

**Program Development  
& Evaluation**

# Using Excel for Analyzing Survey Questionnaires

**Jennifer Leahy**

## Introduction

You have created, tested, and implemented a survey, and now you would like to see the results of your work. This guide will help you set up a simple database in Microsoft Excel 2002® to analyze your survey data. Some steps may be slightly different in other versions of Microsoft Excel.\*

This guide is organized in five steps:

**Step 1 Create an Excel database**, page 1

**Step 2 Code your data**, page 6

**Step 3 Enter your data**, page 7

**Step 4 Clean your data**, page 8

**Step 5 Analyze your data**, page 8

**Resources** on page 28 include companion evaluation materials available online. You may find these helpful as you use this booklet.

## Step 1 Create an Excel database

When you open up Microsoft Excel®, you will see a blank **worksheet**. This worksheet is part of a **workbook**. A **workbook** holds all of your worksheets, and is simply another name for an Excel file.

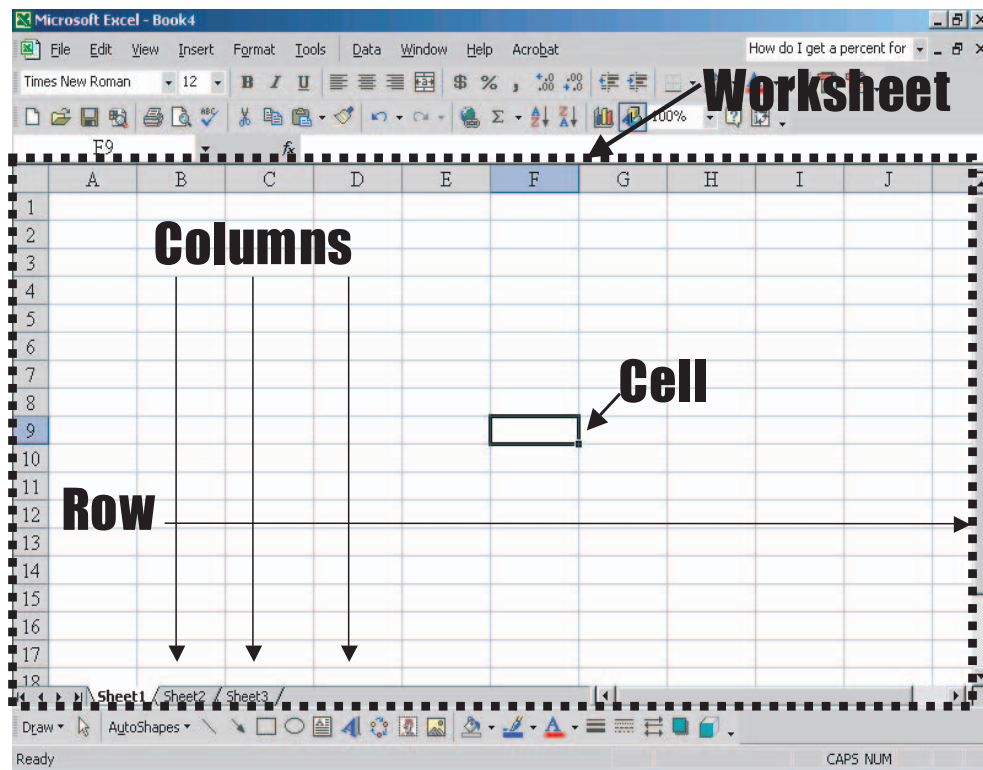
A blank Excel worksheet is composed of a series of vertical columns, horizontal rows, and individual cells (see Figure 1). You can select different worksheets by clicking on the tabs at the bottom of your workbook.

- **Columns** are alphabetized — A, B, C, D ... — from left to right across the top.
- **Rows** are numbered — 1, 2, 3, 4 ... — from top to bottom down the left of the worksheet.
- **Cells** are individual boxes within the worksheet.

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\* Using this product example is not intended to endorse it over others that may be similar, but rather as a convenience to readers. Microsoft Excel® is a registered trademark of Microsoft Corporation in the United States and other countries.

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**Figure 1: Blank Excel worksheet\***

## Create a title for your database

**To begin creating your Excel database:** Type the survey title in the first cell at Row 1, Column A (“Type your title here” in Figure 2, “Title of survey” in Figure 3).

Then move down two rows to Row 3, Column A. This is where you will enter **column headers** — labels to identify each question in your survey.

## Create column headers

The first column is for the ID number of each questionnaire. This is called a **unique identifier**. Type the header “ID #” into the first cell in Row 3, Column A, as shown in Figure 3.

## What is a unique identifier?

A **unique identifier** is an assigned number that identifies each questionnaire. When assigning unique identifiers, you may want to use incremental ID numbers such as 001, 002, 003, 004.

Write this number on the corner of each paper survey questionnaire, and enter that same number in the column labeled “ID#” followed by the data for that questionnaire. Later, this will allow you to find a particular questionnaire or remove identifying elements from your database.

\* Screen shots reprinted by permission from Microsoft Corporation.

Next, create column headers for each of the survey questions (see Figure 3). Decide which kind of header will work better for you.

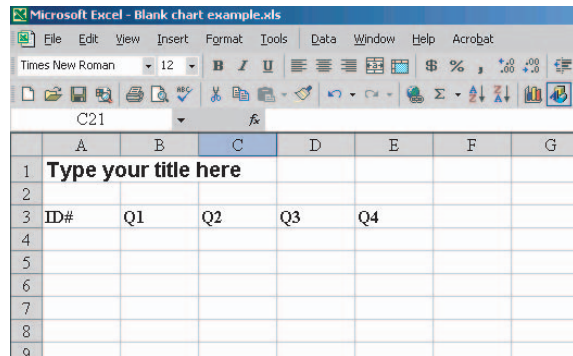
**You can label columns one of these ways:**

- For narrow columns, use the **number of each question** — Q1, Q2, Q3, Q4.
- Or use a **descriptive header** that encapsulates each question’s meaning — for instance, if a question asks “Do you smoke?” the column header could be “Smokes?”

Keep track of the header you give to each question. A good way to do this is to take a blank questionnaire and write the header next to each question. This is your **codebook**.

Continue creating column headers until all questions are labeled. Each question header is entered into a separate column.

**Figure 2: Create a database title and column headers**



**Adjusting column width and row height**

You can adjust column width to fit your headers and data. However, keep the columns as narrow as possible. This allows more columns to be seen at once and makes the database easier to navigate.

**Adjust column width**

To **adjust column width**: Move your cursor over the top of the column you want to adjust. The **stretching tool** will appear (◄►).

Click and hold the left mouse button over the stretching tool. Then drag this to adjust the column size to be as wide or as narrow as you desire.

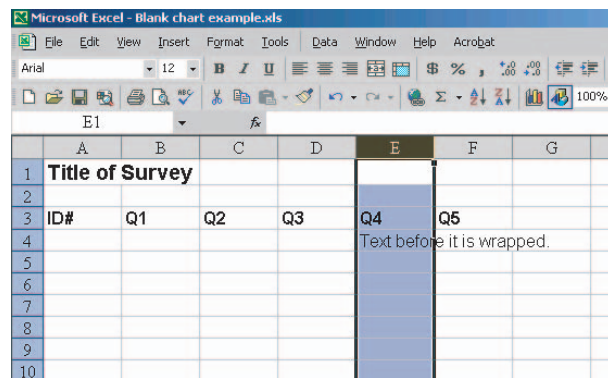
**Auto-format column width**

To **auto-format column width**: You can change column width automatically either of these ways:

- Double-click on the stretching tool.
- Or select (highlight) the entire column or columns you want to adjust.

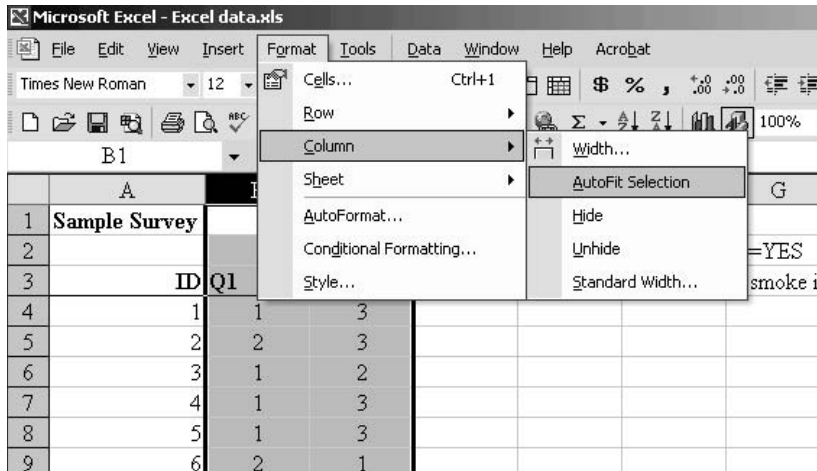
**To highlight (select) an entire column:** Point your mouse over the letter at the top of the column. When an arrow pointing down appears, click your mouse to highlight the entire column (see Figure 3).

**Figure 3: Highlight a column**



Then go to the menu bar, and select “Format>>Column>>AutoFitSelection” (see Figure 4).

**Figure 4: Format column width**



This will change each column width to fit the widest label or value you entered in that column.

If you have open-ended questions on your survey, see how to wrap text as shown in Figure 5 and Figure 6.

### Adjust row height

**To adjust row height:** Move your cursor over the row number on the far left. The **stretching tool** will appear (↕).

Click and hold the left mouse button over the stretching tool. Then drag this to change the row height.

### Wrap text

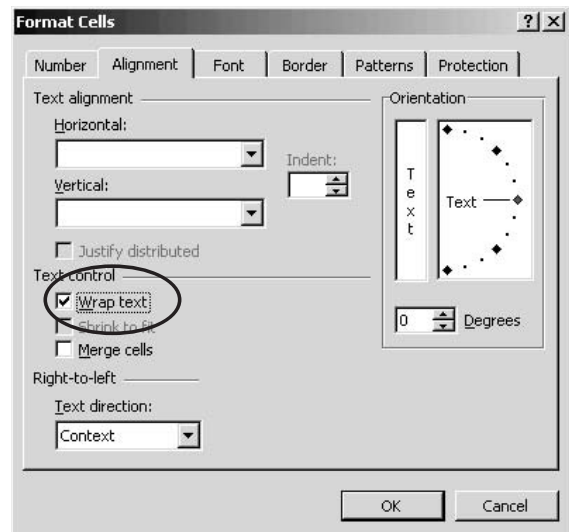
If you have open-ended questions on your survey, you may need to format those columns in your database to make room for the text.

