey hits the field.***

**45 Perform two pretests of a new study**  
Conduct at least two pretests for all new studies.

The first pretest aims to correct problems with the self- or interview-administered survey, openly asking for help and comments.

Conduct the second pretest as you plan to carry out the actual survey.



*In a mail survey, go ahead and mail the surveys to a test sample to gauge response time and other factors.*

**46 Whom you should include in the pretest**  
Usually, no more than 75<sup>s</sup> respondents are needed for a pretest. The **pretest population** should be similar in characteristics (not in size) to the population of the real survey.

**47 How to find problems in your survey**  
The following tactics will help you find flaws in your survey.

- Read questions aloud or to someone else and observe how they sound. If the subject or sentence is complicated, split the question in two or rephrase it.
- Look for overuse of conjunctions such as "and," "or"

and “but” that create compound sentences, then try to eliminate them.

- Minimize the use of common prepositions used as phrase connectors, i.e., “with,” “except,” “by.”

Ask respondents to write in comments and additional responses. Response options you never considered may surface, which can be added to your list of alternatives. Then you can reduce data entry problems by cutting down on the number of write-in responses or “other” responses.

Look for the following common problems in surveys:

- Interviewer problems reading questions or recording answers
- Too many questions left unanswered
- Unclear instructions
- Time it takes to complete the survey is longer than you anticipated
- Too much clutter
- Redundant questions
- Too little space for open-ended questions

**48 Potential problems from your pretest analysis**  
When analyzing the responses from a pretest, you may find the following problems:

- Little or no variance among responses
- Too many “don’t know” responses
- Too many “other” responses
- Unclear *skip patterns*
- Misinterpretation of open-ended questions

If you find these problems, consider the relevance of a question and its wording.

## TELEPHONE SURVEYS

***Make special considerations when writing and formatting a telephone survey.***

**49 Remember, respondents can’t see the questions**  
Since respondents can’t reread items on a page, make sure they understand and remember the question that the interviewer is reading.

- Keep questions short – no more than 25 words
- Offer few response options – no more than five
- Limit number of items to rank – no more than three

**50 Writing an effective telephone script**  
When writing a script for telephone interviews, script the entire call, from the greeting through the closing. Make it clear and direct. You want to make sure the interviewer can easily follow the script, because simple blunders in speech can affect the confidence your respondent has in your survey – and the overall results.

**51 Prompt the interviewer**  
There are tactics the interviewer can use to help the respondent answer the questions. In the interviewer’s script, tell him/her to:

- Mention response alternatives within the question (but not at the beginning)
- Repeat a portion of the question for items in a series so respondents don’t forget what is being asked

**52 Break long surveys into sections**  
Give your respondents a breather. Breaking your survey into sections will hold the respondent’s interest longer. Even if there is not a logical subject change, make one. You need to keep respondents interested and alert during a long stretch of questions.

**53 Help the interviewer**  
During a survey, phone interviewers must concentrate on talking, listening and recording responses. To make their job easier and attain more accurate responses:

- Devise a simple *coding scheme*



*Use numbers to record answers when respondents rate something on a scale so the interviewers don’t have to write a long answer.*

- List instructions (anything NOT to be read to the respondent) in upper case

- Place check boxes on the right side of the page (assuming most interviewers are right-handed)
- Coach the interviewer how to answer common questions that may arise
- List common answers to questions in advance so interviewers don't have to write out the same response multiple times
- Conduct a practice session so you can listen to the interviewer and give feedback

## INTERVIEWER ADMINISTERED SURVEYS

***Make special considerations when planning telephone and in-person interviews.***

**54 Anticipate unavailability of respondents**  
For telephone surveys, give the interviewer a long list of names in case your sample isn't available or is unwilling to participate. To be safe, you should have between seven and 15 times more names than the number of completed surveys you want.

**55 Reduce the barriers to interview response**  
Lack of respondent availability and lack of cooperation are the main barriers to response for telephone or in-person interviews. To compensate for lack of availability, interviewers must keep calling. As the interviewer, you should keep the introduction concise and not mention the length of the interview unless it is short or if the respondent asks. Also, mention any incentives that the survey offers at the beginning. If the person does not want to participate, don't press, say "Thank you," and move on to the next name.

