

**Business statistics**  
**B.Com Ist Semester**

**Graphical presentation**

presented by  
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Department Of Commerce  
**HCPGC VARANASI**

# Graphic Presentation

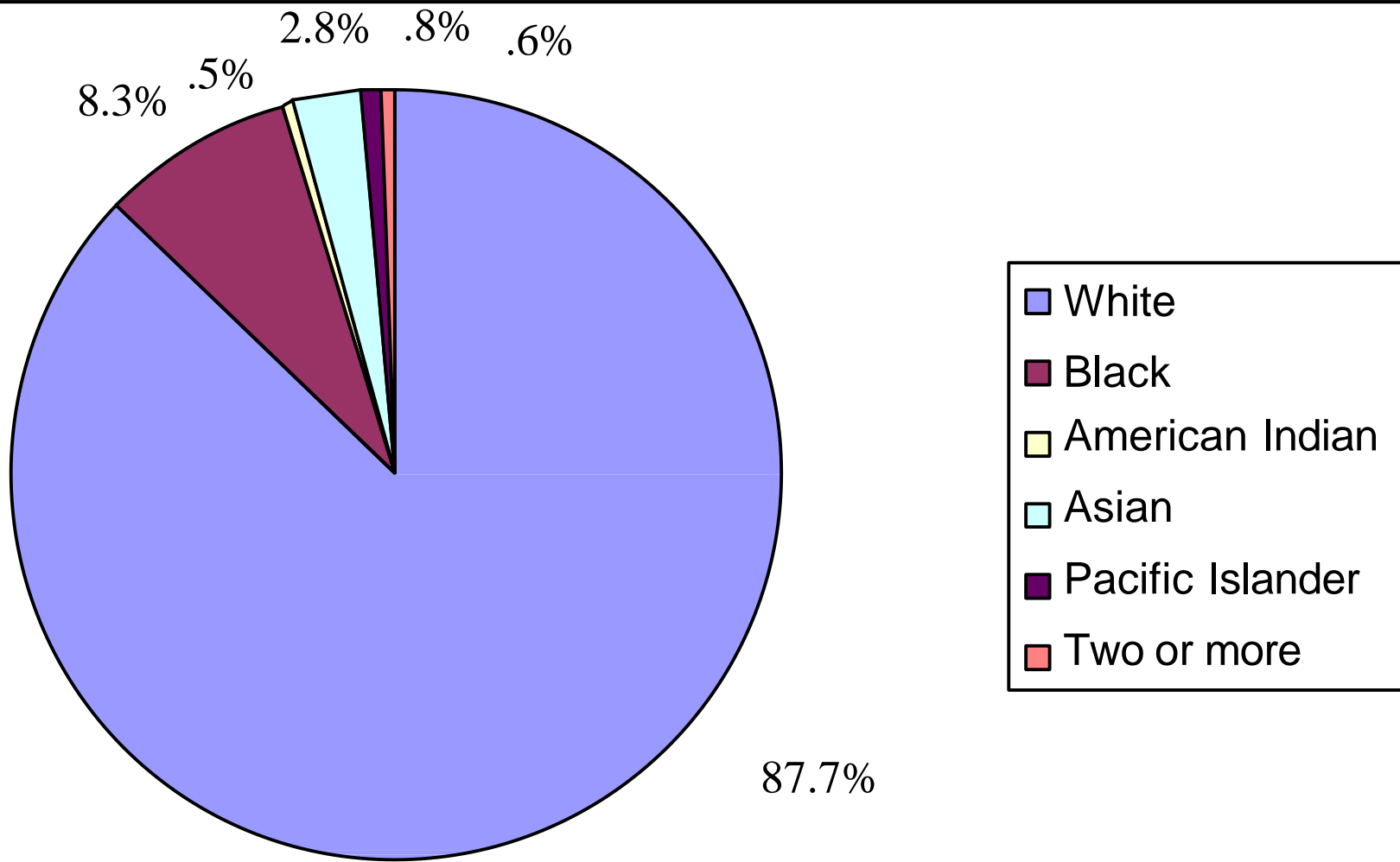
- **The Pie Chart**
- **The Bar Graph**
- **The Statistical Map**
- **The Histogram**
- **Statistics in Practice**
- **The Frequency Polygon**
- **Times Series Charts**
- **Distortions in Graphs**

*It is important to choose the appropriate graphs to make statistical information coherent.*

# The Pie Chart: The Race and Ethnicity of the Elderly

- *Pie chart:* a graph showing the differences in frequencies or percentages among categories of a **nominal** or an **ordinal** variable. The categories are displayed as segments of a circle whose pieces add up to 100 percent of the total frequencies.

