

**Data
Enquiry
That Tests
Entity and
Correlational/Causal
Theories**

For Windows®

USER'S MANUAL

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INTRODUCTION AND OVERVIEW

This manual describes how to use DETECT for Windows. The previously published and complete Application and User's Guide (in the file called Guide.pdf) provides examples and illustrations of the various features of the DETECT analysis package—all of which are retained in the DETECT for Windows version. All previously written DETECT for DOS or mainframe programs can be used by following the directions in Chapter 2 of this manual. Accordingly, on occasion, this brief manual for DETECT for Windows will refer to the more complete and extensive guide as a source for additional information.

This manual for Windows can be the basis for a three-step process for learning how to use DETECT for Windows. This process helps make DETECT much easier to use than the previous DOS and mainframe versions. The first step of this process shows how to run a DETECT program to do an analysis and produce output. The second step shows how to create a simple program to do a single-level analysis and produce output. The third step shows how to use the full power of the DETECT program writer to do an analysis at multiple levels as well as other analyses. The three steps in this manual illustrate how to use DETECT for Windows to analyze the same data set and get the same results in the three different ways.

CONVENTIONS USED IN THIS MANUAL

The CD-ROM includes an electronic copy of the **DETECT Application and User's Guide** in the file Guide.pdf. (An Adobe Reader is needed to view this document.) This Guide gives complete information about the format that programs are written in by DETECT for Windows, and provides details that can be helpful in preparing programs with DETECT for Windows. This manual will give references related material in the Guide by the format [Guide pages xx-yy].

This manual will show dialog boxes from the program in figures placed close to the first text that describes them. Items to be typed into a dialog box fields will be given in `courier` font. The labels on buttons that appear as part of dialog boxes will be given in **arial font**.

STEP 1: RUNNING A DETECT PROGRAM THAT IS ALREADY WRITTEN (CHAPTER 2)

The first step, described in Chapter 2, shows how to use the program and data supplied on this CD-ROM to produce the DETECT output that is described in Chapter 5 of the original Application and User's Guide [Guide, pages 67-97]. This step involves double clicking on the DETECT icon and then clicking on **Just Run**. The next steps involve clicking on the file name for the program (EgProgram.txt) and the file name for the data (EgData.txt) and entering a file name to which the DETECT output is sent. The result is the DETECT output from Chapter 5 of the original guide. Essentially, Chapter 2 illustrates how to get DETECT to read a program and data and produce output in a file with a preferred name. The original guide can always be used to write programs and run DETECT in this way.

STEPS 2 AND 3: RUNNING DETECT WITHOUT A PREVIOUSLY WRITTEN PROGRAM (CHAPTERS 3 AND 4)

Although the previous step illustrates the procedures for doing an analysis by specifying the input and output files, DETECT for Windows allows you to write DETECT programs by pointing, clicking, and entering information into various dialog boxes. There are two ways to do this task: the DETECT Express program writer and the full DETECT program writer. Files that have the program and data combined together can still be analyzed with DETECT. However, programs written with the full DETECT writer or the DETECT Express writer must have the data to be analyzed in a file separate from the program.

Step 2: Using the Detect Express Writer (Chapter 3)

The DETECT Express writer is a very simple place to start, since it writes a program that does only one level of analysis. The result is still a complete DETECT program; the Express writer just provides less options. DETECT Express lets you specify: automatic labeling or entry of labels for variables, missing data, and the input of free-format or fixed-format data. Depending on whether you selected **Write & Run** or **Just Write**, DETECT Express writes a program and automatically runs it or just saves the program on a specified file. The DETECT Express writer begins by asking for the file where your program should be stored, and if you asked for it to be run right away it asks the same

questions as in Step 1. In Chapter 3, an example is given of how you could write the program that is given in file EgProgram.txt and how to use it and the data supplied in EgData.txt to generate results.

Step 3: Using the full DETECT Writer (Chapter 4)

Chapter 4 illustrates how to use the full DETECT writer. The full DETECT writer uses a simple point and click process that writes programs that can perform analyses at any number of levels of analyses, as well as multiple-variable analyses, and multiple-relationship analysis. The same key information used in DETECT Express is input in the full version of DETECT, but additional analyses become available by clicking on a few additional items and entering a few numbers. All of the types of analyses possible are illustrated with graphics in the brief file called Visualiz.pdf. DETECT does Within And Between Analysis (WABA), for which extensive details are provided in the book titled: Theory Testing in Organizational Behavior: The Variet Approach and the accompanying Instructor's manual. These books are provided on the CD-ROM in electronic form in the files ThryTest.pdf and InstrMan.pdf, respectively. Finally, the original Application and User's Guide (Guide.pdf) provides examples of the various analyses that can be performed.

HELPFUL INFORMATION ABOUT DETECT FOR WINDOWS (CHAPTER 5)

The last chapter of this manual includes frequently asked questions (FAQ) about DETECT for Windows.

GETTING STARTED (CHAPTER 1)

Preceding all of the above material is Chapter 1 that explains how to initially select among the alternative ways of using DETECT and how to begin using DETECT

CHAPTER 1

GETTING STARTED

1. DOUBLE CLICK ON THE ICON FOR DETECT

The first step to use DETECT is to double click on the icon for DETECT to get the program started.

2. CHOOSE AMONG OPTIONS IN DETECT

After clicking on the icon, the following dialog box appears on the screen.

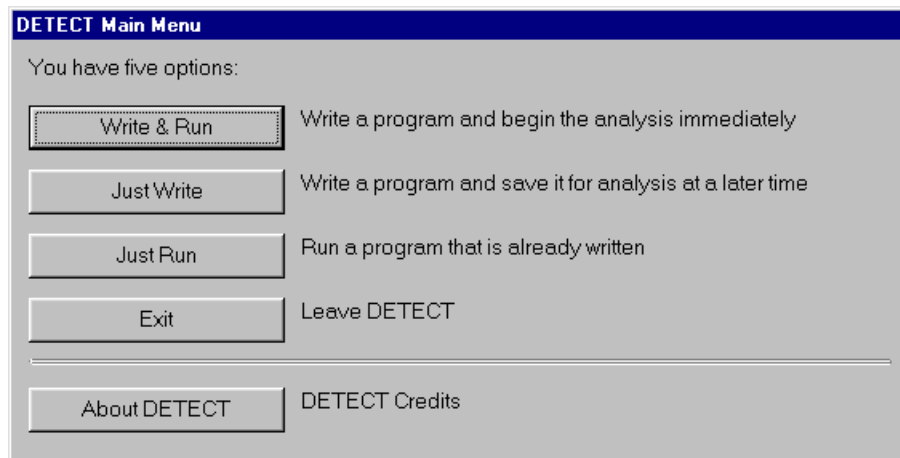


Figure 1 - The DETECT Main Menu

Write & Run (Chapters 3 and 4) This option will let you use either the full DETECT writer or the DETECT Express writer to create a program, save it in a file, and then immediately run that program. If you have *not* written a program, and if you do not necessarily want to see the resulting program, but you only want to see the output from DETECT, click on this first alternative.