**56 Qualities of a good interviewer**  
A good interviewer is essential to a successful telephone or in-person survey. The following qualities make good interviewers:

- Understands respondents and is empathetic
- Listens well
- Maintains attitude of genuine interest: not mechanical
- Is articulate
- Can be objective
- Accepts rejection – doesn't take "no" personally
- Doesn't let mood affect performance

## SELF-ADMINISTERED SURVEYS

***Make special design and notification considerations when distributing written and Web-based surveys.***

**57 Explain your survey**  
To increase response, write a straightforward cover letter, no longer than one page, explaining:

- The purpose of the survey
- The benefits of the respondent's participation
- The seriousness/importance of the survey
- How the respondent's opinions will be used
- Who is sponsoring the survey

If possible, have an important or influential person sign the letter to give the survey more legitimacy.

**58 Certified mail can increase response rate**  
Sending a lengthy survey via certified mail can greatly increase response rate. Surveys can show an almost 100 percent increase in response rate. However, with a short form, response is not affected.

**59 Express mail and e-mail improve response and timeliness**  
Both express mail and e-mail can be especially effective when sending a survey to a business. It increases both the response rate and the timeliness of the return.

**60 Notify respondents in advance**  
Send respondents an e-mail or postcard – a pre-notification notice – to alert them that the survey will arrive in approximately one week. This notice will increase the likelihood of response because the respondents are more likely to expect or recognize the survey when it arrives. The note may also spark curiosity in the respondents, and they will look for the survey.

**61 Use commitment cards or e-mails to estimate response**  
**Commitment cards** and commitment e-mails ask prospective respondents to return a postcard or e-mail agreeing to participate in the survey. Pre-notification notices generally give a larger response rate than

commitment cards or e-mails. However, commitment cards give you an estimation of the response rate.

**62 Postcard and e-mail reminders increase response**  
Send a reminder by postcard or e-mail approximately one or two weeks after the initial survey mailing. These reminders should thank people who completed the survey while also reminding those who have not yet responded. Research shows that these postcards and e-mails greatly increase the response rate.

**63 Telephone follow-up can improve response**  
Telephone follow-up can increase response rates when personnel are well-trained. The personal contact and having someone explain the importance of the survey can encourage respondents to participate. However, don't forget your budget, since this can be a costly effort.

**64 Re-mail surveys to increase response**  
Send out duplicate surveys to non-respondents or to the entire sample group 10 to 14 days after the thank you and reminder postcard. Although this will cost more, it should increase your response rate.

**65 Wait about six weeks to start analysis for mailed surveys**  
Six weeks after the initial survey was mailed, you should have received about as many completed surveys as you ever will. Waiting another week or two can't hurt – unless you need to begin processing and analyzing right away. However, for Web-based surveys, you should expect to receive completed surveys in less than one week.

## INCENTIVES

*Use incentives to enhance respondents' motivation to complete the survey.*

**66 Use incentives where possible**  
The best incentive depends on your population, but, in general, monetary rewards are often the best incentive.

A six-year-old might cooperate for an hour in exchange for a treat or game.

Academics and some business audiences are motivated by the promise to share results.

In general, everyone is more motivated by personal rewards.

Using statistics, you can study the impact of incentives and get a clearer picture of your respondents' reactions.



**AnswerTree**

**67 Examples of concrete incentives**

- Gift certificates
- Cash
- Chances to win prizes in drawings
- Promotional or premium items, such as key chains or calendars

**68 Examples of intangible incentives**

Some respondents will react better to non-concrete incentives. Communicate tangible rewards to enhance respondent motivation.



*"Help our organization better understand this learning disability for the benefit of other sufferers." Or, "By telling us how you feel about our product, you will help us understand consumers' needs, which will result in the development of better, more useful products."*

## RESPONSE RATE

*Response rate is an important issue to consider since it can have a great impact on your results.*

**69 No "ideal" response rate**

There is no ideal **response rate** for surveys. A variety of factors influence the rate, including:

- Administration method
- Subject matter
- Presence of incentives/perceived awards
- Level of difficulty
- Aesthetic appeal
- Perceived cost of completion

## 70 What does non-response imply?

Non-response, by itself, should not be a cause for concern. But when non-respondents differ from respondents in relevant ways, you have to account for the bias. Software can help you analyze missing data patterns and account for these non-response variables. If you find that respondents are systematically different than the respondents:

- Weight your results so that the sample matches known population values
- Draw conclusions more carefully due to missing responses



### SPSS Missing Value Analysis

## DATA ANALYSIS

*Analysis delivers the value from your survey data. There are several ways to evaluate your data.*

## 71 Use a unique identification variable

After the surveys are returned, always place a unique identification number on each survey or record. This unique number, sometimes called a “case ID,” will help you track down problems in data cleaning as well as flag cases of particular interest during analysis.