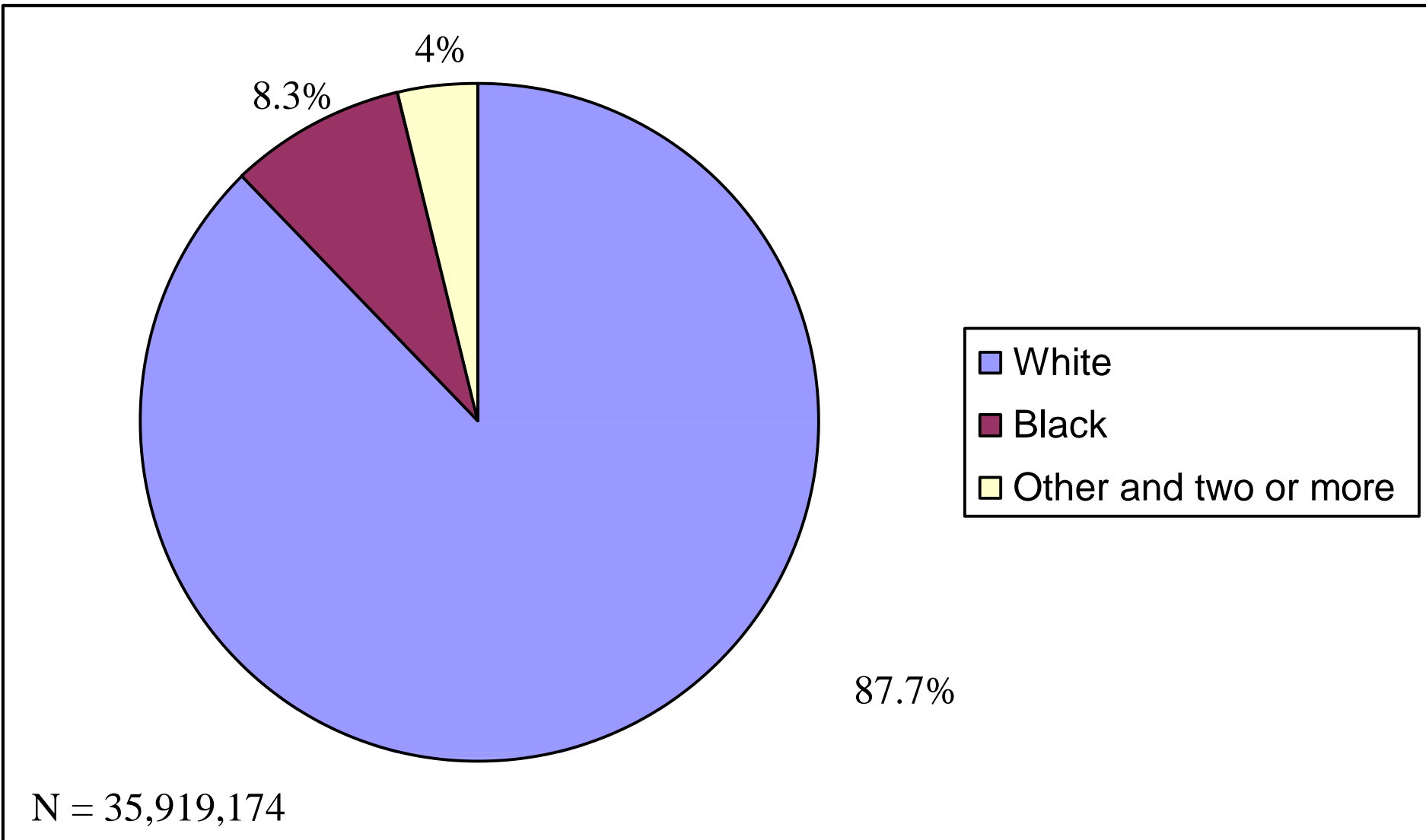
# Too many categories can be messy!



