

Appendix

Comparing Trends on Graphs

Throughout the book, you have been introduced to various kinds of graphs and the kinds of information they display. But all the bar and line graphs you have seen have been simple with only one type of data on them and only one trend to interpret. When graphs have more than one set of data, whether they are shown with bars or lines, those graphs compare the trends represented by the different data sets.

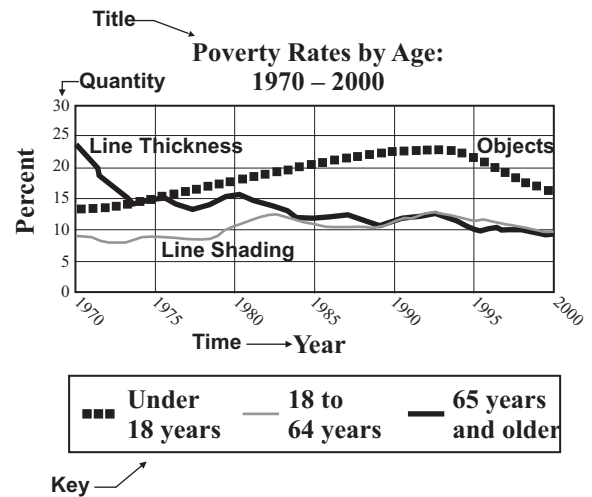
This brief appendix provides some insights into how to compare multiple trends on the same graph. It will also introduce **population graphs** (sometimes **population pyramids**), a kind of graph that uses multiple bars and multiple categories to show trends in population or trends related to age groups. They may look scary, but when broken down into the various components, they aren't that bad.

Line Graphs

As you are aware, a line graph shows a trend over time. Data points are plotted on a graph with the quantity on the vertical axis and the time on the horizontal axis.

When comparing trend lines on the same graph, you need some way of being able to tell which line belongs to which category of data. There are several ways to differentiate one line from another. The simplest way is to label them, but words on the graph sometimes makes it difficult to read. To make each line different, objects or symbols may be used, different line thicknesses may be used, or different colors or shades of gray may be used.

Most graphs with multiple lines use a **key** to show what each line represents, although it may not say "key" on it. If a key is not used, the lines are labeled directly on the graph. The graph in **Figure 1** shows some of the different ways to distinguish lines. The black line is thicker and the thinner line is a shade of gray. A third line is made of objects. The key tells which data is on the identified line. Each line shows a different trend over time that can be compared to the other trends on the graph. As you can see, in 1970 the greatest number of people in poverty (the one with the highest percentage) was the elderly (65 and older), followed by those under 18 (considered children), and then adults (18 to 64). However, by the year 2000, the trend had changed. The largest group in poverty was children, followed by adults, and then the elderly. A number of other observations can also be made from the graph, but you will need to know the history from the time period to interpret the trends and make inferences from the graph.



Source: The Census Bureau

Figure 1

Example 1: From the graph above in Figure 1, which of the following could account for the poverty rate decreasing in all three categories after 1995?

- A. inflation
- B. George H.W. Bush's policies toward the elderly
- C. the recession from the Reagan years
- D. the boom during Clinton's presidency

Inflation has a tendency to make everything more expensive, so inflation would make the poverty rates go up. The answer cannot be A. George H. W. Bush was President from 1989 to 1993, so you can eliminate B because it is the wrong time period. Reagan is also the wrong time period, so C isn't the answer. There was a significant increase in the economy during Clinton's term, which would have been 1993 to 2001. A boom in the economy tends to lower the poverty rate. The answer is D.

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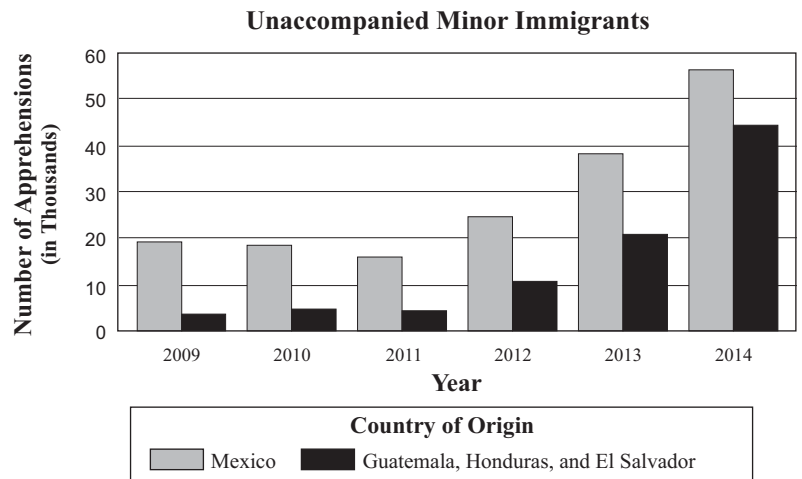
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Bar Graphs