## 72 Don't skip data verification and cleaning

When examining a new data set, perform data verification and cleaning. As the analyst, you should have an idea of how your file should look. Using data collection software during this step can help you save time by streamlining the process.



*For example, look to make sure the results to these questions are consistent with your experience:*

- *How many people should be managers versus staff*
- *The average number of years of education of the sample*
- *The proportion of missing cases you should have for a question that did not pertain to everyone*

Run a series of crosstabulations before doing further analysis to look for:

- Inconsistent relationships (such as someone saying they are a female, but whose relationship to the head of household is “son”)
- Unexpected averages
- A large number of missing values



### SPSS Base, Data Entry, SPSS Missing Value Analysis

## 73 Keep track of the analyses you run

When performing complex analyses, keep a record of the procedures you perform or the way you created new variables. This record will help you reconstruct your analyses if any questions arise and when you write your report.



### SPSS Base

## 74 What are your data like?

Different statistical procedures are appropriate for variables depending on what you want to learn and the **level of measurement** of the variable (refer to tips 75-77 for types of variables).



### SPSS Base, SPSS Categories

## 75 Using nominal variables

**Nominal variables** provide a list of choices with no meaningful order to the list.



*Examples include gender, type of organization that a person works for and hair color.*

An **arithmetic mean** of a **nominal variable** is useless. Instead, use the **mode** and run **frequencies** and crosstabulations using nominal variables. To display these data, use pie and bar charts.

## 76 Using ordinal variables

**Ordinal variables** have an implied order between the response choices.





*Ask an opinion on a particular issue where a code of 1 (strongly agree) means more agreement than a code of 2 (somewhat agree), but how much more is unknown.*

Examine the **median** and **mode** for these variables and run crosstabulations or tree-based approaches. Bar charts display the choices well.



**SPSS Base, SPSS Categories, AnswerTree, SPSS Advanced Models**

## 77 Using interval or continuous variables

**Interval** or **continuous variables** have an implied order and an implied distance between the response options. With a variable such as age in years, a one-unit difference is the same throughout the distribution.



*The numerical difference between 20 and 21 is the same as that between 45 and 46.*

These variables lend themselves to a much broader range of powerful statistics than do the previous variable types.

**Regression** is one of the more popular statistical procedures using interval-level variables. **Scatterplots** and **histograms** are appropriate graphical displays for these kinds of variables.

Don't be afraid to use continuous variables if appropriate; they will give you more information. If necessary, you can always collapse a continuous variable into a categorical variable (variable whose response options are categories – either nominal or ordinal). However, there are some instances where it is appropriate to use a continuous variable, but the respondent may not be able or willing to answer the question.



*For example, income in currency increments such as dollars or euros, is a sensitive and difficult question to answer. Respondents may feel uncomfortable or unable to answer the question in exact numbers. To reduce non-response, offer respondents a range from which to choose.*



**SPSS Base, SPSS Advanced Models, SPSS Regression Models, AMOS**

## 78 Crosstabulations

Crosstabulations are appropriate when you have two or more categorical variables. Continuous variables don't lend themselves to crosstabulation, since you would get as many rows or columns as there are different responses.

When looking at crosstabulations, if the probability of a chi-square is .05 or less, it is usually small enough for the analyst to feel that the distribution did not result from chance. The chi-square statistic does not measure the strength of the relationship; instead, it measures if a relationship is likely due to chance. The smaller the probability of the chi-square statistic, the more comfortable you can be that the patterns you see are "real." If your chi-square statistic is significant, you must then study the crosstabulation to characterize the pattern you see in the table.

## 79 Differences in the mean

Use a **t-test** to learn about differences in **means** between two groups.



*Are men who receive a certain surgical procedure more likely to be younger than women receiving the same procedure?*

You can determine the average age for each group, but you need a procedure like a t-test to confirm if the observed difference is due to chance, or if it can be considered "real." If the significance is less than .05, you will usually conclude that the differences in the observed averages are not due to chance, and that they reflect real population differences.

When presenting the results of a t-test, use a bar chart in which the height of each bar is the average score for each group. **Error bar charts** show both the group means and the precision with which the mean was estimated (often the 95 percent **confidence band**).

If you have more than two groups that you would like to compare, use the **ANOVA** procedure instead of a t-test.



# GLOSSARY

**Analysis of variance (ANOVA)** – a method of analysis used when dealing with one intervally scaled dependent variable and one or more nominally scaled independent variables; used primarily in the analysis of experiments to determine whether treatment population means are equal.