Just Write (Chapters 3 and 4) This option will let you use either the full DETECT writer or the DETECT Express writer to create a program and then save it in a file. If you want to write a program and want to see it before you run DETECT at a later time, click on this second alternative.

Just Run (Chapter 2) This option will let you run a DETECT program that was created and stored in a file. For this option, your program and data can be in the same or separate files. If you already have a program written and a data set, click on this third alternative.

Exit If you are finished with DETECT or are not sure what to do, click on this fourth alternative and you will exit DETECT.

About DETECT This option will give you information about the Institute for Theory Testing, and the people responsible for this Windows version of DETECT.

3. AFTER SELECTING ALTERNATIVES 1 OR 2

If you choose to write a program and run it or just write it (Alternatives 1 or 2), you will be asked whether you want to use the DETECT Express writer (Chapter 3) or the full DETECT writer (Chapter 4). For a very simple analysis, at one level of analysis, select DETECT Express. For more complex analyses, select DETECT. Here are the alternatives as shown in the program.

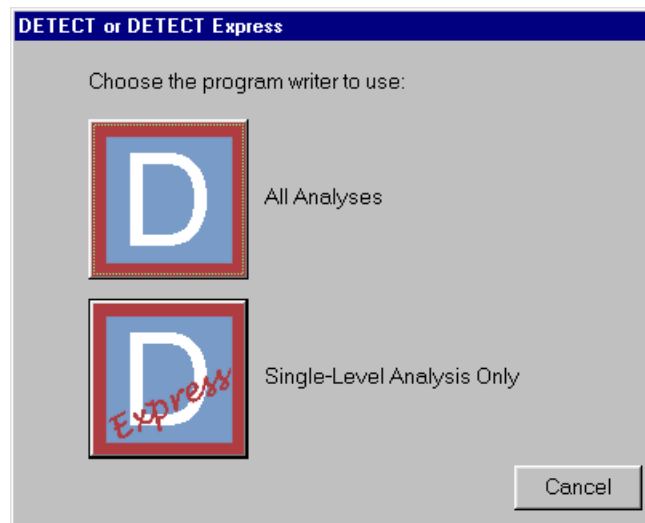


Figure 2 - Choosing between the DETECT and the DETECT Express Writers

CHAPTER 2

RUNNING A DETECT PROGRAM THAT IS ALREADY WRITTEN

It is always possible to run DETECT with programs written for DETECT for DOS by using the new procedures described in this chapter. In fact, it is easiest to begin learning about the Windows version by running DETECT using the program and data supplied on the CD with DETECT. After double clicking on the DETECT icon and after clicking on **Just Run** a dialog box will appear that explains the information necessary to continue to run a program.

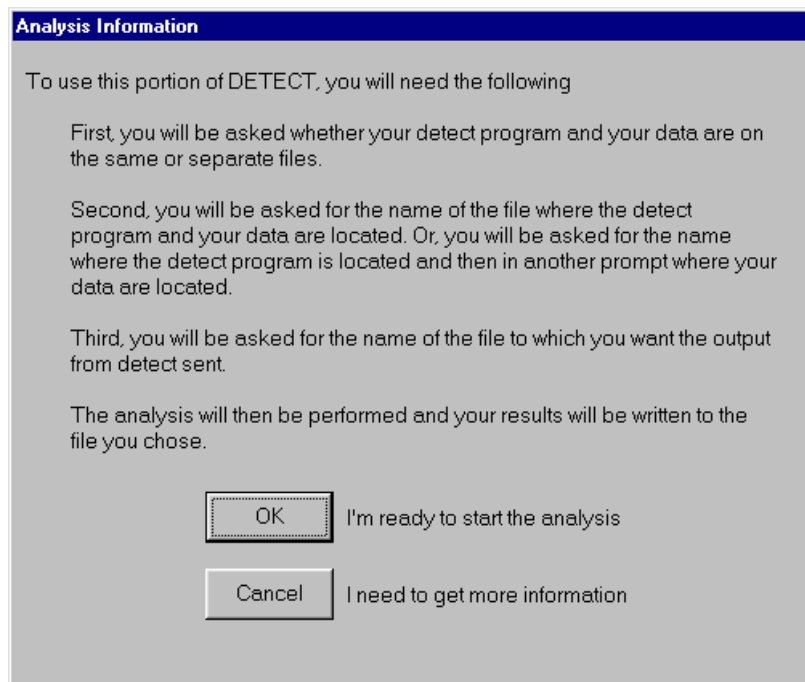


Figure 3 - Information needed to run an analysis

If you click **OK**, another dialog box will open that asks if the DETECT program and data are on a separate file.

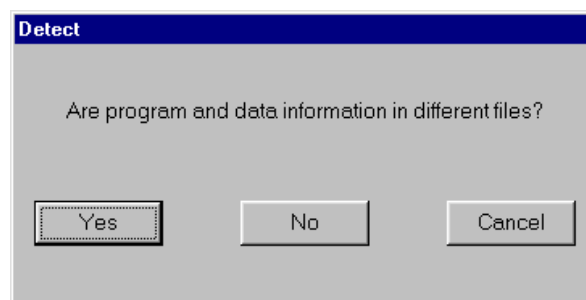


Figure 4 - Choosing between one or two files for the program and data

If **Yes** is selected, DETECT will ask for two file names: one for the program file and one for the data file. If **No** is selected, DETECT will ask for one file name that contains the program and the data. If **Cancel** is selected, you will be returned to the main menu. Finally DETECT will ask for a file to which output should be sent.

The following figure shows a typical file selection dialog box. Each time that DETECT needs you to select a file, whether to save your program, save your analysis output, or to read a program or data, you will see a dialog box similar to this one. The main difference in each of these cases will be the title on the box that will identify what DETECT is looking for.

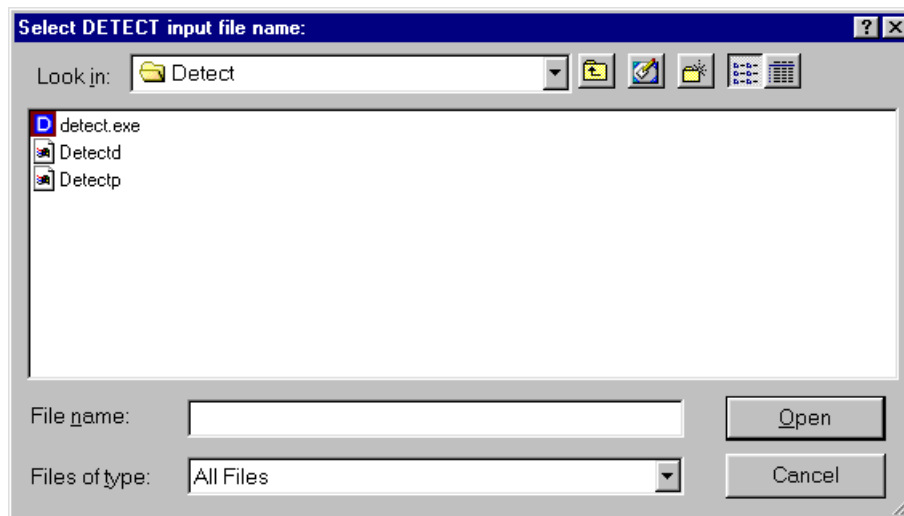


Figure 5 - A typical file selection dialog box

The process of running an analysis becomes easier to understand by actually trying the following example. To try this example, the two files supplied on the CD (EgProgram.txt and EgData.txt) should be copied into the folder containing Detect.exe. (This will already be done if you copied the entire Program folder during installation.)