You have already seen that bar graphs are a way to compare quantities at certain time intervals. Graphs with multiple bars display more than one set of data that can be compared to each other. Like all bar graphs, they show a trend over a series of time intervals.

In **Figure 3**, you can see that there are two different sets of data on the graph. The key shows what each bar color represents.

The quantity shown on the left is the number of apprehensions, but notice that this number has a multiplier. “In thousands” means each bar value must be multiplied by one thousand. For example, the gray bar in 2009 is nearly 20 on the graph, so that bar actually represents nearly 20,000 apprehensions. To multiply by 1,000, simply add three zeros to the number from the graph.



Source: U.S. Customs and Border Protection

Figure 3

Example 3: What is the overall trend of the data in Figure 3?

Trends are usually defined as increasing, decreasing, or stable (unchanging). The data for Mexico decreases slightly from 2009 to 2011 but then increases every subsequent year. The data from Guatemala, Honduras, and El Salvador increase every year except for 2011 when the number appears about the same as 2010. Overall, you would say that the trend of the data in this graph is increasing year after year, especially since the year 2011.

Example 4: How does the data for Mexico relate to the data from Guatemala, Honduras, and El Salvador?

You can easily see from the bars that the number of unaccompanied minor immigrants from Mexico is consistently higher than those from the other three countries.

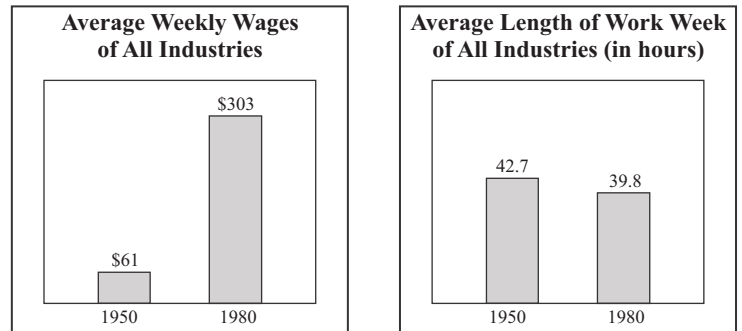
Example 5: Which consecutive years show the greatest increase in the number of apprehensions from Guatemala, Honduras, and El Salvador?

The increase from one year to another is determined by subtracting one year’s apprehensions from the other year’s. Since this question asks about Guatemala, Honduras, and El Salvador, look only at the black bars. Each line represents 10,000 apprehensions, so you can answer this question without actually doing the math. From 2013 to 2014, you should be able to see the apprehensions from these three countries increased over 20,000 from one year to the next. This jump represents the greatest increase from one year to the next.

Appendix, continued Comparing Trends on Graphs

Another way to compare multiple trends is to compare the trends on two or more graphs as in **Figure 4**. Notice that the two graphs show entirely different data: one shows average weekly wages and the other shows the length of the average work week.

In the first graph, weekly wages in 1950 are compared to weekly wages in 1980. In the second graph, the average work weeks of 1950 and 1980 are shown. Consider the trends in both graphs.



Source: *Historical Statistics of the United States*

Figure 4

Example 6: From the graphs in Figure 4, what are the overall trends of the graphs? How do the trends compare to one another?

The overall trend of weekly wages increases over time. The trend in the length of the work week decreases over time. When comparing both trends, weekly salaries are rising while the average work week is getting shorter.