**Arithmetic mean** – the sum total of all observations divided by their number.

**Census** – an entire population that is of interest, as opposed to a sample of that population.

**Chi-square** – a test statistic often used in crosstabulations to test the hypothesis that the row and column variables are independent. That is, it measures whether the observed distribution is likely due to chance.

**Coding Scheme** – coding schemes are used to allocate a code (usually in the form of a number) to an open ended question. For example, If you're interviewing someone about a certain feature of a product and ask for their opinion, a coding scheme would allow you to then simply enter a code such as 1 for positive, 2 for negative and 3 for neutral as their answer. Coding scheme's are used to turn open- ended answers into data that can be analyzed.

**Commitment card** – card which asks respondents to commit to participating in a survey.

**Confidence band** – probability that, in the long run, a specified interval around the value of a statistic estimated from a sample actually includes the value that would be calculated from the whole population (if that were possible). Such “confidence intervals” are commonly calculated for confidence levels of 0.95 or 0.99.

**Continuous variable** – variable whose response options have an implied order and distance where one unit represents the same quantity throughout the scale. For example: age in years or weight in pounds or kilograms.

**Crosstabulation** – a table showing the relationship between two or more variables by presenting all combinations of categories of variables.

**Error bar chart** – plots the confidence intervals, standard errors or standard deviations of individual variables.

**Exact tests** – calculate the probabilities exactly rather than using estimates to find if a relationship exists. Necessary when you have small data sets, small sub-groups or unbalanced distributions.

**Focus Groups** – focus groups are a somewhat informal technique that can help you assess user needs and feelings both before interface design and long after implementation. In a focus group, you bring together approximately six to nine users to discuss issues and concerns about the features of a user interface. The group typically lasts about two hours and is run by a moderator who maintains the group's focus.

**Frequencies** – univariate distribution of responses to a question, also known as marginals.

**Histogram** – bar chart representation of a continuous variable where continuous responses are grouped.

**Interval variable** – see continuous variable.

**Level of measurement** – refers to the way your questions can be answered. Three levels of measurement include nominal, ordinal and interval (see other entries for descriptions).

**Mean** – see arithmetic mean.

**Median** – a measure of central tendency for ordinal data, defined for ungrouped data as the middle value when the data are arranged in order of magnitude.

**Missing data** – questions with invalid data. This can be caused by questions left unanswered by “don't know” responses or by mismarked responses, among other reasons.

**Mode** – category of a variable that occurs with the greatest frequency.

**Nominal variable** – variable whose response options have no implied order. For example, hair color or company department.

**Nonparametric tests** – statistical tests that require either no assumptions or very few assumptions about the population's distribution.

**Non-response rate** – proportion of sample population that doesn't respond to the survey. Look for patterns in non-response.

**Open-ended** – a question in which no response list is provided. The respondent is expected to supply a free-form response.

**Ordinal variable** – a variable whose response options have an implied order but no implied distance. For example, a scale that ranges from strongly agree to strongly disagree.

**Population** – the totality of things (or people) that you wish to study. This group is often referred to as a “universe.”

**Pre-notification card** – a card alerting prospective respondents that a survey will arrive.

**Pretest** – A pretest is like a rehearsal of the actual survey to be conducted. The purpose of a pretest is to highlight problems and issues in order to better implement the final survey.

**Pretest population** – a group of people who perform the initial testing of one or more aspects of the research design. This group should have similar characteristics to the survey sample.

**Purposive sampling** – a sampling procedure in which each element of the population is purposely selected.

**Random sampling** – a sampling procedure that selects population elements based on chance and therefore ensures a sample that accurately represents the population.

**Regression** – estimation of the linear relationship between a dependent variable and one or more independent variables.

**Response rate** – the proportion of people who were given a survey that responded.

**Sample** – a portion of a population from which information is collected so as to obtain information and draw conclusions about the total population.

**Scatterplot** – a graph of data points based on two variables. One variable defines the horizontal axis and the other variable defines the vertical axis. Most frequently used for displaying continuous data.

**Skip pattern** – a method of questioning that requires the respondent to skip ahead to another question if the information in the current question is not relevant to him/her.

**Strata** – (plural of stratum) in sampling, are groups defined by certain characteristics in a stratified sample (see stratified sample).

**Stratified sample** – sample which selects respondents according to strata or characteristics of interest. For example, race or business title.

**Strong effect** – a high correlation between two factors, can also be thought of as a strong relationship.

**Systematic sampling** – a random sampling method that is equivalent to a simple random sample.

**t-test** – a hypothesis test that uses the *t* statistic to determine whether or not two means are equal in the population.

**White space** – an area on a page that contains no graphic or text.

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