EXAMPLE FOR THE SUPPLIED PROGRAM AND DATA

The supplied program and a data set are from the DETECT Application and Users Guide [Guide, Section 5.2 and Appendix A].

To run the program and obtain the results shown in Appendix A of the original Application and User's guide do the following:

1. Double click on the icon for DETECT
2. Click on **Just Run** (Figure 1)
3. Click **OK** (I'm ready to start. Figure 3)
4. Click on **Yes** (different files Figure 4)
5. Click on **EgProgram.txt** in the dialog box and then click **Open** (Figure 5)
6. Click on **EgData.txt** in the dialog box and then click **Open** (Figure 5)
7. Enter the name of a file to which you want the DETECT output sent and then click **Save**. For example, out1.txt (Figure 5)
8. When DETECT says that it has finished, click **Ok**



Figure 6 - Dialog box indicating that DETECT has completed and can find Wordpad to display the results

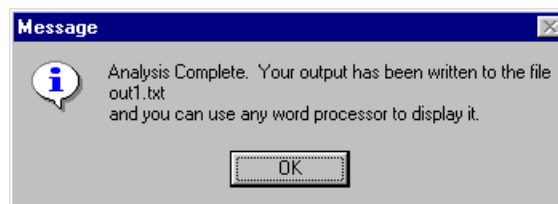


Figure 7 - Dialog box indicating that DETECT has completed and cannot find Wordpad to display the results

In most cases, the output will then appear on the screen. Every time that DETECT executes, output is written to the specified file. If the output does not appear immediately after DETECT runs, this means DETECT was unable to locate "Wordpad" on your computer. In that case, you can use whatever word processor that you prefer (Word, WordPerfect, etc.) to open the output file.

CHAPTER 3

USING THE DETECT EXPRESS WRITER

DETECT Express becomes available as an option after double clicking on the DETECT icon to start the program and then selecting either **Write & Run** or **Just Write**. Then, you will see two choices: DETECT or DETECT Express (Figure 2). Click on DETECT Express for this step.

INTRODUCTORY DETECT EXPRESS DIALOG BOX

After DETECT Express is selected, a dialog box appears that explains the information that is essential for writing any DETECT program. Click **OK**. The information is described in more detail below.

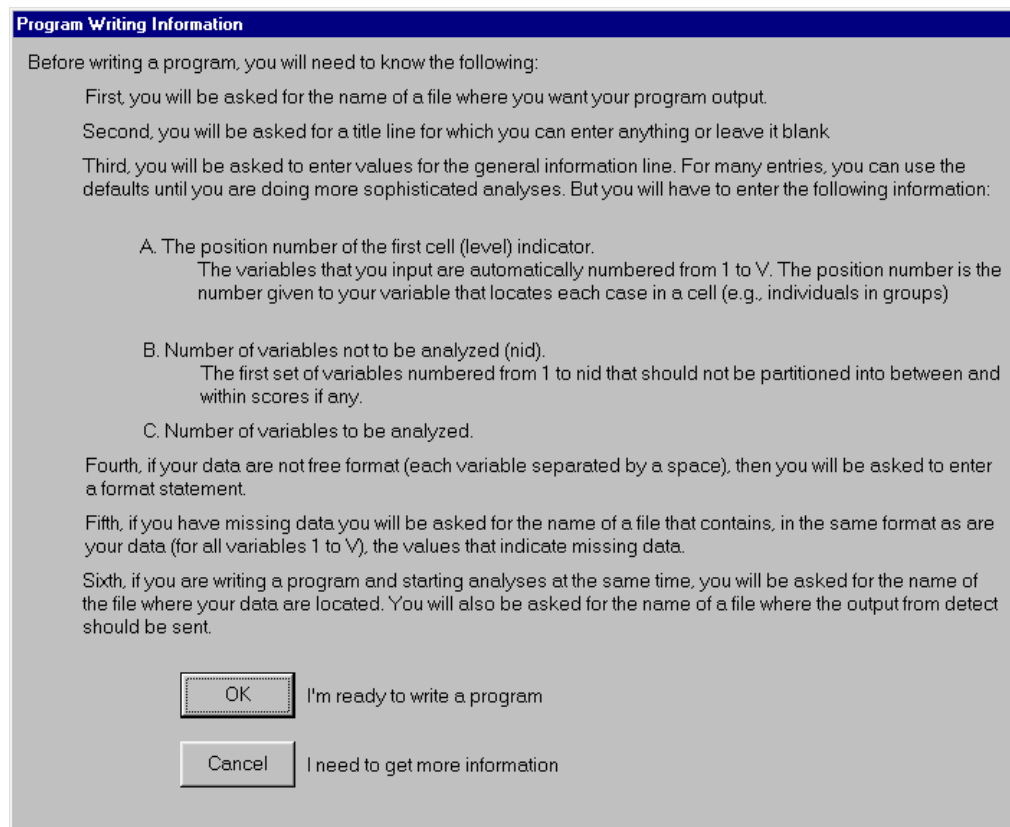


Figure 8 - Information needed to write a program

REQUEST FOR A FILE NAME FOR THE PROGRAM

A dialog box then asks for a file name to which DETECT Express should write a program. Enter any preferred file name.

TITLE LINE

A dialog box then asks for a title that will be placed in the final output. Enter any title of up to 80 characters or just hit the enter key or click on the **Next** button to leave the title blank.

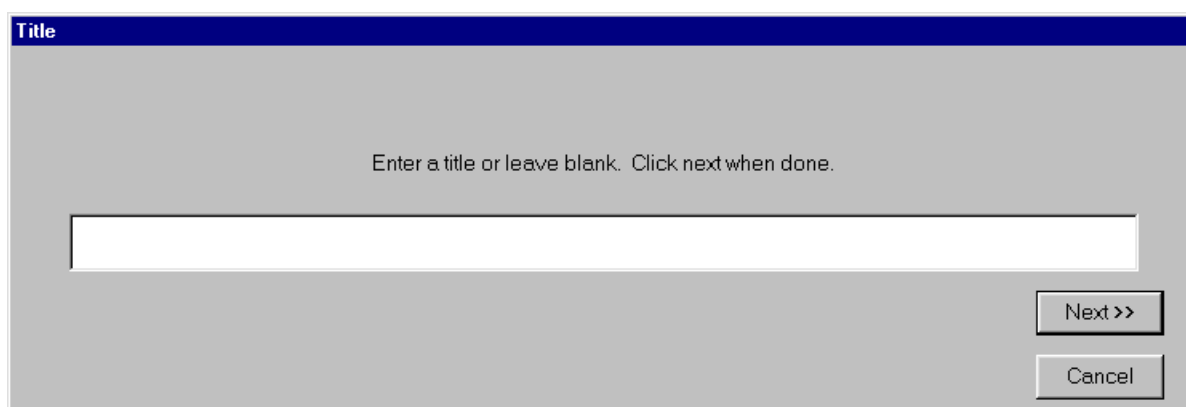


Figure 9 - The Title dialog box

DETECT EXPRESS GENERAL INFORMATION LINE

The next dialog box is the key for controlling DETECT analysis and requires a little more detailed explanation. This was called the general information line in all previous versions of DETECT. When writing a program with DETECT Express you are presented with only a subset of the items that appear in the full DETECT dialog box. The numbers for the items in the dialog box correspond to the numbers used for the same items in the Full Detect version. Click on the question mark for any item to get a short description of what should be input. A little detail is given here for the entries. References to the two Appendices in this manual as well as to the page numbers from the original manual that describe these key entries are also supplied in this chapter.