Population Pyramids

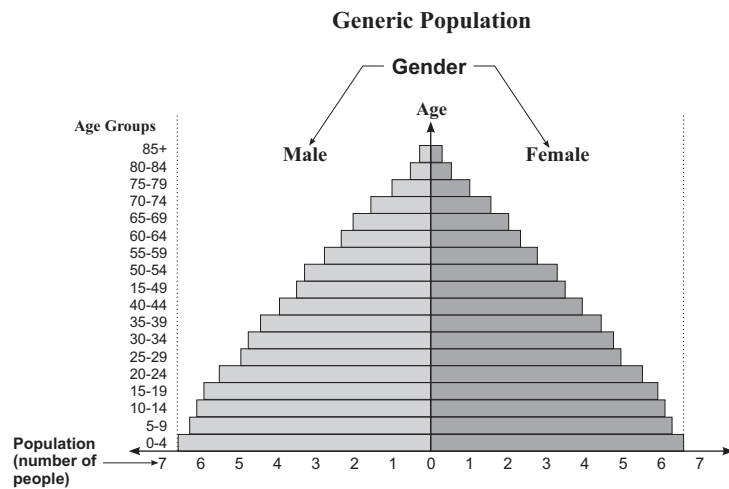


Figure 5

A **population pyramid** is a special type of bar graph that shows the distribution of males and females in various age groups. Look at **Figure 5**. The bars to the left of center represent males, and the bars to the right of center represent females. The age groups are given on the vertical axis. The horizontal axis gives the population in millions. Each bar, then, represents the number of males or females in each age group.

Sometimes, the gender labels are replaced with a key to identify male and female, and often the age groups are shown down the center of the graph.

The population pyramid in **Figure 5** is generic. Depending on how the quantities among age groups are distributed, actual data might not look much like a pyramid. Population pyramids show a trend among age groups. In the generic population pyramid in **Figure 5**, the numbers of males and females decrease as age increases.

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The population pyramid shown in **Figure 6** is slightly different from the one in **Figure 5** on the previous page. The age ranges are given in the middle instead of on the left side. More importantly, this graph includes an additional set of data. The dark gray bars represent the total population for each age range, but the light gray bars represent the number of employed people in each age range.

Notice also that the quantity across the bottom of the graph has a multiplier. If you look at the bars representing infants (0-4) there are over 8 million male babies and around 8 million female ones. Obviously, none of them work. In fact, all babies do is eat, sleep, potty, keep their parents awake, and look cute.

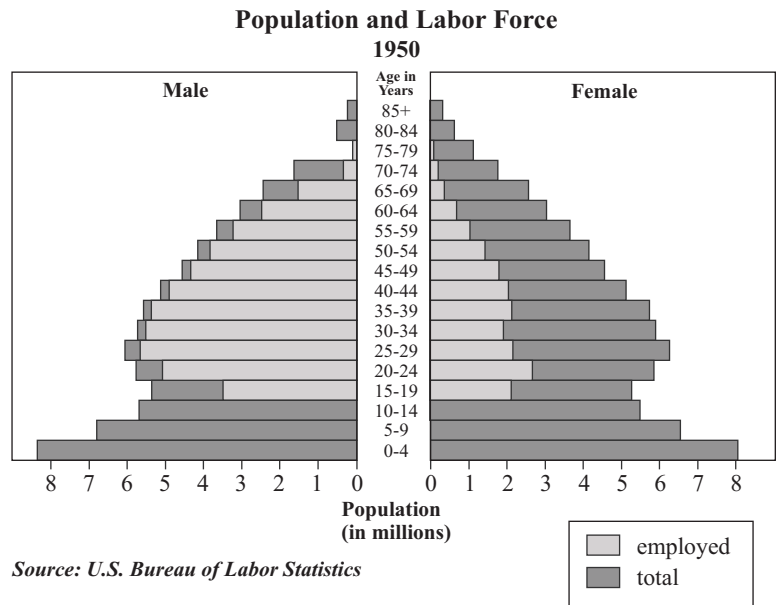


Figure 6

Example 7: In 1950 regardless of employment status, what was the general trend in population across the age groups?

Figure 6 roughly looks like a pyramid. In general, the bars get smaller as the age ranges increase. The general trend of the population in 1950 is increasing because there are more young people than older ones.

Example 8: In 1950, which age group of women had the most workers? Which age group of men had the most workers?

The longest gray bar for females is shown in the age group of 20 to 24. About 2.7 million women age 20 to 24 were working in 1950. The longest gray bar for males is shown in the age group of 25 to 29. About 5.7 million men age 25 to 29 were working in 1950.

Example 9: In 1950, how does the number of employed females compare to the number of employed males?

You should be able to easily see that the number of employed men in each age group outnumbers employed women. In 1950, a greater percentage of men worked than women.