**Wrap text** helps you see all of the text in the cell regardless of the amount of narrative data.

**To wrap text:** First, highlight the cells in which you want text to wrap. You may want to select an entire column to wrap text for every response to a question.

After highlighting the cells or column(s), go to the menu bar and select “Format>>Cells.” Select the “Alignment” tab at the top of the window that opens. Under “Text control,” select the “Wrap Text” option (see Figure 5).

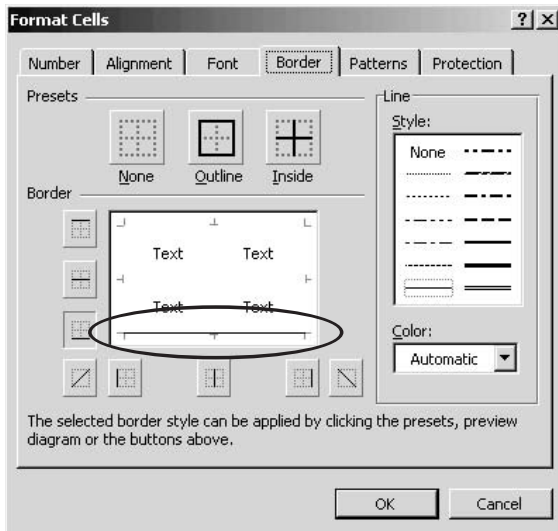
**Figure 5: Select “Wrap Text”**





Next, from the menu bar, click on “Format>>Cells.” Select the “Border” tab at the top of the window that opens. To underline your headers, click on the bottom of the white box that says “Text” in the middle. This will create a line under your headers (see Figure 8).

**Figure 8: Underline headers**



You have now created the framework for a database that should look something like Figure 9.

**Figure 9: Sample database without data entered**

	A	B	C	D	E	F	G	H	I	J
1	<b>Title of Survey</b>									
2										
3	<b>ID#</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q5</b>				
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

## Step 2 Code your data

When you use a database, every response item on the questionnaire needs to be entered as a numbered **code** (except narrative text). To do this, assign numbers to your responses prior to entering your data.

### What is a response item?

A response item is one possible answer to your survey question. In the first question on the next page — “Do you smoke?” — “No” and “Yes” are the response items.

When assigning numbers to response items in a question:

- Start with a small number such as 1 (but not zero).
- Or leave the cell blank if the question is unanswered.

Sometimes, numbers already exist next to the responses in your survey. These are your codes. For example:

1. Do you smoke? (Please circle your response.)
  - 1 No } 1 = code for “No”
  - 2 Yes } 2 = code for “Yes”

Other times, there may be no numbers next to the responses. Then you need to assign response code numbers before you enter the data. For example:

2. Do you think secondhand smoke is harmful?
  - No 1
  - Unsure 2
  - Yes 3

**If unanswered, leave cell blank**

The response code may be the number a respondent gives. In this example you would enter the number 20 in your database.

3. How many cigarettes do you smoke in a day?  
20

If a question is not answered, leave that cell blank.

While assigning codes to your response items, note the codes in the same codebook you used to document your column headers.

## Step 3 Enter your data

Beginning with Row 4, enter the ID number, then the data for each questionnaire (see Step 2). Do this by typing the code of the selected response for each question in the cell under that question’s header. Be careful to enter each response accurately.

### Troubleshooting

While entering your data, you may encounter some unexpected problems. Here are tips for preventing problems and dealing with common situations that come up while entering data:

- **If a question is not answered:** Leave the cell for the unanswered question blank or code it as no response.
- **If the respondent missed an entire page of the survey:** If possible, contact that respondent again to complete the survey. Or leave the cells for unanswered questions blank.
- **If two responses are selected for a question when only one is requested:** That invalidates the data for that question. Treat this question as if it were not answered.
- **If someone circles data between two points on a scale:** This can be tricky. If you are not sure of the response, treat the question as if it were not answered. Or treat all responses that lie between two points on a scale the same. For example, give them all the exact same number that is directly between the two points, such as 0.5 if the response sits somewhere between 0 and 1, or round to the higher or lower number. The important thing is to treat all responses between two points on a scale the same way. Note this in your codebook.
- **If an open-ended response is incomplete:** Enter the data that are given.

**Make backup copies**

Remember to **SAVE, SAVE, SAVE!!!** Save your file after each record using the keyboard command <ctrl-s>.

**After all your data are entered:** Create at least one backup copy of your file. This will be helpful during the analysis process.

**Step 4  
Clean your data**

After you have entered all your data, you will want to clean your data to make sure they are accurate.

**If you have a small number of questionnaires:** Go through each paper survey and compare it with the data in your database to make sure the two documents match. Checking each questionnaire is a best-case scenario.

**If you have a large number of questionnaires:** Revisiting every entry may be too time-consuming. Carefully scan the worksheet for unusual entries such as a 14 when the responses should range from 1 to 4.

Look down the column of responses for each question, and see if any entries look unusual. If they do, go back to the original questionnaire and check to make sure the data are accurate.

You can also check your data entries in Excel by running frequencies on your data using the PivotTable feature. Creating frequencies using PivotTables easily and accurately identifies responses that do not belong in your data. You will read more on PivotTables in the next step, “Analyze your data.”

**Step 5  
Analyze your data**

Now that all the data are entered, you are ready to analyze your data. Think about what you would like to do with your results:

- Who will read or use the data?
- What do they want to know?
- What types of analyses will they want? What will be of most interest?
- Will you want charts or graphs to illustrate your findings?

Use the answers to these questions to determine what analyses will meet your needs.

The following provides help to easily calculate **basic analyses in Excel** — frequencies and percents; means, modes and medians; ranges, standard deviations, and variance.

**Frequencies and percents**

A **frequency** tells you **how many times** something occurred. A **frequency table** displays frequencies and/or percents of the response items for one question (see Figure 10).

**Figure 10: Frequency table for Q1 “Do you smoke?”**

	A	B	C	D	E
1	Frequencies for Q1, "Do you Smoke?" in Sample Survey				
2					
3	Q1 Do you smoke? 1=NO 2=YES				
4					
5		<b>Code</b>	<b>Value</b>	<b>Frequency</b>	<b>Percent</b>
6		1	No	16	57%
7		2	Yes	12	43%
8			Total	28	100%
9					
10					
11					



Excel gives you two ways to create frequencies:

**COUNTIF** function — You type in formulas that calculate frequencies.

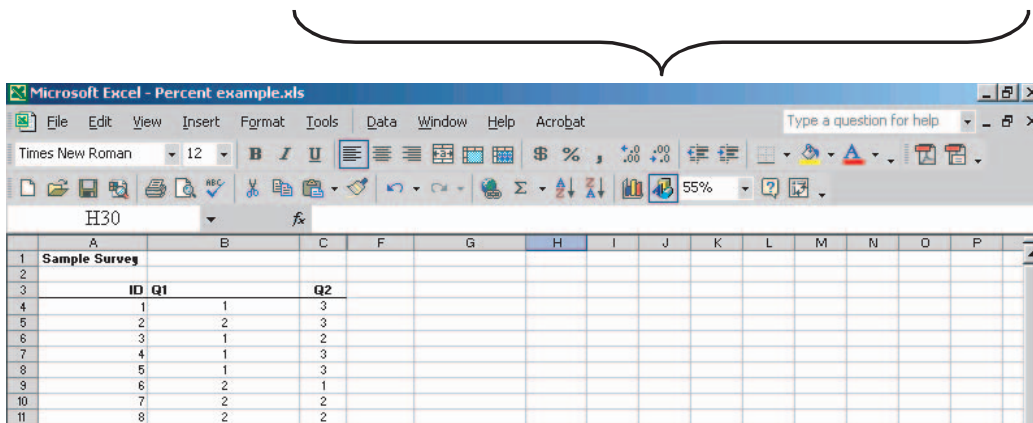
**PivotTable Wizard** — Use the PivotTable Wizard to create frequencies that are automatically formatted into a table.

**COUNTIF**

The Excel **COUNTIF** function is a formula inserted into a cell or the **formula bar**. The formula bar displays the information from the active cell and vice versa. Formulas may be entered directly into a cell or the formula bar. But when using the formula bar, the appropriate cell must be selected first.

The **formula bar** is located under the buttons at the top of your Excel window (see Figure 11).

**Figure 11: Formula bar**



**To select a different worksheet:** Click on the appropriate tab at the bottom left-hand corner of your worksheet (see Figure 12).

**Rename and add worksheets**

By default, Excel provides “Sheet1,” “Sheet2” and “Sheet3.” You can rename these tabs and add new worksheets:

**To rename the tab:** Right-click over the tab you want to change, then select “Rename.”

**To add a new blank worksheet:** Right-click over the tab you want to change, then select “Insert,” then “Worksheet.”

**COUNTIF** calculates frequencies for **each** response item. For instance, if you asked “Do you smoke?” and 1 = No and 2 = Yes, you would need to use a separate COUNTIF function for each response item, 1 and 2.

Before you enter your COUNTIF formulas, create an empty table in a separate worksheet.

**Creating an empty frequency table**

Create an empty table in a worksheet that does not contain your data, but is in the same Excel workbook.

Once you have selected the new sheet, create your table (see Figure 12). Enter:

1. A title for your frequency table.
2. The name of the question you are analyzing.
3. The header "Code" and the codes for the question.
4. The header "Response Item" and the label for each code you listed. Type "Total" below the response items.
5. Headers for "Frequency" and "Percent."