General Information Line (GIL) Express Version

? 5) What is the position number (PN) of the first cell indicator?

? 10) What is the number of variables not to be analyzed?

? 11) What is the number of variables to be analyzed?

? 12) How do you want to setup labels for variables to be analyzed.
 I'll enter labels Let DETECT generate labels

? 13) How many lines are needed for format statement?
 One line Two lines Three lines Free format

? 14) How do you want to delete missing data?
 No missing data
 Cases with missing data deleted, no report (Input file needed)
 Cases with missing data deleted with report (Input file needed)

Done
Cancel

Figure 10 - The DETECT Express General Information Line (GIL)

Position of First Cell Indicator (See also Appendix 1 in this manual [Guide, pages 42-43])

Simply and briefly stated, DETECT numbers all variables in a data set from 1 to V. The *position number* of the indicator that tells which cases are embedded in which group is entered here. For example, if there are four variables in total and the first variable indicates the group in which each individual is located, enter the value 1. If this is not clear, Appendix 1 of this manual describes in detail the meaning of position numbers. The numbering system is also described in more detail from pages 27 to 29 in the original DETECT guide. The end of Appendix 1 in this manual also describes in detail, with an example, what is necessary to identify the position number for the first cell indicator.

The Number of Variables Not to be Analyzed [Guide, page 44]

It is recommended that the cell (level) indicator variable described above not be analyzed. This is easier to explain with an example. Say that there is one cell indicator variable and three variables of interest. Then, enter a 1 here. In other words, the entry of 1 indicates the number of variables at the

beginning of the string of all variables not to be output in each analytical table. When this entry equals 0, all variables (including the cell indicator) are analyzed and thus appear in tabular output.

Number of Variables to be Analyzed [Guide, page 44]

The third entry specifies the variables to that are to be analyzed and that are to appear in tabular output. For example, consider a data set in which there is one cell indicator *preceding* the three variables of interest (for example, performance, negotiation, and satisfaction). This data set may be handled in two ways. The preferred procedure is enter 1 in the previous entry and to enter 3 for this entry. In this case, the cell indicator in position one is deleted from the analyses and three variables are analyzed. As an alternative, you can enter 0 for the previous item, and set this entry to 4. In this case, all variables and the indicator are included in analyses.

Note in each example that the addition of the values for the two entries equals the total number of variables. Specifically, in the first example the two entries were

1 variables not to be analyzed

3 variables to be analyzed

In the second example the two entries were

0 variables not to be analyzed

4 variables to be analyzed

In both cases, the total of the two entries is 4.

Variable Labeling Option [Guide, page 44]

There are two choices for labels. You can enter labels by selecting the alternative **I'll enter labels**. DETECT will ask for a label for each variable to be analyzed when the GIL dialog box is completed. Alternatively, you can let DETECT number the variables from 1 to V by selecting **Let DETECT generate labels**.

Type of Input Data [Guide, pages 44-45]

The next entry indicates if data are in free-format or fixed-format. Specifically, click on **Free format** when data are in free format. (Free Format means that commas or spaces separate the variables—DETECT will always read all the variables in free format.) If the data are not in free format,

use a format statement to specify the location of variables in columns. For data of this type, click on **One line** when only one 80 character line is needed to write the format statement; click on **Two lines** when two 80 character lines are needed to write the format statement; and click on **Three lines** when three 80 character lines are needed to write the format statement. Format statements are described in Appendix 2 in this manual. In the original guide, the way format statements are written is described in Section 2.2.3, and the way format statements are included in a DETECT program is described in Section 4.5. In general, describe all variables in F format. Data to be analyzed can include decimal points (for example, 5f10.3). The indicators for analyses can have no decimal points in the data (e.g. 3F1.0, or 3I1). DETECT will not work properly if there are decimal points in the first cell indicator.

Missing Data Option [Guide, page 45]

The last entry in DETECT Express controls whether cases with missing values are deleted by DETECT. When there are no data with missing values, do nothing and use the default, **No missing data**. There are two options when data are missing. First, when one alternative is selected (**Cases with missing data deleted, no report**), the cases with missing data are deleted and a report is not issued. Second, when the other alternative is selected (**Cases with missing data deleted with report**), a frequency table of the missing values for all variables is output in addition to cases with missing data being deleted. This table can be quite useful when one or two variables account for most of the missing data. A high frequency for two or three variables indicates that if these variables were deleted fewer cases in total would be deleted. Thus, by deleting these variables, for example, with a format statement, very few cases would be deleted. The DETECT missing data option does *not* perform automatic "pairwise" deletion for the following reason. When one set of cases is missing data on one set of variables and another set of cases is missing data on a different set of variables, with pairwise deletion, the output is based on essentially two different samples and is not interpretable. Nevertheless, pairwise deletion can be performed with several DETECT programs that analyze different variables. The additional line(s) that specify values for missing data are described in the next section.

ADDITIONAL DIALOG BOXES

Depending on the answers to the above items, DETECT may ask for the following information in various dialog boxes.

Variable Labels

To enter labels, a dialog box appears for each variable to be analyzed. Enter up to eight characters for each variable **to be analyzed**.

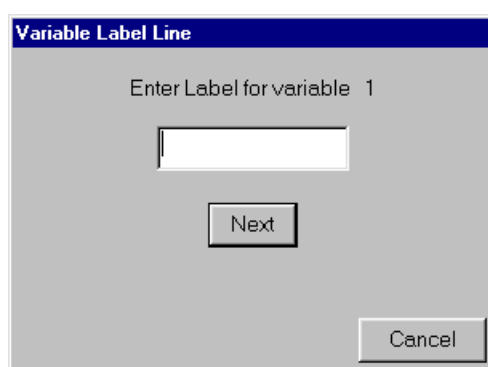


Figure 11 - Request for a variable label

Format Statement and data

See Appendix 2 for details about how to write format statements. (Free format data requires that the total number of variables not to be analyzed plus the number to be analyzed should equal the total number of variables with spaces or commas between them.) The dialog box that appears when you are asked for a format statement is shown below. The number of times that the dialog box appears depends on the number of lines requested for the format statement.