N = 35,919,174

**Figure 3.1 Annual Estimates of U.S. Population 65 Years and Over by Race, 2003**

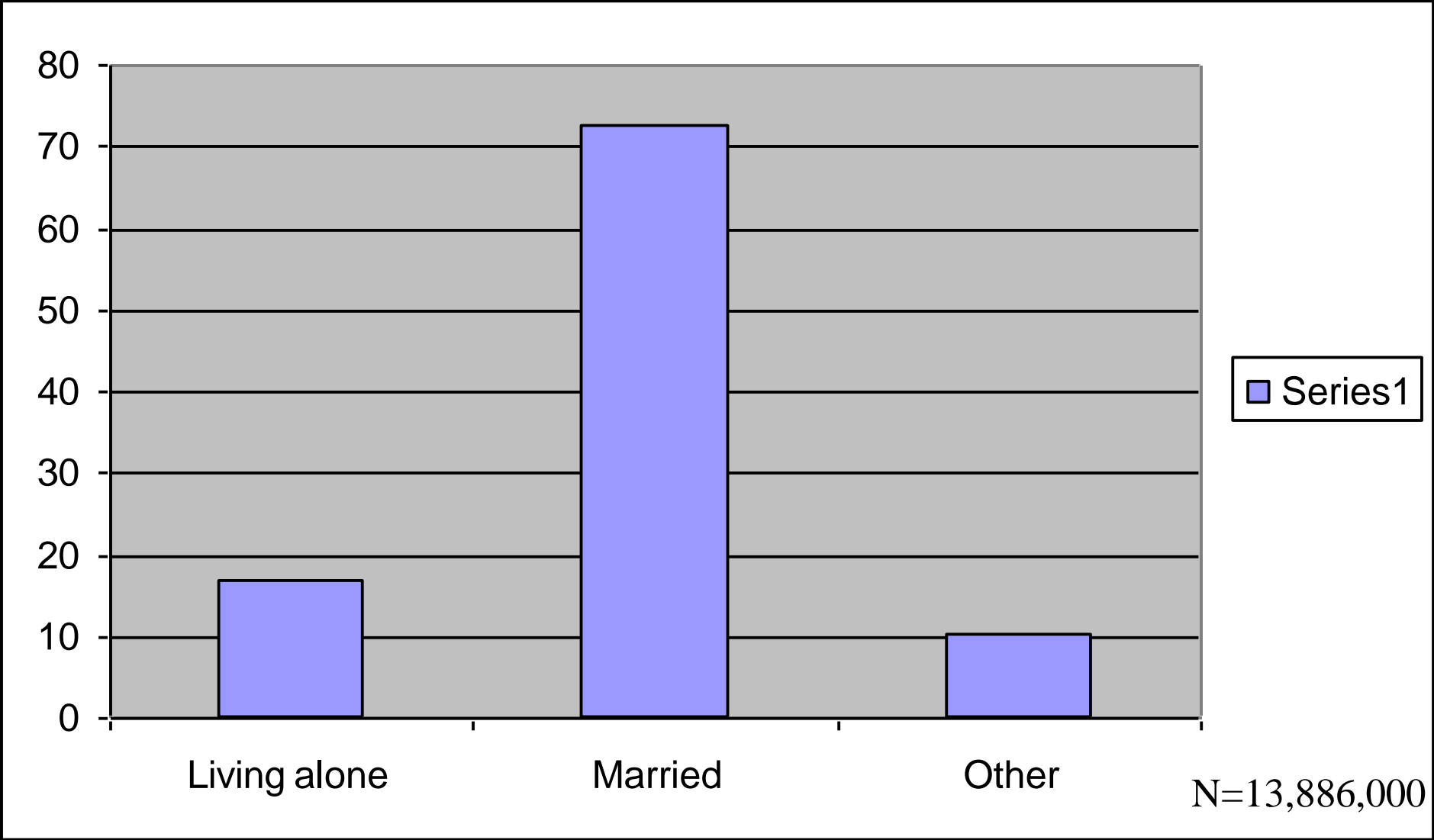
# We can reduce some of the categories



**Figure 3.2 Annual Estimates of U.S. Population 65 Years and Over, 2003**

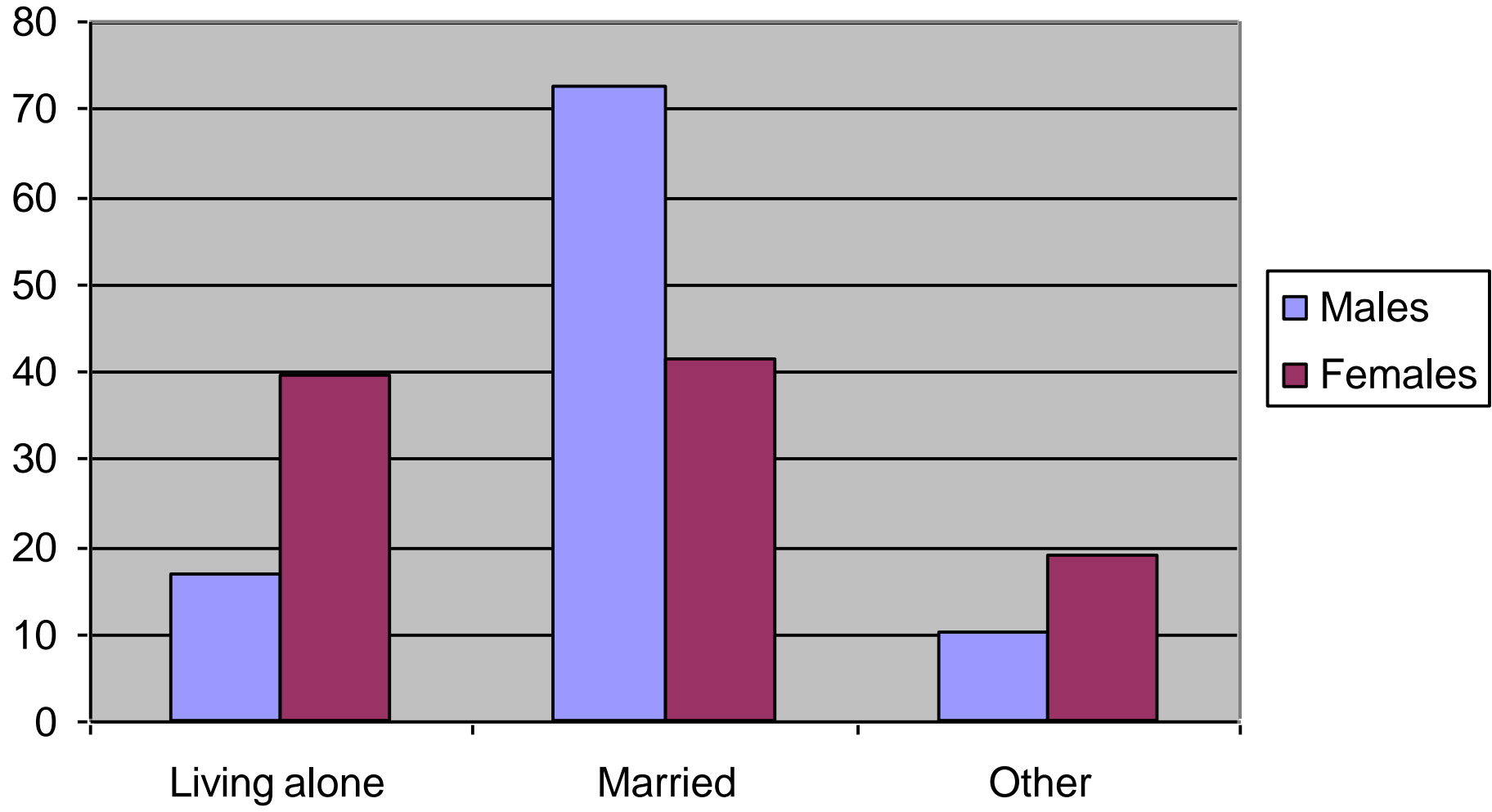
# The Bar Graph: The Living Arrangements and Labor Force Participation of the Elderly

- ***Bar graph:*** a graph showing the differences in frequencies or percentages among categories of a **nominal** or an **ordinal** variable. The categories are displayed as rectangles of equal width with their height proportional to the frequency or percentage of the category.