**Figure 12: Frequency table created in a new sheet in the same workbook**

The screenshot shows a Microsoft Excel spreadsheet with the following content:

Frequency Table for Questions in Sample Survey			
Q1 Do you smoke? 1=NO 2=YES			
Code	Response Item	Frequency	Percent
1	NO		
2	YES		
	Total		

Callouts in the image provide the following explanations:

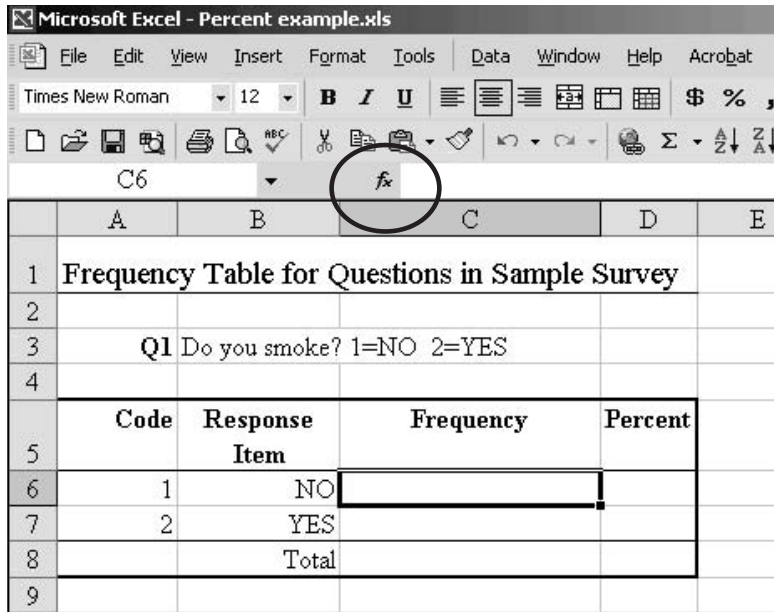
- 1. A title for your frequency table. (Points to the title in row 1)
- 2. The name of the question you are analyzing. (Points to the question text in row 2)
- 3. The header "code" and the codes for the question. (Points to the 'Code' header and codes in row 5)
- 4. The header "Response Item" and the label for each code you listed. Type "Total" below the response items. (Points to the 'Response Item' header and 'Total' row in row 5)
- 5. Headers for "Frequency" and "Percent" (Points to the 'Frequency' and 'Percent' headers in row 5)
- These tabs allow you to navigate among worksheets. (Points to the worksheet tabs at the bottom)

**Calculating frequencies using COUNTIF**

Now that you have created an empty table in a separate worksheet, you can **enter the COUNTIF formula**.

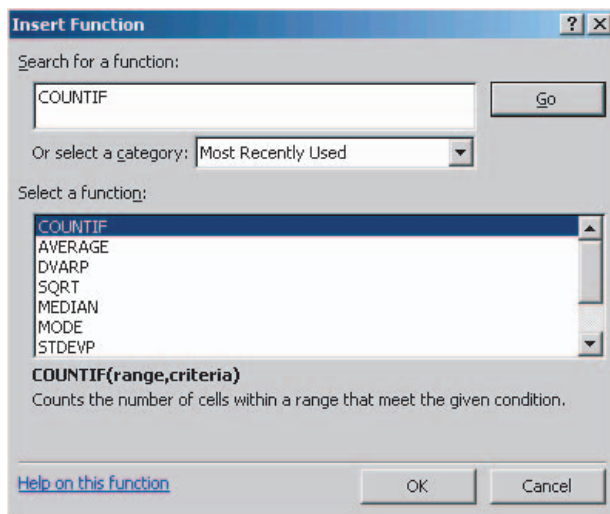
First, start in the appropriate cell of your table (see Figure 13).

**Figure 13: Select a blank cell in your table**



**To calculate the frequency for a question in Excel:** Click on the function key **fx** that you see next to the formula bar. Make sure the blank cell you originally selected is still highlighted by a thick black outline. The “Insert Function” window will pop up as shown in Figure 14.

**Figure 14: Select COUNTIF in the “Insert Function” window**

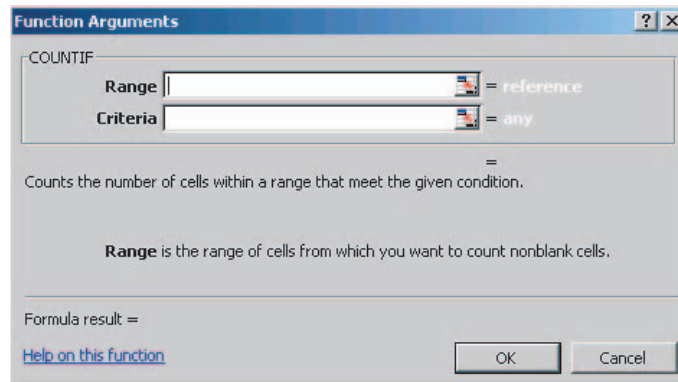


Under “Select a function”: Select COUNTIF

**If COUNTIF does not appear when the window opens:** Type COUNTIF in the “Search for a function” field, and click “Go.” COUNTIF will appear. Select COUNTIF, then click on “OK” (see Figure 14).

In the next window, you will be asked to choose a “Range” and “Criteria” (see Figure 15).

**Figure 15: Choose Range and Criteria in the “Function Arguments” window**



**Range** is the group of cells that contain the data you want to analyze.

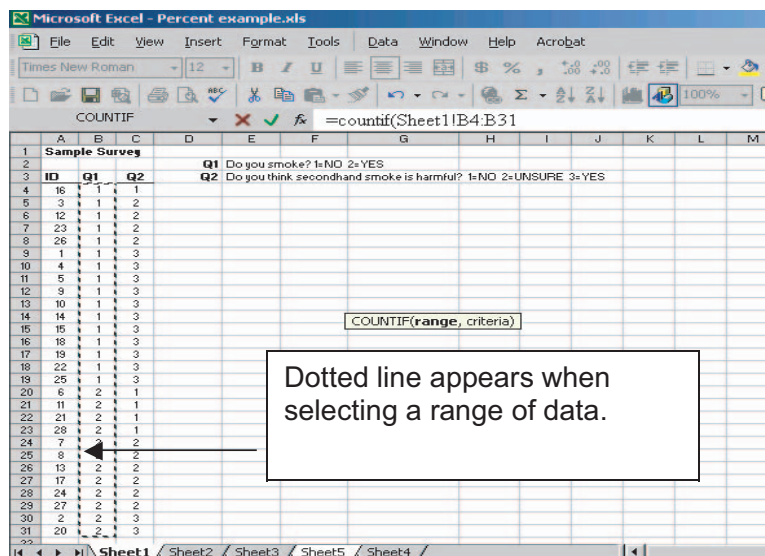
**To select a range:** First, make sure your cursor is in the range field. Then go to your data worksheet, and use your mouse or keystrokes to highlight the data you want analyzed (see Figure 16).

**To highlight data:** Place your cursor in the top data cell of the data column for the question, and use your mouse or keyboard as follows:

- Hold down the mouse button and drag the cursor to the bottom cell of the data column.
- Or hold down the shift key while using the down arrow key.
- Or select data using cell labels.

A dotted line appears around the data you select.

**Figure 16: Highlight the range of data**



**Select data using cell labels:**

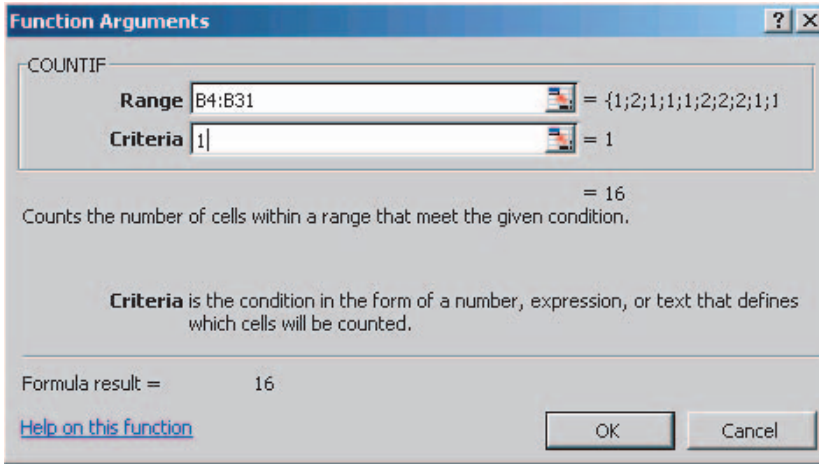
In the blank cell you chose, type the **column letter** and **row number** of the first data point in the column for the question you want to average — **B4** for Q1 in this database. Then type a colon : to separate the data points. Finally, type the column letter and row number for the last data point in the range — **B31** in this database.

So in this database, you could have typed **B4:B31** in the blank cell you chose, instead of highlighting the data with your mouse or keystrokes. Either way, a dotted line appears around the data you select.

In Excel, **criteria** means the **code of the specific response item** for which you want frequencies. If you asked “Do you smoke?” and codes are 1 = No and 2 = Yes, to count the number of people who answered “No,” criteria would be response code number 1.

**To select criteria:** In the “Criteria” field, type the code for the response item. Then click “OK” (see Figure 17).

**Figure 17: Type the criteria (response code)**



After you have successfully created a COUNTIF formula, a number will appear in the cell. This is the **frequency**.

For a completed frequency table, see Figure 8 below.

## Percents

Using the frequency table you created with COUNTIF, you can create a table that shows percents for your data. See Figure 19 for a completed table with percents.

### To create percents using formulas in Excel:

First, create a frequency table for all possible response items by using the COUNTIF function. Then calculate the total number of responses by summing all of the frequencies in your table.

**To calculate percents:** In a separate column, enter a formula to divide the frequency for each response item by the total number of responses. For example, to calculate the percent of total Q1 respondents (28) who answered “No” (16), enter the formula **=16/28** in the “Percent” column (see Figure 18).

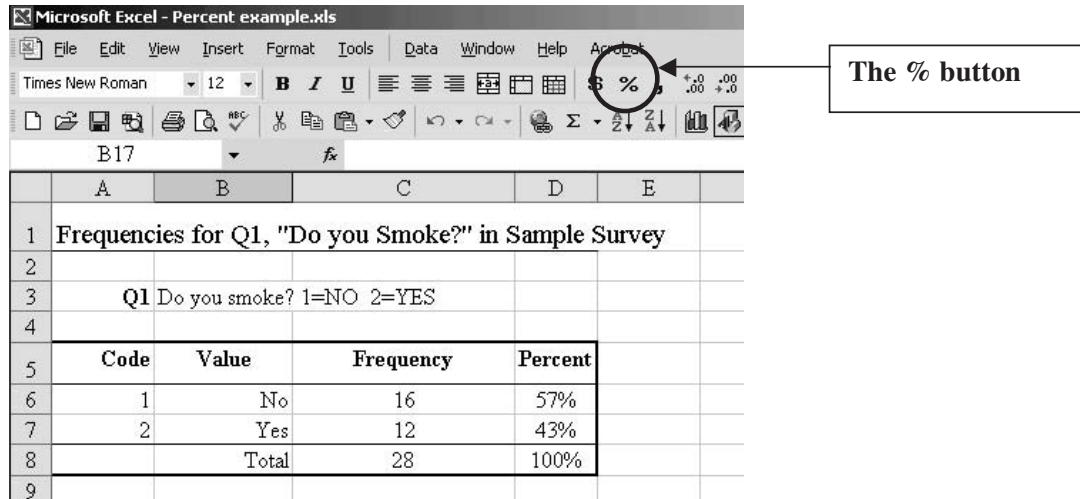
**Figure 18: Formulas to calculate percents**

	A	B	C	D	E
1	Frequencies for Q1, "Do you Smoke?" in Sample Survey				
2					
3	Q1 Do you smoke? 1=NO 2=YES				
4					
5	Code	Value	Frequency	Percent	
6	1	No	16	=16/28	
7	2	Yes	12	=12/28	
8		Total	28	=28/28	
9					

After you enter the formula into a cell, a figure will appear. This figure will begin with a decimal point.