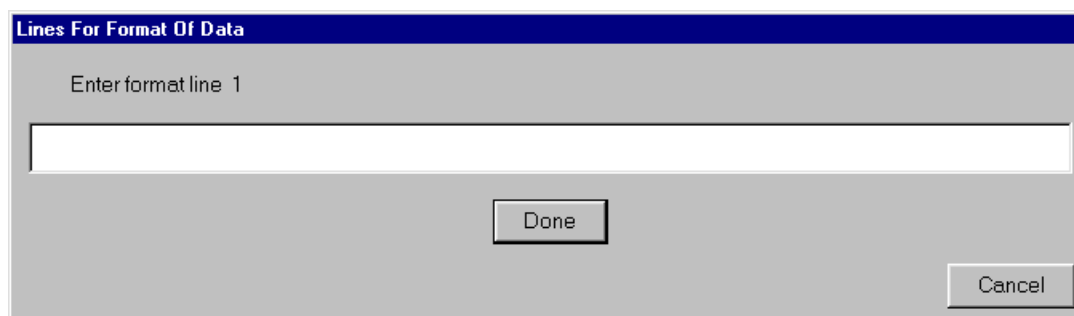


Figure 12 - Request for format information

Missing Data

If data are missing, a dialog box will ask for the name of the file that contains the missing data for one case. To construct the file when data are in free format, the values for missing data for all variables must be input in free format. For example, suppose that there are three variables to be analyzed in positions 3 to 5, two additional variables not be analyzed are in positions 1 and 2, for a total of five variables, that values of 99 indicate missing data for positions 1 to 4, and that a value of 98 indicates missing data for variables in position 5, then the missing data line is:

```
99, 99, 99, 99, 98
```

For fixed-format, data the missing data values are input in the format specified by the format statement. For example, in the case of five variables input with the format (5F2.0), the missing data line for all values for one case, as described previously, is

```
9999999998
```

This alone should be placed in a file. Please recognize that DETECT reads the one case for missing data EXACTLY as you write it—it is viewed as a transparent file. If there are more data than for one case, Detect will read it as one case and probably at some point your program will fail. More detail about how to specify missing data files appears in Section 4.6 in Chapter 4 in the original guide.

OTHER DIALOG BOXES

If you requested that only a program be written, DETECT will write the program to the file that you specified and put the file name in a dialog box for you. You can use the **Just run** option to run it later (see Chapter 2).

If you asked for DETECT to **Write & Run** the program, DETECT will ask for the file name for your data and the file to which you want DETECT to send your output. You will then be told DETECT has executed and an attempt will be made to open the output file—Click **OK**. If the file does not appear, DETECT was unable to locate Wordpad on your computer. Whether your output is displayed in Wordpad or not, you can use whatever word processor you prefer to examine the output once the analysis is completed.

EXAMPLE FOR THE SUPPLIED PROGRAM AND DATA

1. Double click on the icon for DETECT
2. Select **Write & Run** (Figure 1)
3. Choose DETECT Express to write your program (Figure 2)
4. Click **Ok** (I'm ready to write a program. Figure 8)
5. Enter a file name for where the program is to be written and then click **Save** (e.g., myprog.txt) (Figure 5)
6. Enter a title or click next or hit enter (Figure 9)
7. Enter these values (Figure 10)
 - For position number of the first cell indicator enter 2
 - For number of variables not to be analyzed, enter 6
 - For number of variables to be analyzed enter 4
 - For variable labels option, leave as default (do nothing)
 - For type of input data, leave as default (do nothing)
 - For missing data, leave as default (do nothing)
7. Enter labels for each variable as they are called (Figure 11):
 - Negotitn
 - Satisfn
 - Performc
 - TaskClar
8. Enter the format when asked (Figure 12):
 - (3F2.0, 2F1.0, 5F2.0)
9. Click on **EgData.txt** when asked for the data file and then click **Open** (Figure 5)
10. Enter the name of file to output the DETECT results (eg. out2.txt) (Figure 5)
11. Click **Ok** (Figure 6 or 7)

The results will be stored in a file and appear on your screen. If the results do not appear, they are still stored on the file you selected for output.

This example provides virtually the same results as for the example supplied with the package. You can compare the program that results from this procedure to the one supplied with the package and see the differences and similarities. (Basically less tables are output by DETECT Express.)

CHAPTER 4

USING THE FULL DETECT WRITER

To obtain the full power of DETECT, first double click on the DETECT icon, and select either (1) **Write & Run**, or (2) **Just Write**. Then click on DETECT (not DETECT Express). A list of the information needed to run DETECT will appear that is identical to the list that appears for DETECT Express (Figure 8). A dialog box allowing a choice among all of the options in DETECT will appear (Figure 13).

General Information Line (GIL)

? 1) Data to be analyzed must be in a separate file.
 A separate file Within DETECT program

? 2) Your output will be sent to a file.
 File Print Both file and print

? 3) What size output table do you want?
 Regular Abbreviated Both regular and abbreviated

? 4) Do you want to select each output table?
 No, selected subset No, all tables output Yes

? 5) What is the position number (PN) of the first cell indicator?

? 6) Do you want to analyze at a second level of analysis?
 No Yes Enter position number:

? 7) Do you want to analyze more than two levels of analysis?
 No Yes Enter number of levels beyond 2:

? 8) Do you want multiple-variable analysis (MVA)?
 No Yes, between-cell only
 Yes, within-cell only
 Yes, both between and within cell

? 9) Do you want multiple-relationship analysis (MPA)?
 No Yes Enter position number:

? 10) What is the number of variables not to be analyzed?

? 11) What is the number of variables to be analyzed?

? 12) How do you want to setup labels for variables to be analyzed.
 I'll enter labels Let DETECT generate labels

? 13) How many lines are needed for format statement?
 One line Two lines Three lines Free format

? 14) How do you want to delete missing data?
 No missing data
 Cases with missing data deleted, no report (Input file needed)
 Cases with missing data deleted with report (Input file needed)

? 15) Do you want data transformation?
 No Yes Number of variables input to transformations:

Done
 Cancel

Figure 13 - The full General Information Line (GIL) dialog box

For comparison purposes, in DETECT Express, only six items are available. In the full DETECT option, there are 15 different items, which correspond to the 15 entries in the general information line described in the original guide. A default value appears for all but three of the items.

Item 5: Position number of the first cell indicator

Item 10: Number of variables not to be analyzed

Item 11: Number of variables to be analyzed

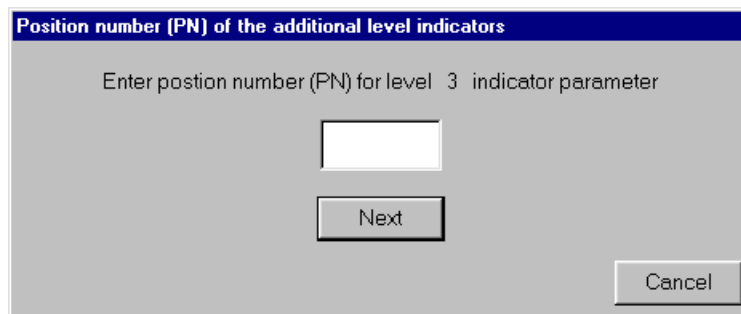
The previous chapter about DETECT Express describes how to handle these three items. In addition, the meaning of the entries for items 12, 13, and 14 were also described in the previous chapter. Thus this chapter only describes the items that are available in addition to the items in DETECT Express. A click on the question mark for any item will also produce an explanation of that item.