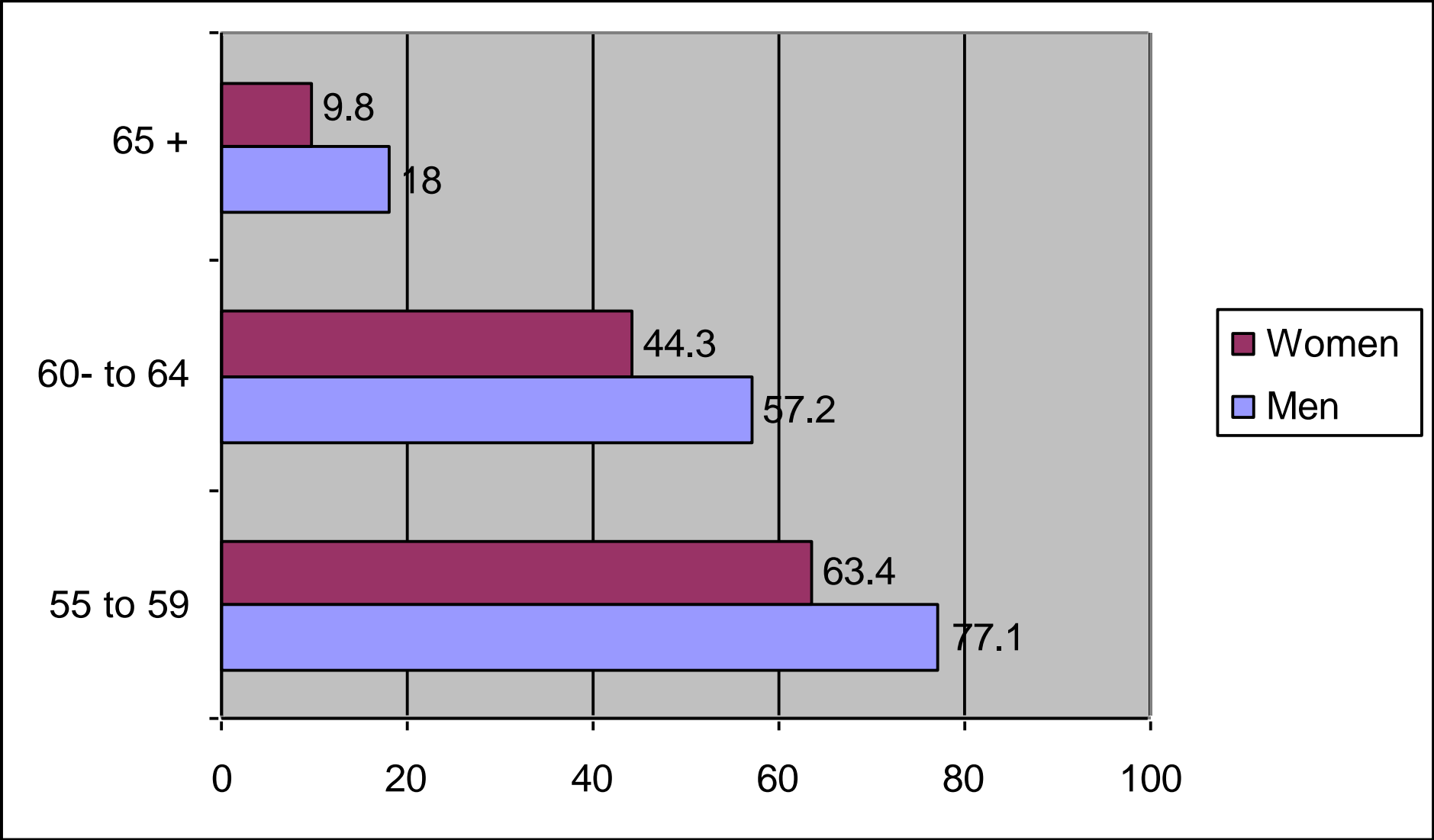
**Figure 3.3 Living Arrangements of Males (65 and Older) in the United States, 2000**