**To make the resulting decimal look like a percent:** Select the cells containing your intended percents, then hit the “%” button located below the menu bar (see Figure 19).

**Figure 19: Frequency table with percents**



If you want, you can then delete the “Frequency” column by highlighting the cells you no longer need — in the Figure 19 example, cells C5 through C8. Then right-click over the highlighted cells and select “Delete.” When prompted, select “Move cells to the left” to complete the table.

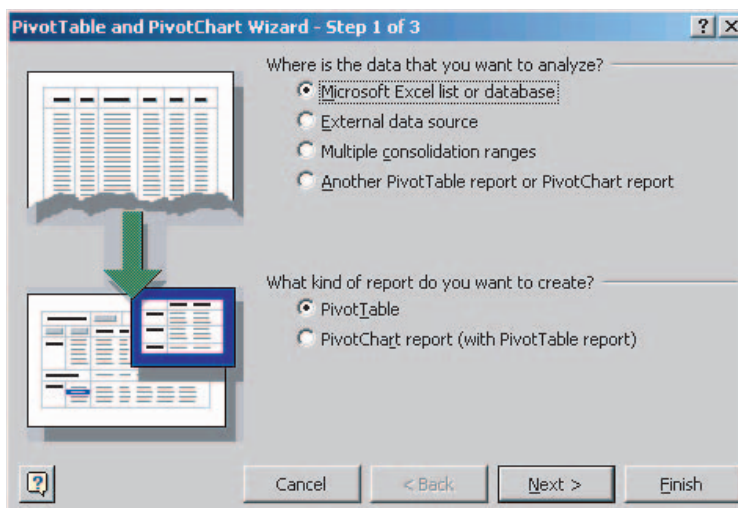
### PivotTable frequencies

You can use the **PivotTable Wizard** in Excel to calculate frequencies and percents. Instead of creating a formula for each response item, the PivotTable Wizard immediately displays in a table all of the possible frequencies for your question.

**To calculate frequencies using the PivotTable Wizard:** Click on “Data” in the menu bar. Then click on “Create a PivotTable report or PivotChart report.”

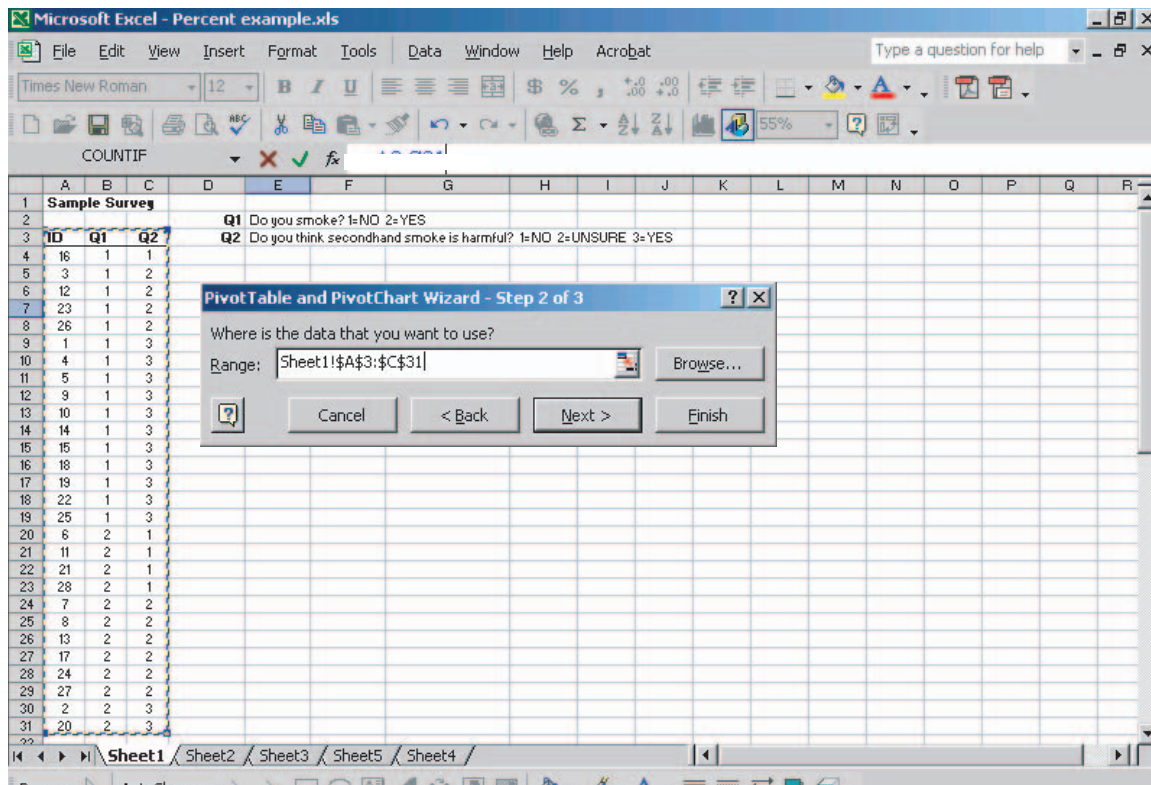
A window appears as in Figure 20. In this window, click on “Microsoft list or database” and “PivotTable.” Then select “Next >.”

**Figure 20: Create frequencies using PivotTable Wizard**



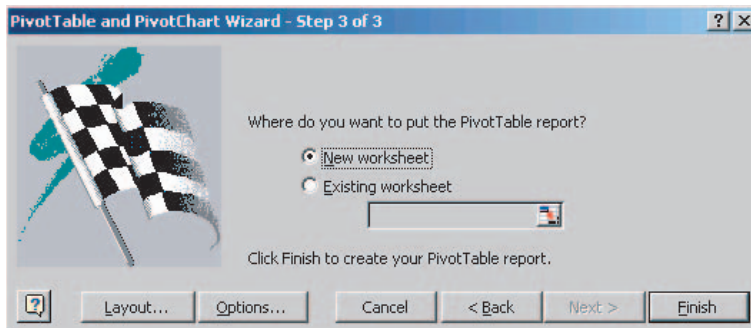
In the next screen (Figure 21), the PivotTable Wizard asks you to choose the data you want to use. Begin with the cursor in the range field, and highlight all of your data or selected questions. Include the question headers (see Figure 21). After you have selected your data, click “Next >.”

**Figure 21: Select your data**



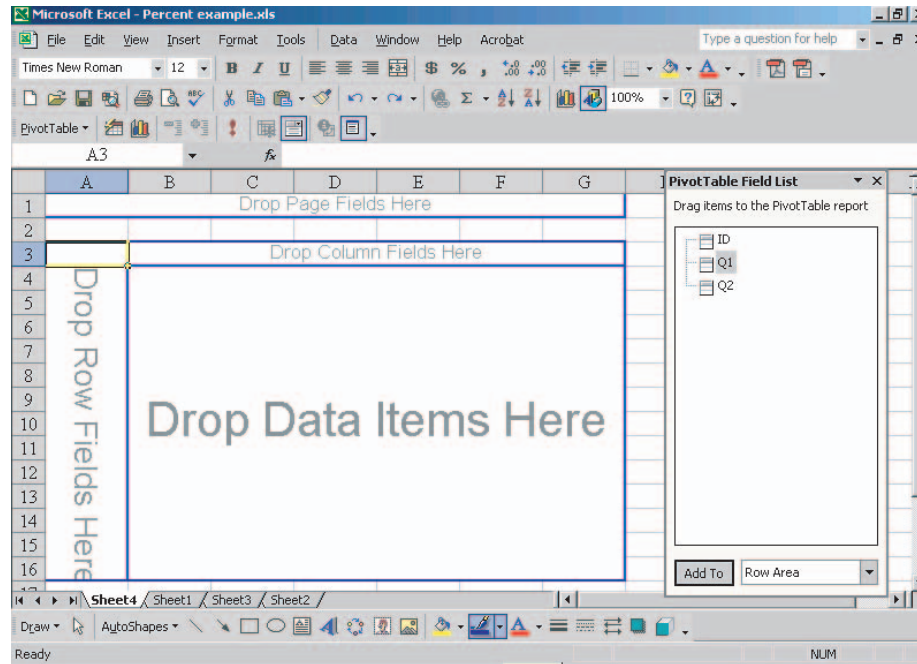
In the next screen (Figure 22), choose “New worksheet.” Then click “Finish >.”

**Figure 22: Choose “New worksheet”**



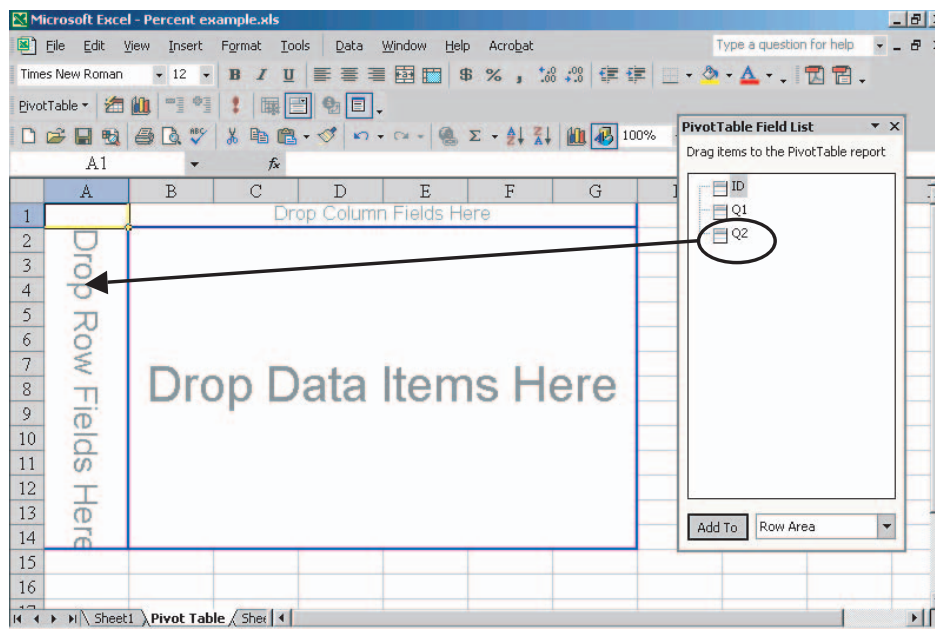
Excel then takes you to a screen that looks like Figure 23.