ADDITIONAL ANALYSES

Essentially, DETECT Express can perform only single-level analysis. The other more sophisticated analyses available in DETECT are called in the following ways in the full version.

Multiple-Level Analysis

To analyze at two levels of analysis rather than one, go to item 6 on the dialog box and insert the position number of the second level of analyses in the text box. (**Yes** will be automatically chosen when you do this.) If you want to consider 3 or more levels of analysis, enter the number of levels beyond 2 in item 7. Later you will see the following dialog box for each additional level that is to be included in the analysis. When that dialog box appears, enter the position number of the indicator for that level.



The image shows a dialog box with a blue title bar that reads "Position number (PN) of the additional level indicators". Below the title bar, the text "Enter position number (PN) for level 3 indicator parameter" is displayed. There is a white text input field, a "Next" button, and a "Cancel" button.

Figure 14 - Request for additional level indicators

Multiple-Variable Analysis

Run multiple-variable analysis by clicking on one of the “yes” responses for item 8. The output from multiple-variable analysis is extensive if there are a large number of variables.

Multiple-Relationship Analysis

Run multiple-relationship analysis by entering the position number of the indicator that you are using to form conditions in the text box for item 9. In multiple-relationship analysis, complete analyses

(including any number of levels of analysis and multiple-variable analyses) can be run within each condition. The condition for each case is indicated by the indicator in the specified position number.

Additional Information

These four analyses available in DETECT are described and illustrated in the electronic texts in the books folder as well as in the other documents contained in this manuals folder.

OTHER FEATURES

Detailed Information Line

In addition, on the general information line dialog box, if you select yes for item #4, a dialog box will appear later. The dialog box allows the specification of the number of entries in each table as well as the page size used by DETECT. This box that appears following the general information line is called the detailed information line (DIL). Click on the question marks in the (DIL) dialog box to get more detail about each entry or see the original guide for a description of the detailed information line.

Detailed Information Line (DIL)

? 1) How many lines do you want per page?
 Default Enter number of lines:

? 2) Do you want to print the DETECT page and information tables?
 Yes No, delete Print only DETECT page

? 3) How do you want the cell frequencies table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 4) How do you want the average and dispersion across cells tables?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 5) How do you want the average and dispersion by cells table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 6) How do you want the average and dispersion by variables table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 7) How do you want the within and between analysis I table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 8) How do you want the within and between analysis II table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 9) How do you want the within cell multiple-variable analysis table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 10) How do you want between cell multiple-variable analysis table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 11) Do you want to output the correlation matrix?
 No Yes

? 12) Do you want to output the deviation scores?
 No Yes, include in output Deviations scores are the only output to file

? 13) How do you want the multiple relationship analysis table?
 Default spacing Delete Number of entries per table per page
 Enter number:

? 14) Do you want the sequence packaging?
 Yes No

? 15) Do you want extra rounding?
 No Yes

Done
 Cancel

Figure 15 - The Detailed Information Line (DIL) dialog box

Data Transformations

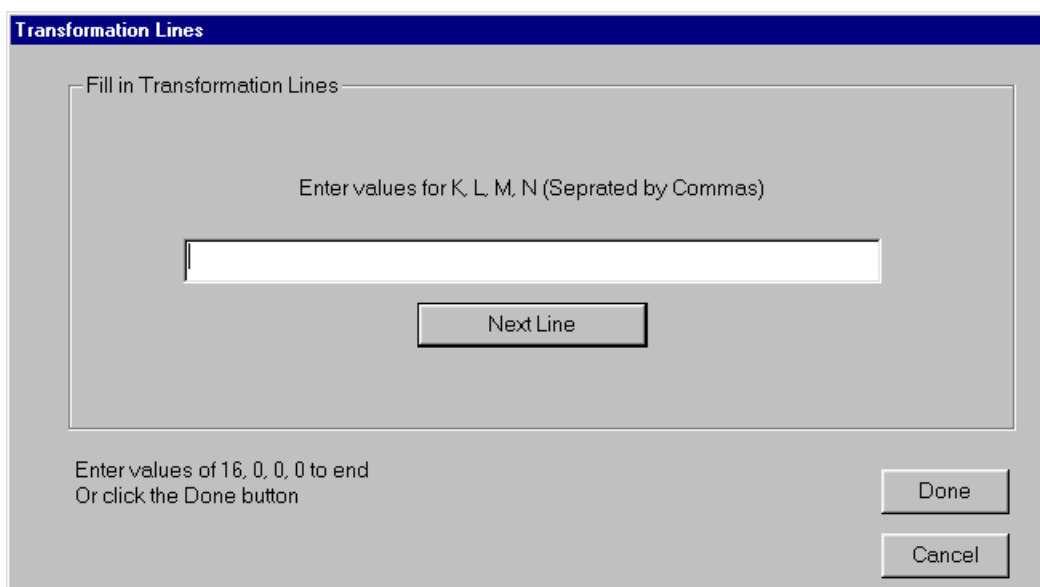
To perform mathematical operations and reposition variables, click on yes for item 15 on the general information line and enter the number of variables to be input to transformations. The format statement and any free-format data should be consistent with the number of variables that are input to transformations. The other entries in the general information line should indicate how many variables are to be analyzed after transformations. At a later point, when the general information line is finished, you will be asked to enter the first line of the data transformations in one dialog box (Figure 15). This dialog box will be followed by another one that allows for the input of the transformation lines (Figure 16). The available data transformations are described in detail in the original DETECT guide on pages 58 to 63. Please refer to the guide to know how to respond to the second dialog boxes that appear in data transformations. In general, it may seem easier to use software other than DETECT to transform data. Nevertheless, for some applications, the transformations in DETECT may be appropriate because they offer 33 digits of precision. Moreover, by using the transformations, no precision will be lost from creating a new data set and then inputting it into DETECT.

The dialog box is titled "Line for Data Transformations". It contains a section labeled "Fill in First Line" with the instruction "Entry K automatically set for the first line (K=0)". Below this, there are three dropdown menus:

- Set Entry L: Do not list the transformation lines in the output
- Set Entry M: Data before transformation are not listed
- Set Entry N: Transformed data are not listed

At the bottom right of the dialog, there are two buttons: "Next Line" and "Cancel".

Figure 16 - The dialog for the first transformation line



The image shows a dialog box titled "Transformation Lines". It has a blue header bar with the title. Below the header, there is a large rectangular area with a light gray background. Inside this area, the text "Fill in Transformation Lines" is at the top left. In the center, it says "Enter values for K, L, M, N (Seprated by Commas)". Below this text is a long, empty white text input field. Underneath the input field is a button labeled "Next Line". At the bottom left of the dialog, there is a note: "Enter values of 16, 0, 0, 0 to end Or click the Done button". At the bottom right, there are two buttons: "Done" and "Cancel".

Figure 17 - The dialog for the rest of the transformation lines

Regular and Abbreviated Tables

For interpreting results, the regular tables output by DETECT are more useful because they contain probabilities. For publication purposes, abbreviated tables are more useful because results are rounded to 2 decimal points and the tables fit on a regular size page. Item 3 in the general information line controls which size tables and combination of different size tables are output by DETECT

EXAMPLE FOR THE SUPPLIED PROGRAM AND DATA

The steps shown on the next page will produce the same results as did the program and data set supplied with DETECT.

1. Double click on the icon for DETECT
 2. Select **Write & Run** (Figure 1)
 3. Select DETECT (not DETECT Express) (Figure 2)
 4. Click on **Ok** (Figure 3)
 5. Indicate the name of the file for your program and then click **Save** (Figure 5)
 6. Enter a title or click next or hit enter (Figure 9)
 7. On the GIL page enter values only for the following (Figure 13)
 - Item 5 enter 2
 - Item 10 enter 6
 - Item 11 enter 4
- Leave all items at their default values and enter nothing, then click on **Done**.
8. Enter labels one at a time when prompted (Figure 11)
 - Negotitn
 - Satisftn
 - Performc
 - TaskClar
 9. Enter the format statement (Figure 12)
 - (3F2.0, 2F1.0, 5F2.0)
 - Click **Done**
 10. Click on EgData.txt when asked for data and then click **Open** (Figure 5)
 11. Enter the name of file to output the DETECT results (Figure 5)
 12. Click **Ok** (Figure 6 or 7)

The results will be stored in a file and appear on your screen. If the results do not appear, they are still stored on the file you selected for output.

Chapter 5

INFORMATION ABOUT DETECT FOR WINDOWS (FREQUENTLY ASKED QUESTIONS)

1. If I want to change one value on the general information line in a DETECT program, do I have to rewrite the entire program?

No, when you initially created a program with DETECT, the program was written to the file that you specified. You can use any word processor to change the one value in the program and simply select **Just run** in DETECT using the new modified file. Make sure that you save the program file as "text with line breaks" in your word processor so that DETECT can read it.

2. If I have a long format statement that I already wrote into a file, can I copy it from the file to DETECT when I am writing a program?

Yes, start DETECT, and then start your word processor and open the file that contains your format statement. Highlight the one line of the format statement that you want then click on copy (or copy which is on the edit menu). Then go back to DETECT (click on DETECT on the task bar at the bottom of the screen). Click to place the cursor in position on the format dialog box and then hit the control key and the letter V at the same time. The format will appear in the dialog box for entering the format.

3. Why does DETECT not display output at the end of a program run?

This occurs because DETECT is not be able to locate Wordpad on your particular computer to display the results. You can always use any word processor and simply open the file that you told DETECT should be the output file. DETECT may not display output if your program fails. But you can still open the file that contains the output to identify any problems. DETECT looks for wordpad.exe in two places. First in the `c:\Program Files\Accessories` folder and then `c:\Program Files\Windows NT\Accessories` folder.

4. How can I use the output as part of a manuscript?

If you select the abbreviated tables (item #3 on the general information line), the tables in the output will fit very easily on an 8 1/2 x 11 page. The 80 column regular tables sometimes also fit on an 8 1/2 x 11 page as well. If you use the abbreviated tables, no probabilities are presented. You will need to insert asterisks to indicate statistical significance.

5. What happens if I make a mistake in writing a program?

A program will be written but a diagnostic message will be written to the file that you specified along with your program. A diagnostic will also appear on your screen.

6. What do the error messages mean?

If the messages are from DETECT, they are more fully described in the original guide contained on the CD on pages 335-342. If you look at the file output from a failed program, the last line usually indicates the nature of the problem.

7. What do the error messages mean that are not DETECT related?

These occur because of errors in your program that DETECT does not correct or because there are so many errors, the program fails. One method of locating the problem is to go to the original guide and check that your program has the right values. Another way is to examine the output from the failed program and look for the DETECT errors in your output.

8. Why would a file appear called FORT13, etc.?

This file appears when DETECT is looking for your data separately from your program but can not find any data.

9. Why doesn't DETECT seem to correctly read data where variables are in free format separated by spaces or commas?

DETECT reads all the variables in the data set when the data are in free format. So if there are 50 variables and 20 are not relevant, DETECT will read 50 anyway. You need to make sure that you specify the number of variables to be skipped in item 10 on the GIL. The number of

variables to be analyzed plus the number not to be analyzed must equal the total number of variables in each case of the data. You can use data transformations or other word processors to delete variables, or you can use a format statement to delete variables.

10. Is there any limit to the number of levels of analysis that can be analyzed in DETECT?

Because each lower level is assumed to be wholes, and between group scores serve as the total scores for the next higher level, there is no limit to the number of levels that can be analyzed. The standard version of DETECT can handle 600 levels (where for example, analyses at the individual, group, department, division, organization, industry, and country levels combined total only 7 levels where 600 are allowed). Special orders from the Institute for Theory Testing can increase the number substantially

11. What is the maximum number of variables that I can input to DETECT?

The answer is 200. Versions of DETECT are available on special order from the Institute for Theory Testing that have a much higher limit.

12. What is the maximum number of cases that can be analyzed with DETECT?

Approximately 500 million divided by the total number of variables being analyzed. For example, for 20 variables the maximum number of cases would be 25 million. The supplied program is written in extremely high precision which allows for accuracy with very large samples, but very large samples require more time to be analyzed. Special DETECT packages are available that go up to about twice the capability of the standard DETECT package (1 billion divided by total number of variables). Special orders should be directed to the Institute for Theory Testing.

13. What is the maximum number of cells at any one level of analysis?

This maximum number is 20,000 cells (groups) at any one level. The number of cells that can be analyzed at any one level can be adjusted upward to over 999 billion by special order from the Institute for Theory Testing.

14. What is the precision of DETECT?

The precision is approximately 33 digits which exceeds the precision of a 60 bit word mainframe computer.

15. How can I increase the speed of the execution of DETECT?

You can (1) decrease the number of variables, (2) decrease the number of cases, (3) decrease the number of selected analyses. Alternatively, you can buy a computer with some combination of the following: (1) a faster processor, (2) more memory, or (3) a larger cache.

16. Why do asterisks appear in the output instead of numbers?

The values that are being output are too large to print in the space in the table. In some cases, instead of correcting values to 99.00 when a divisor is zero, DETECT will print out asterisks.

17. Why are there white boxes that sometimes appear on the background?

The white boxes don't affect the program writer or DETECT analyses. When you switch between DETECT (while it is running) and another program (for example, a word processor or the Adobe Reader to look at the User's Manual) the windowing system gets out of synchronization causing the white boxes. The windows become resynchronized after a short while. This adjustment never has any impact on DETECT.

18. Why can't I close DETECT with the x button (the close or cancel button) at the top right of the background screen?

DETECT needs to complete processing before it ends which the close button would not allow to happen. If you want to exit DETECT, choose **Cancel** to get back to the DETECT Main Menu and select **Exit** there.