**Figure 23: PivotTable row and data fields**



Choose the question for which you want to create frequencies in the “PivotTable Field List.” Drag the question header from the “PivotTable Field List” to the “Drop Row Fields Here” box in the PivotTable (see Figure 24).

**Figure 24: Drag the question header into the “Drop Row Fields Here” box**

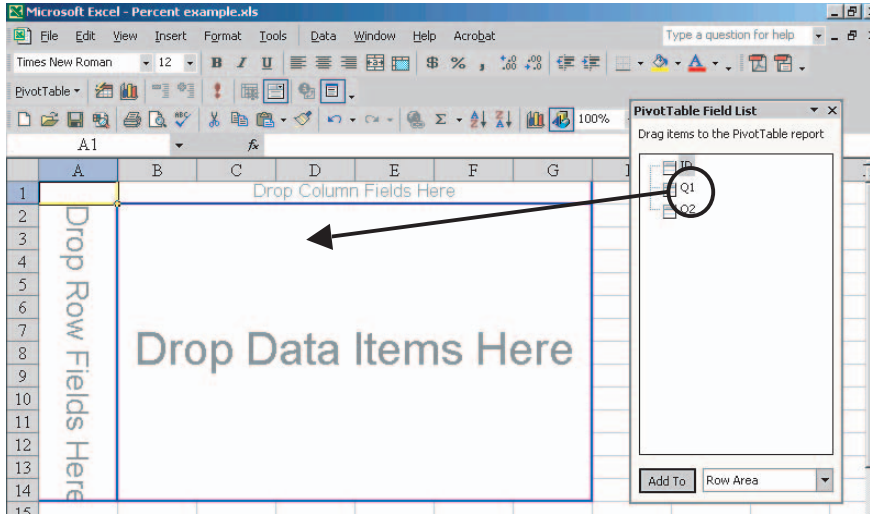


After you have dragged the question header to the “Drop Row Fields Here” box, the response items will appear in the PivotTable.



**To make data appear in the PivotTable:** Select your question from the “PivotTable Field List” again. This time, drag the question into the field that says “Drop Data Items Here” (see Figure 25).

**Figure 25: Drag the question header into the “Drop Data Items Here” box**



You now have a PivotTable that lists the response items for the question you chose, and the response items’ frequencies (see Figure 26).

**Figure 26: Frequency PivotTable for Q1 “Do you smoke?”**

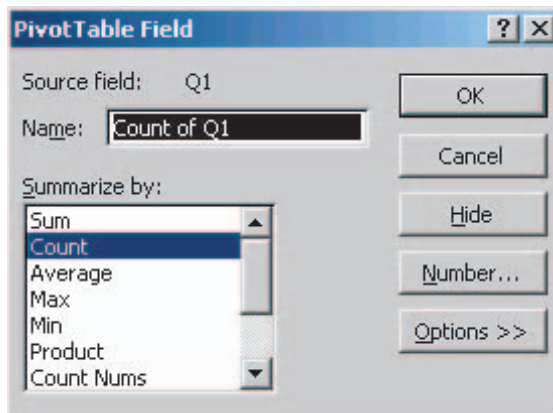
Count of Q1	Total
Q1	
Doesn't smoke	16
Smokes	12
Grand Total	28

Double-click here if it does not say “count.”

When checking over your frequencies, make sure that the top left cell in the table says “Count of [the question you chose]” (see Figure 26). If not, double-click on that cell.

This takes you to the “PivotTable Field” window. Go to the field below “Summarize by:” and select “Count” (see Figure 27) to make sure you have frequencies.

**Figure 27: Select “Count” in the PivotTable Field window**



**Inserting descriptive labels**

After you have created a frequency PivotTable, you may want to replace the response item codes with descriptive labels.

**To insert descriptive labels:** Click on the cell that holds the code. Then type in the label you prefer. In Figure 28, the descriptive label “Doesn’t smoke” replaces code 1, and “Smokes” replaces code 2.

**Figure 28: Descriptive labels for example Q1 “Do you smoke?”**

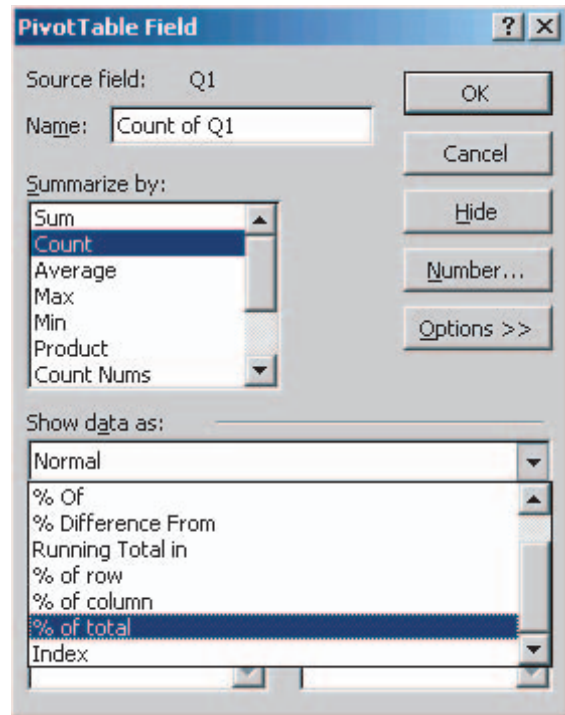
Count of Q1	
Q1	Total
Doesn't smoke	16
Smokes	12
Grand Total	28

**Percents**

**To create a PivotTable with percents:** First, create a PivotTable with frequencies (see directions on pages \*\*\*-\*\*\*). **After you complete the frequency PivotTable:** Double-click on the top left cell in your PivotTable that says “Count of [question you chose].”

In the “PivotTable Field” window, click on the button that says “Options>>.” An extension appears. In the drop-down menu “Show data as:” select “% of total” (see Figure 29).

**Figure 29: Create PivotTable percents**



**Show percents as whole numbers**

**To round percents to the nearest whole number:** In the “PivotTable Field” window, choose the “Number...” button, then choose %.

From the field “Decimal places,” select the number 0 to round to the nearest whole number.

Click on “OK” in both windows, and your PivotTable will show percents as in the Figure 30 example.

You will also round percents for PivotTable cross tabs (Figure 38 and Figure 39 on page 27).

You can also use this process to round percents in cross tabs created with the Pivot Table Wizard (Figure 38 and figure 39 on page 27).

**Figure 30: PivotTable percents**

Count of Q1		
Q1	Total	
1	57%	
2	43%	
Grand Total	100%	

### Measures of central tendency

Measures of **central tendency** include means, modes and medians. You can read more about when to use each of these in the UW-Extension booklet *Analyzing Quantitative Data* (see “Resources” on page \*\*\*).

#### Mean

To calculate a **mean** in Excel, use the **AVERAGE** function.

First, identify the data you want to average, and where you want the mean to appear.

**Where should you place your formula?** You may choose the cell at the bottom of the data column (see Step 1 below). Or you may choose a cell in a worksheet separate from your data worksheet in the same workbook.

Either way, make sure you create an adjacent label that clearly articulates:

- the **type of formula** you use, and
- the **question** for which you select the data to analyze.

After you have determined what data you are using and where you are going to place the mean, type the label and move on to calculating the mean.

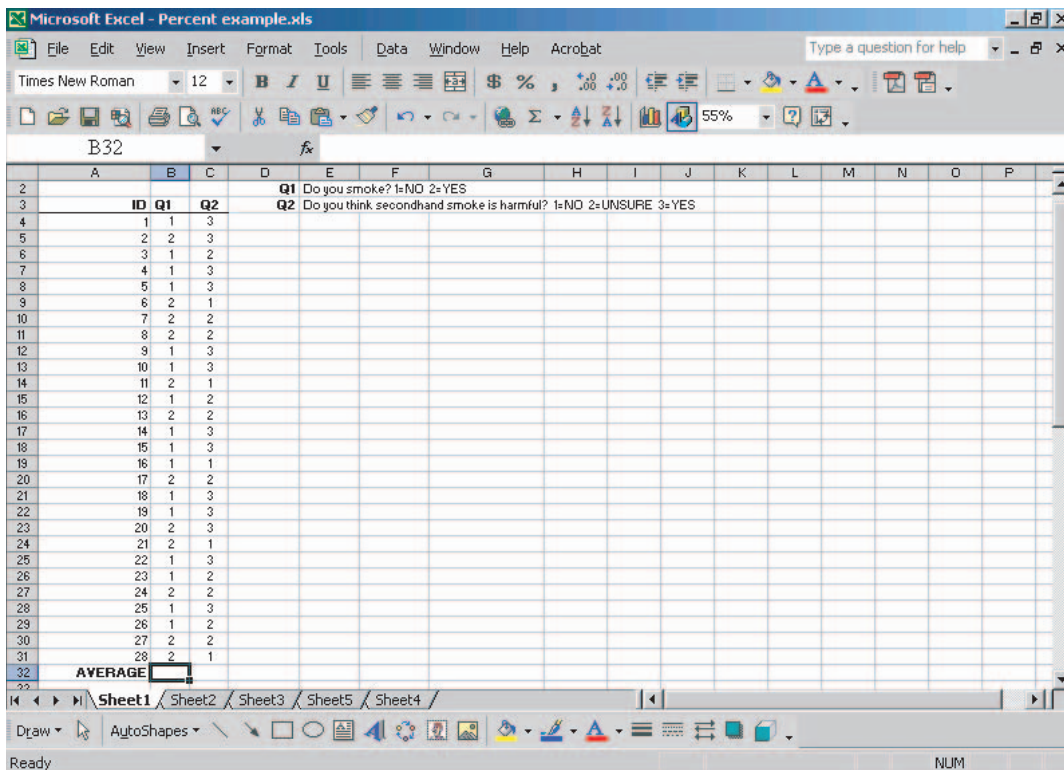
#### To calculate a mean for a question in Excel:

Either follow the directions for “Using the function Key” on page 21, or type the formula into the formula bar in the next four steps.