APPENDIX 1

UNDERSTANDING AUTOMATIC POSITION NUMBERING

To illustrate how position numbers are generated by DETECT for data in free format, assume that scores on three variables, satisfaction, performance, and negotiation are assigned to individual 1 and individual 2. Let us say that individual 1 has scores of 11 for satisfaction, 2 for performance, and 3 for negotiation, and that individual 2 has scores of 14 for satisfaction, 5 for performance, and 6 for negotiation. The data for individual 1 are coded as follows in free format:

1, 11, 2, 3

The 1 indicates that the row refers to individual 1, and the subsequent scores are for satisfaction, performance, and negotiation, respectively. The data for individual 2 are coded as follows:

2, 14, 5, 6

The scores for both individuals are written as follows:

1, 11, 2, 3

2, 14, 5, 6

The order of variables is as shown on the left side of the following table:

Variable	Position number
ID number	1
Satisfaction	2
Performance	3
Negotiation	4

With free-format data, DETECT automatically sequentially numbers the variables from the first to last as shown in the right portion of the table.

When fixed-format data are used, the values for variables are located in specific columns. For example, using the same data, we might code it as follows beginning in column 1:

11123

21456

and describe it as shown in the table on the next page:

Variable	Column	Position number
ID number	1	1
Satisfaction	2-3	2
Performance	4	3
Negotiation	5	4

As shown in the last column of the table, again position numbers are assigned to all of the variables in the order in which they are input. The way data are organized and position numbers are used in various analyses is described in Sections 2.1.1 to 2.1.5 in the original guide.

POSITION NUMBER FOR SINGLE-LEVEL ANALYSIS

In single-level analysis one variable is used to indicate the unit (cell) within which each case is embedded. (Only positive whole numbers are used for cell indicators.) For example, suppose there are four individuals numbered 1 to 4, and individuals 1 and 2 are in dyad 1, and individuals 3 and 4 are in dyad 4. (The numbers used for indicators need not be sequential.) Assuming each individual has a score on satisfaction, performance, and negotiation, the variables and indicators are properly organized in the example shown in the next table. Although not necessary, it is helpful to place the cell indicators before the variables to be analyzed.

Individual	Cell indicator	Satisfaction	Negotiation	Performance
1	1	11	2	3
2	1	14	5	6
3	4	13	9	2
4	4	11	8	7

In free format where individuals' ID numbers are deleted, the data may be rewritten as follows:

1, 11, 2, 3
 1, 14, 5, 6
 4, 13, 9, 2
 4, 11, 8, 7

The cell indicator is in position 1 while the variables to be analyzed are in positions 2 through 4. In fixed format we may arrange the variables so that each case takes two lines; thus, beginning in column 1 on each line the data would read as follows (see Section 2.2.3 for details on how DETECT creates position numbers from format statements):

111
23
114
56
413
92
411
87

The following type of table is particularly helpful in keeping track of the position of variables entered in fixed format:

Line	Column	Variable	Position number
One	1	Cell Indicator	1
One	2-3	Satisfaction	2
Two	1	Negotiation	3
Two	2	Performance	4

The position numbers generated by DETECT are listed in the last column of the table.

To summarize, for single-level analysis there are two requirements:

1. Indicate for each case the cell in which it is located. (Use only positive whole values.)
2. Determine the position number of the cell indicator.

DETECT does not require the presorting or sequencing of data into cells because it automatically sequences data.

APPENDIX 2

FIXED- OR FREE-FORMAT DATA

The data presented in Table 2.1 illustrate fixed- and free-format data. In both illustrations the same numbers appear for the 10 cases embedded in five cells. There are three variables of interest and one cell indicator (the first variable) for each case. Thus, there are four variables in total. The way data in free- and fixed-format are input to DETECT is now described.

TABLE 2.1 Properly prepared free- and fixed-format data

Column:

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

Free-format

0	1		0	1		0	2		0	4
0	1		0	2		0	3		0	3
1	2		0	3		0	4		1	0
1	2		0	4		1	0		0	7
0	3		0	5		0	9		0	6
0	3		0	6		0	8		0	3
0	4		0	7		0	7		0	5
0	4		0	8		0	6		0	8
1	5		0	9		0	5		0	9
1	5		1	0		0	3		0	2

Fixed-format:

	1		1		2		4			
	1		2		3		3			
1	2		3		4	1	0			
1	2		4	1	0		7			
	3		5		9		6			
	3		6		8		3			
	4		7		7		5			
	4		8		6		8			
1	5		9		5		9			
1	5	1	0		3		2			

Free-Format Data In free-format data the variables are separated by commas or blank spaces. The position number of a cell indicator is determined by counting the number of variables preceding the cell indicator and adding 1. For the example in Table 2.1, the position indicator is in columns 1 and 2, followed by a comma, and thus has a position number of 1.

Fixed-Format Data When variables are not separated by commas or blanks, a format statement must be input to DETECT and the position number for each variable is derived from the statement. The format statement which applies to all variables and indicators is written using *only* the standard F format of the following general form:

Fa.b

where:

- F indicates that data are numeric
- a indicates the total number of columns for a variable (including any signs, or decimal points)
- b indicates the number of columns in the variable to the right of the decimal point

For example, F1.0 indicates a variable that occupies one column; F2.0 indicates a variable that occupies two columns. A decimal point may or may not be entered for any variable of interest. (Values that follow decimal points are ignored by DETECT for cell and condition *indicators*.) The following examples illustrate the meaning of different format statements:

Statement	Value in data	Value read by DETECT
F2.0	10	10.00
F3.1	100	10.00
F4.1	10.1	10.10
F3.2	010	00.10

Because DETECT accepts data with 80 columns per line, the format for a data set usually consists of a string of such statements. The string is written with each statement separated by a comma and preceded and ended with parentheses. For the example shown in the lower portion of Table 2.1, a format statement is

(F2.0, F2.0, F2.0, F2.0)

where each element has the following meaning:

Required beginning parenthesis: (

Two column cell ID number: F2 . 0 ,

Two column value for variable *W*: F2 . 0 ,

Two column value for variable *X*: F2 . 0 ,

Two column value for variable *Y*: F2 . 0 ,

Required ending parenthesis:)

When redundancy occurs in a statement, a number is used before the F to indicate the number of times the same statement repeats. In the example from Table 2.1, the format can be rewritten as:

(4F2 . 0)

which is identical to the previous statement.

Two additional elements are useful in writing a format statement. First, when it is desirable to skip columns the following notation is used:

dX

Where

X indicates to skip columns

d indicates the number of
columns to skip.

For example, if it were not desirable to read the second variable for the data in Table 2.1, the following format would be used:

(1F2 . 0 , 2X , 2F2 . 0)

A second feature allows for any number of lines to be read as one case. This involves the use of the slash (/). For example, suppose data are stacked such that there are 2 two-column cell indicators and

38 two-column variables on the first line, and 2 two-column cell indicators and 38 two-column variables on the second line. In this case there are two cell indicators (variables 1 and 2) and 76 variables of interest for a total of 78 variables. A format line for this case is written as:

$$(40F2.0/4X, 38F2.0)$$

When variables are input in fixed format, all variables are numbered sequentially (that is, 1, 2, 3, etc.) by DETECT according to the format statement. For example, in the illustration from Table 2.6 the variables have the following position numbers given the format $(4F2.0)$:

Column	Variable	Position number
1 – 2	Cell indicator	1
3 – 4	Variable W	2
5 – 6	Variable X	3
7 – 8	Variable Y	4

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