### Entering a formula

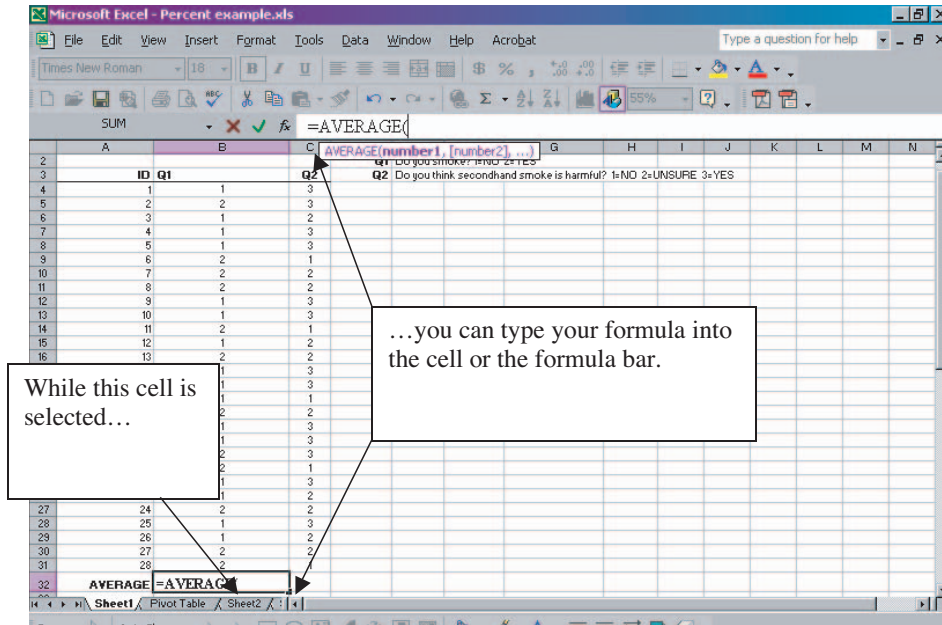
Do you want to calculate a mean, a mode or a median? A range or standard deviation? You can follow the “Entering a formula” directions on pages 19-21 to calculate any of these measures.

#### 1. Start in a blank cell.



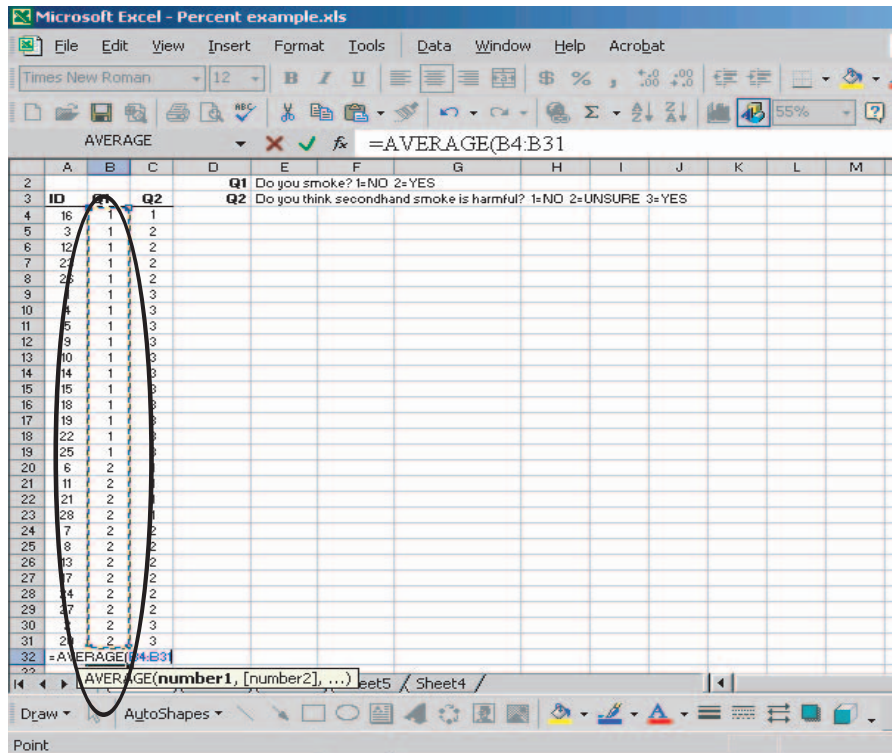
**2. While the blank cell is selected, type =AVERAGE( in the formula bar.**

You can also type this into the blank cell, since the formula bar displays information typed in the cell you selected, and vice versa.



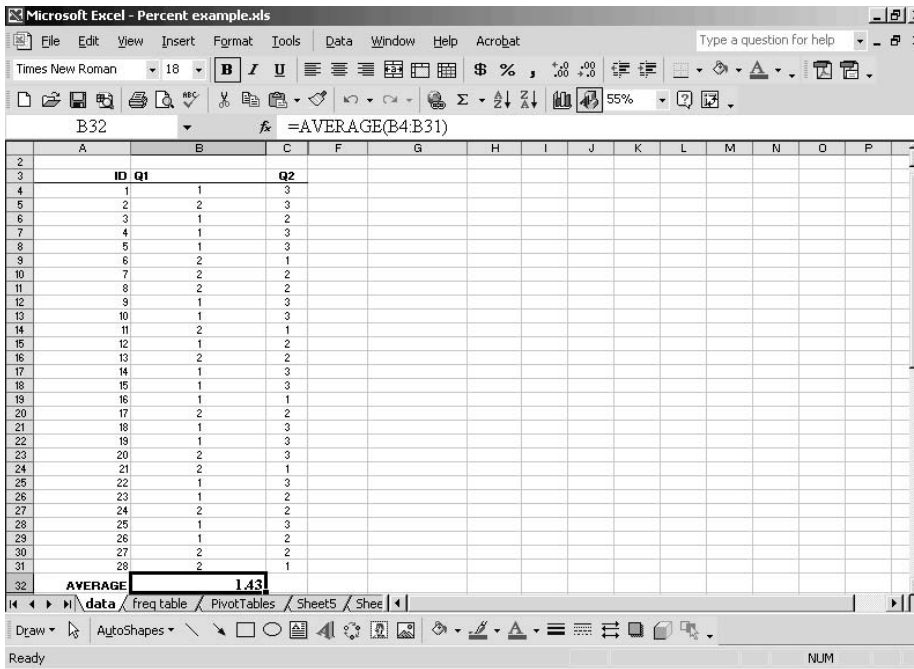
**3. Select a data range for the question you want to average.**

See page xx for how to highlight data.



**4. Close the formula by closing the parentheses.**


Type ) and then hit the Enter key (Return).




The mean for the question you chose will appear in the cell where you entered your formula. In the step 4 example, the **mean is 1.43**.

**To round to a certain decimal point:** You can use the  $\uparrow .00$  button to round up by a decimal point. This button is located on the standard toolbar. Click on the button as many times as necessary to round to the decimal point you desire.



**Using the function key **

Do you want to calculate a mean, a mode, or a median? A range or standard deviation? You can follow the “Using the function key”  directions on this page to calculate any of these measures.

**Using the function key **

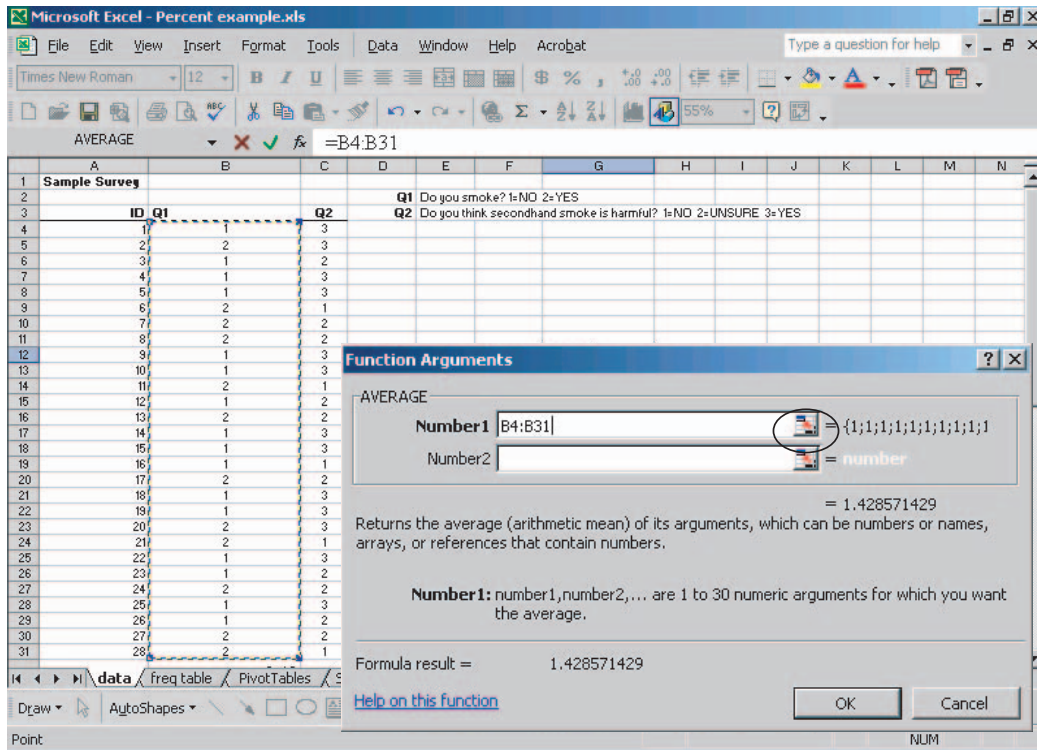
**To calculate a mean using the function key in Excel:** Click on the function key.  After you click on this key, the “Insert function” window appears. In this window, select AVERAGE from the “Select a function” field, then click “OK.”

After you click “OK,” the “Function Arguments” window will appear. Select a range of data in this window (see Figure 31). You only need to select a data range for the “Number1” field, even though Excel gives you two fields for entering a range.

**If the “Function Arguments” window blocks the data you want to select:** Click on the  button next to the “Number1” field. Clicking this button will collapse that window so only the “Number1” field appears while you select data. After you finish selecting your data, click on the  button again to make the rest of the window reappear.

If **AVERAGE** does not appear in the “Select a Function” field type **AVERAGE** in the “Search for a Function” field.

**Figure 31: Select a data range**



**After you have selected your data:** Click "OK." The cell where you inserted the formula should show the mean for the data you selected.

**Mode**

A **mode** is the most commonly occurring answer to a question. For example, in the string of numbers "1,1,1,2,2,2,2,2,3,3" the mode would be the number 2.

**To calculate a mode for a question in Excel:**

1. Start in a blank cell.
2. While the blank cell is selected, type =MODE( in the formula bar.
3. Select a data range for the question you want.
4. Close the formula by typing ) and then Enter (Return).

Or, you can use the function key . Select MODE from the drop-down field in the "Insert function" window. All other steps stay the same as for "Using the function key " on page 21.



**Median**

A **median** is the middle number for your question — an equal number fall above and below this number.

For example, in the sorted string of numbers "1,2,2,2,3,3,4,4,5,5,5" the median is the number 3.

**To calculate a median for a question in Excel:**

1. Start in a blank cell.
2. Type **=MEDIAN** ( in the formula bar.
3. Select a data range for the question you want.
4. Close the formula by typing ) and then Enter (Return).

Or, you can use the function key . Select MEDIAN from the drop-down field in the “Insert function” window. All other steps stay the same as for “Using the function key  ” on page 21.

**Measures of variability**

Measures of **variability** express the spread or variation in responses. Measures of variability include range, standard deviation and variance.

**Range**

A **range** shows you the minimum and maximum answers to a question. For example, in the sorted string of numbers “1,1,2,2,3,4,4,5” the range would be expressed as **(1, 5)**. Ranges are useful with questions such as timeframes, but not with categorical data.

**What are categorical data?**



**Categorical data** come from a question that has a limited number of response items.

For example, from the question “Do you smoke?” the responses “1 No” or “2 Yes” are categorical data.

**To create a range in Excel:** You will need to run two separate formulas on your data to obtain the minimum and maximum answers:

1. **To calculate the minimum for the question:** Start in a blank cell and type **=MIN**( in the formula bar. Then select the data range. Close parentheses with ) to close the formula.
2. **To calculate the maximum for the question:** Start in a blank cell and type **=MAX**( in the formula bar. Then select the data range. Close parentheses with ) to close the formula.

You then have the low and high values for your question. This is a **range**, which you can write out as **(MIN, MAX)**.



Or, you can use the function key  to calculate a range. Select MIN (and later MAX) from the drop-down field in the “Insert function” window. All other steps stay the same as for “Using the function key  ” on page 21.

**Standard deviation**

A **standard deviation** demonstrates the degree to which individual answers vary from the mean.

**To calculate the standard deviation for a question in Excel:**

1. Start in a blank cell.
2. While the blank cell is selected, type **=STDEVP**( in the formula bar.
3. Select a data range for the question you want.
4. Close the formula by typing a ) and then Enter (Return).

Or, you can use the function key . Select STDEVP from the drop-down field in the “Insert functions” window. All other steps stay the same as for “Using the function key  ” on page 21.

**Variance**

The **variance** is sometimes used instead of a standard deviation, and has the same purpose as a standard deviation. Variance is expressed as (Standard deviation)<sup>2</sup>.

**To calculate the variance in Excel:**

1. Start in a blank cell.
2. Type **=STDEVP**( in the formula bar.
3. Select a data range for the question you want.
4. Close parentheses with a ) to close your data range.
5. Type **^2** to complete the formula, then Enter (Return).

**Cross tabulations**

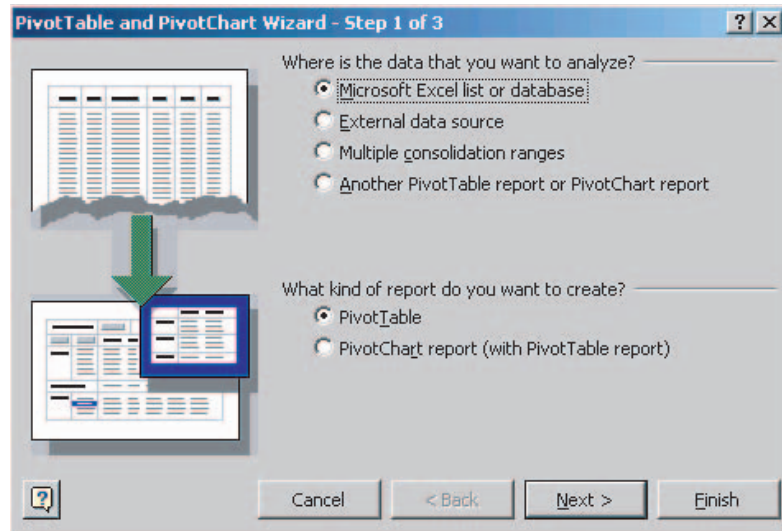
**Cross tabulations (cross tabs)** provide effective means to compare the results of two survey questions. In Excel, use the PivotTable Wizard to create cross tabs.

**To create cross tabs using PivotTable Wizard:**

Click on “Data” in the menu bar. Then click on “Create a PivotTable or PivotChart report.”

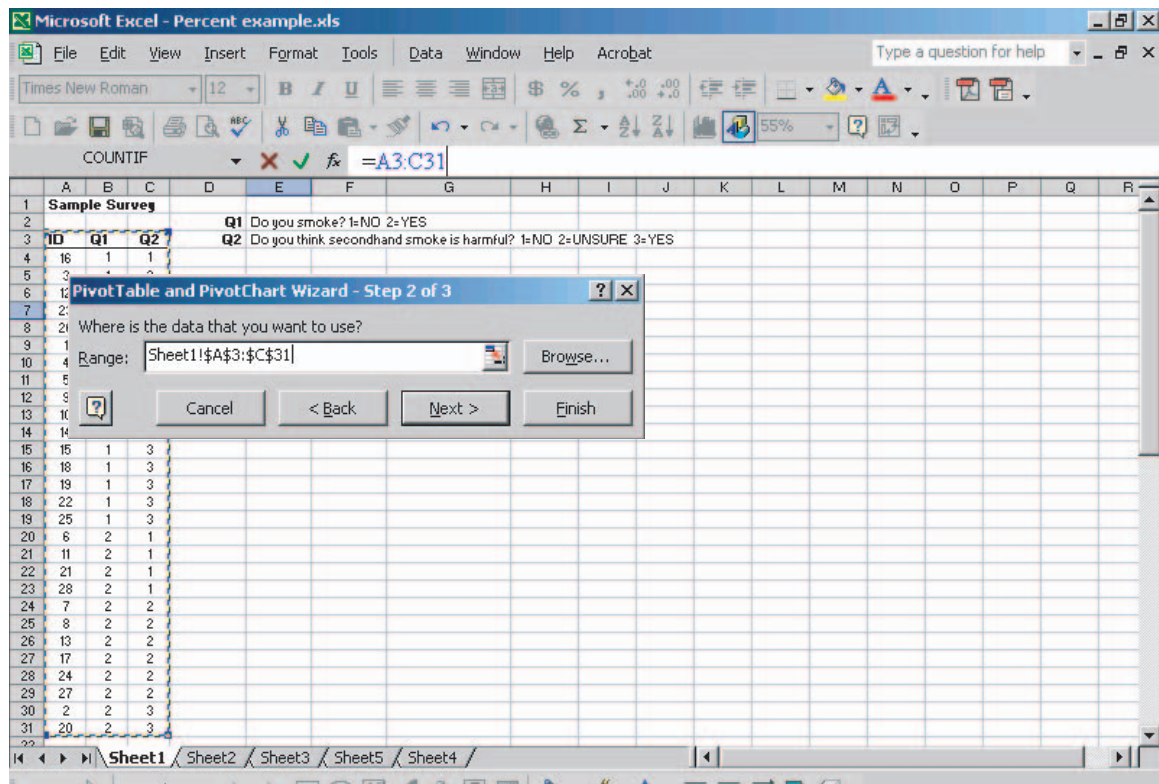
The first window appears (see Figure 32). In this window, click on “Microsoft list or database” and “PivotTable.” Then click on the “Next >” button.

**Figure 32: First window of the PivotTable Wizard**



In the second window, the PivotTable Wizard asks you to choose the data you want to use. Begin with the cursor in the range field, then highlight all of your data or just the data for the questions you want to analyze. Include question headers, but not the title. Make sure not to include any calculations that are in your database. After you have selected your data, click “Next >” (Figure 33).

**Figure 33: Select your data**



In the third PivotTable Wizard window, choose “New worksheet,” then click “Finish.” A blank Pivot Table will appear.



**Next, determine which questions to compare:**

- One question is an **independent variable**.
- The question to compare is a **dependent variable**.

For example, you may want to compare the age of your respondents to their attitudes about smoking.

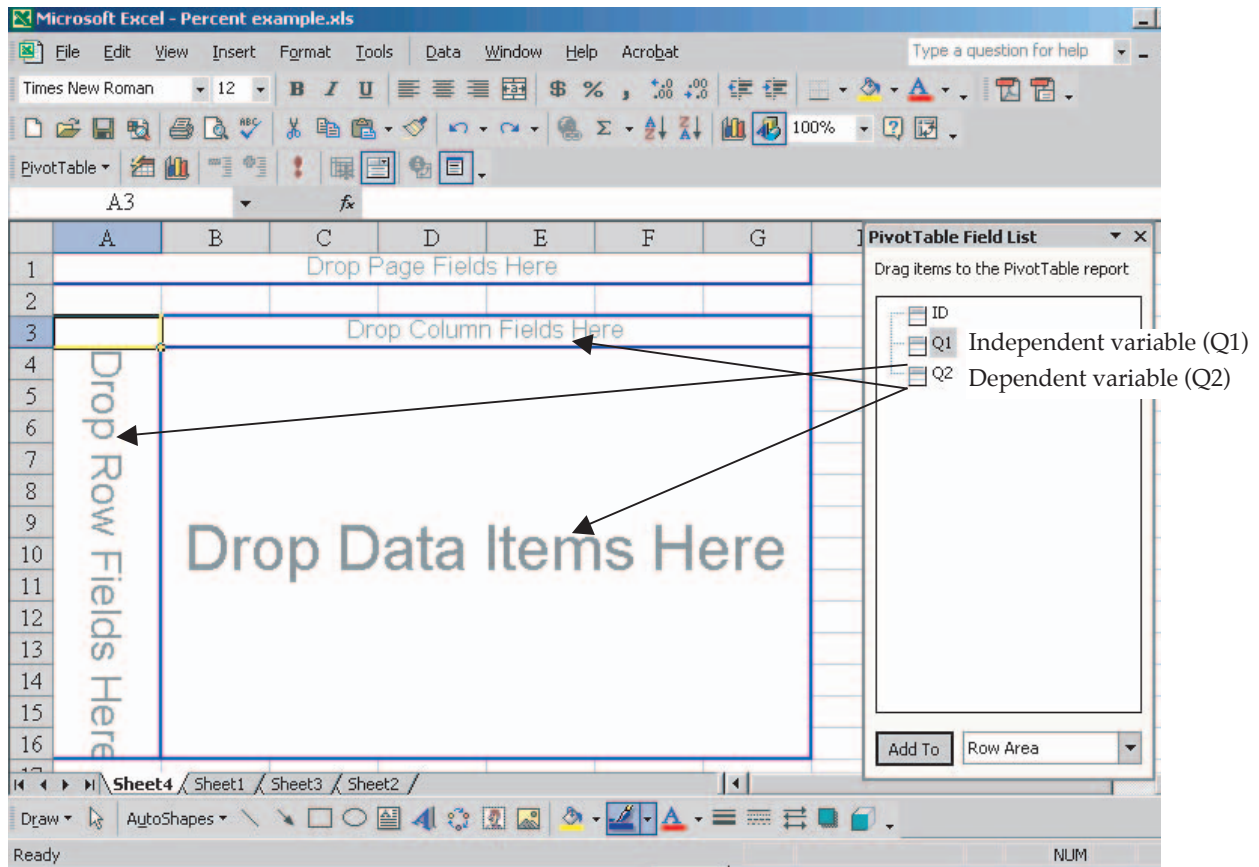
In this example, age is the **independent variable**. The independent variable is expected to affect the **dependent variable** — in this case, the respondent’s attitude toward smoking.

**To create a cross tab for this example** (see Figure 34):

1. Select the independent variable header (Q1) from the “PivotTable Field List,” and drag it to the PivotTable “Drop Row Fields Here” box.
2. Select the dependent variable header (Q2) from the “PivotTable Field List,” and drag it to the PivotTable “Drop Column Fields Here” box.
3. Select the dependent variable header (Q2) again from the “PivotTable Field List,” and drag it to the “Drop Data Items Here” area in the blank PivotTable report.

**Figure 34: Create a cross tab**

Your cross tab will look like Figure 35.



**Figure 35: Example of a cross tab**

Count of Q2	Q2				
Q1	1	2	3	Grand Total	
1	1	4	11		16
2	4	6	2		12
Grand Total	5	10	13		28

**Checking your cross tab**

When checking over your cross tab, make sure that the top left cell in the table says “Count of [the question you selected]” (see Figure 34). If not, double-click on that cell.

This takes you to the “PivotTable Field” window. Go to the field below “Summarize by:” and select “Count,” then click “OK.” This assures that your table contains frequencies.

**To insert descriptive labels:** You may want to replace the numbered codes in your cross tab with descriptive labels. To do so, click in the cell that holds the numbered code. Then type in the label you prefer.

In Figure 36, the descriptive label “Doesn’t smoke” replaces Q1 response code 1, and “Smokes” replaces response code 2. For Q2, the descriptive labels “Not harmful,” “Unsure,” and “Harmful” replace response codes 1, 2, and 3.

**Figure 36: Insert descriptive labels**

	A	B	C	D	E	F
1	Count of Q2	Q2				
2	Q1	Not harmful	Unsure	Harmful	Grand Total	
3	Doesn't smoke	1	4	11		16
4	Smokes	4	6	2		12
5	Grand Total	5	10	13		28
6						

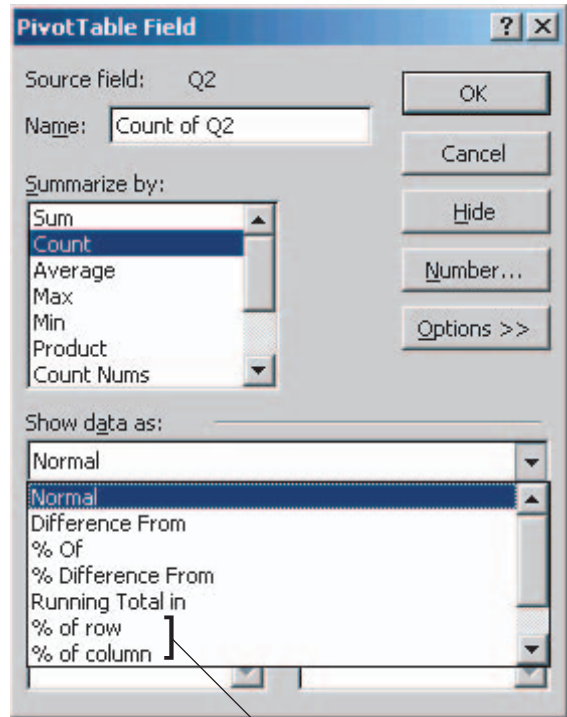
**Percents in PivotTable cross tabs**

**To create a PivotTable cross tab with percents:** First, create a cross tab PivotTable (see directions on pages 23-25). After you complete the PivotTable cross tab, double-click on the top left cell in your table that says “Count of [question you chose].”

In the “PivotTable Field” window, click on the “Options>>” button. An extension appears.

Under “Show data as:” select the % you would like to use (see Figure 37).

**Figure 37: Select the % you want in your cross tab**



Which do you use?  
The two percents most commonly used in cross tabs are:

1. % of row
2. % of column

Read why on the next page.

**Most common percets used in cross tabs**

**1. % of row**

The % of row illustrates the percent of answers per row item.

In Figure 38, % of row shows what percent of those who fit the description “Doesn’t smoke” or “Smokes” (Q1 responses) answered the question “Do you think secondhand smoke is harmful?” (Q2) as “Not harmful,” “Unsure” and “Harmful.”

In the Figure 38 example, of the respondents who answered that they do not smoke:

- 6 percent thought secondhand smoke is not harmful.
- 25 percent were unsure.
- 69 percent thought secondhand smoke is harmful.

**Figure 38: % of row for “Do you smoke?” (Q1) with “Do you think secondhand smoke is harmful?” (Q2)**

1	Count of Q2	Q2			
2	Q1	Not harmful	Unsure	Harmful	Grand Total
3	Doesn't smoke	6%	25%	69%	100%
4	Smokes	33%	50%	17%	100%
5	Grand Total	18%	36%	46%	100%
6					
7					
8					

**2. % of column**

The % of column illustrates the percent of answers per column item.

In Figure 39, % of column shows what percent of those who answered “Do you think secondhand smoke is harmful?” (Q2) as “Not harmful,” “Unsure” or “Harmful” also fit the description “Doesn’t smoke” or “Smokes” in response to “Do you smoke?” (Q1).

In the Figure 39 example, of the respondents who answered that they think secondhand smoke is not harmful,

- 20 percent do not smoke.
- 80 percent do smoke.

**Figure 39: % of column for “Do you think secondhand smoke is harmful?” (Q2) with “Do you smoke?” (Q1)**

	A	B	C	D	E
1	Count of Q2	Q2			
2	Q1	Not harmful	Unsure	Harmful	Grand Total
3	Doesn't smoke	20%	40%	85%	57%
4	Smokes	80%	60%	15%	43%
5	Grand Total	100%	100%	100%	100%
6					

**To show percents as whole numbers:**

See the directions for frequency PivotTables (Figure 30) on page 18-19.

## Closing comments

These instructions are designed to help you enter your data and run simple analysis with Microsoft Excel®.\*

For more extensive statistical analysis, consider software packages such as SPSS or SAS.

## Resources

### Evaluation materials

This publication is one in a series of program evaluation guides designed to help extension educators better plan and implement credible and useful evaluations. These also may be useful to agencies or funders seeking realistic evaluation strategies.

This guide refers you to companion evaluation publications in this series. You may find these helpful as you work through this booklet:

*Analyzing Qualitative Data* G3658-12, 12 pages

*Analyzing Quantitative Data* G3658-6, 6 pages

These and other evaluation materials are available online: [www.uwex.edu/ces/pdande/evaluation/evaldocs.html](http://www.uwex.edu/ces/pdande/evaluation/evaldocs.html)

### Tips on survey analysis and data management

Quick Tips 15: *Don't Average Words* — How to analyze categorical data

Quick Tips 22: *Make Certain Your Electronic Data Are Accurate* — Cleaning your data

[www.uwex.edu/ces/pdande/resources/quick-tipsnumerical.html](http://www.uwex.edu/ces/pdande/resources/quick-tipsnumerical.html)

### Tips for using Microsoft Excel

*Tips for Using Excel*, 1 page

*Tips for Viewing Data Using Excel*, 2 pages — Includes information on filtering data in Excel. Choose "Tips for using the AutoFilter function in Excel" from the web menu.

[www.uwex.edu/ces/tobaccoeval/analyzing-data.html](http://www.uwex.edu/ces/tobaccoeval/analyzing-data.html)

### Microsoft references\*

*Analyzing Data with Microsoft Excel 2002* by Microsoft — Overview of analysis in Excel

[www.microsoft.com/education/?ID=Excel2002Tutorial](http://www.microsoft.com/education/?ID=Excel2002Tutorial)

Excel — General information and assistance

[office.microsoft.com/home/office.aspx?assetid=FX01085800&CTT=6&Origin=ES790020011033](http://office.microsoft.com/home/office.aspx?assetid=FX01085800&CTT=6&Origin=ES790020011033)

\* *Using this product example is not intended to endorse it over others that may be similar, but rather as a convenience to readers. Microsoft Excel® is a registered trademark of Microsoft Corporation in the United States and other countries.*

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**Author:** Jennifer Leahy, Program Development and Evaluation, University of Wisconsin-Extension. The author wishes to thank the following UW-Extension faculty and staff for their careful reviews and useful contributions to this publication: Ellen Taylor-Powell, Susan Anderson, Heather Boyd, Rhonda Lee and Lisa Linfield.

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