# Can display more info by splitting sex



**Figure 3.4 Living Arrangement of U.S. Elderly (65 and Older) by Gender, 2003**



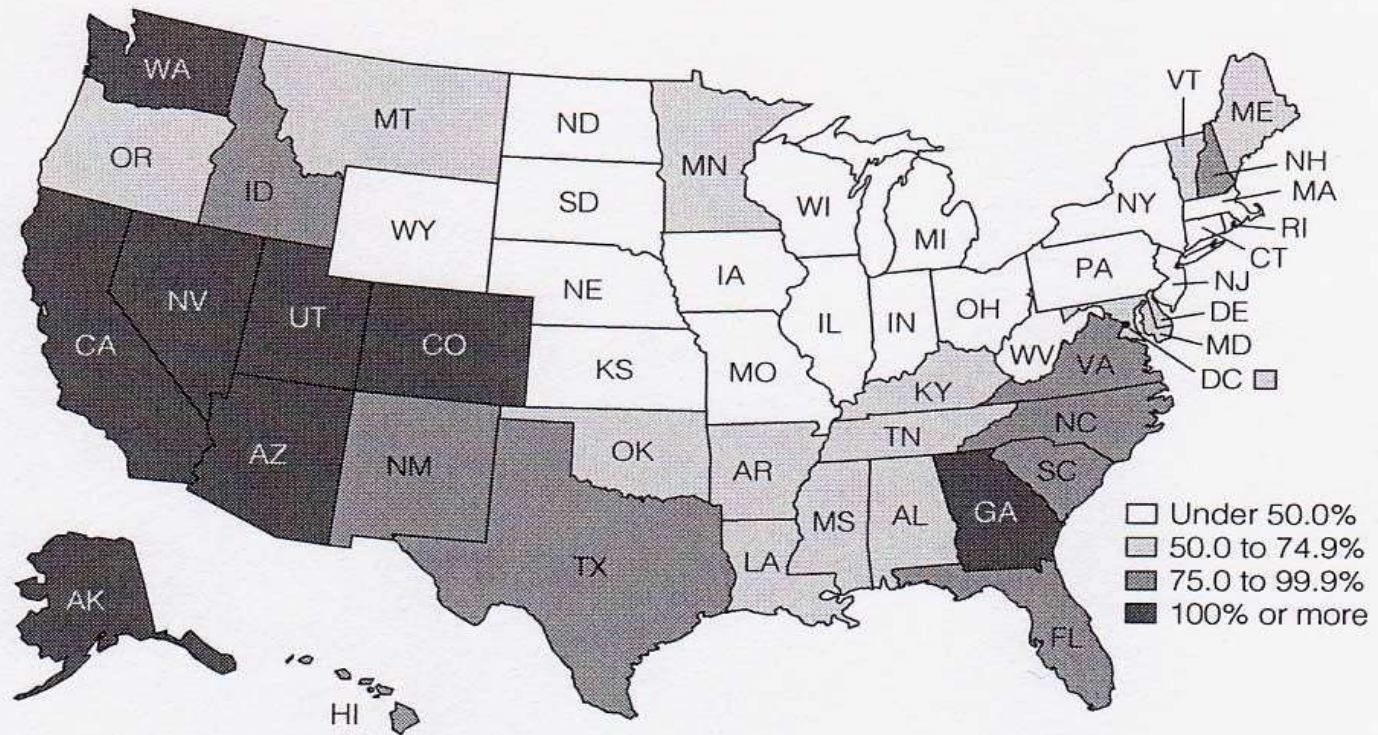


**Figure 3.5 Percent of Men and Women 55 Years and Over in the Civilian Labor Force, 2002**

# The Statistical Map: The Geographic Distribution of the Elderly

We can display dramatic geographical changes in American society by using a **statistical map**. Maps are especially useful for describing **geographical variations in variables**, such as population distribution, voting patterns, crimes rates, or labor force participation.

Figure 3.6 **Percentage Increase in Population 65 Years and Over, 1993 to 2020**



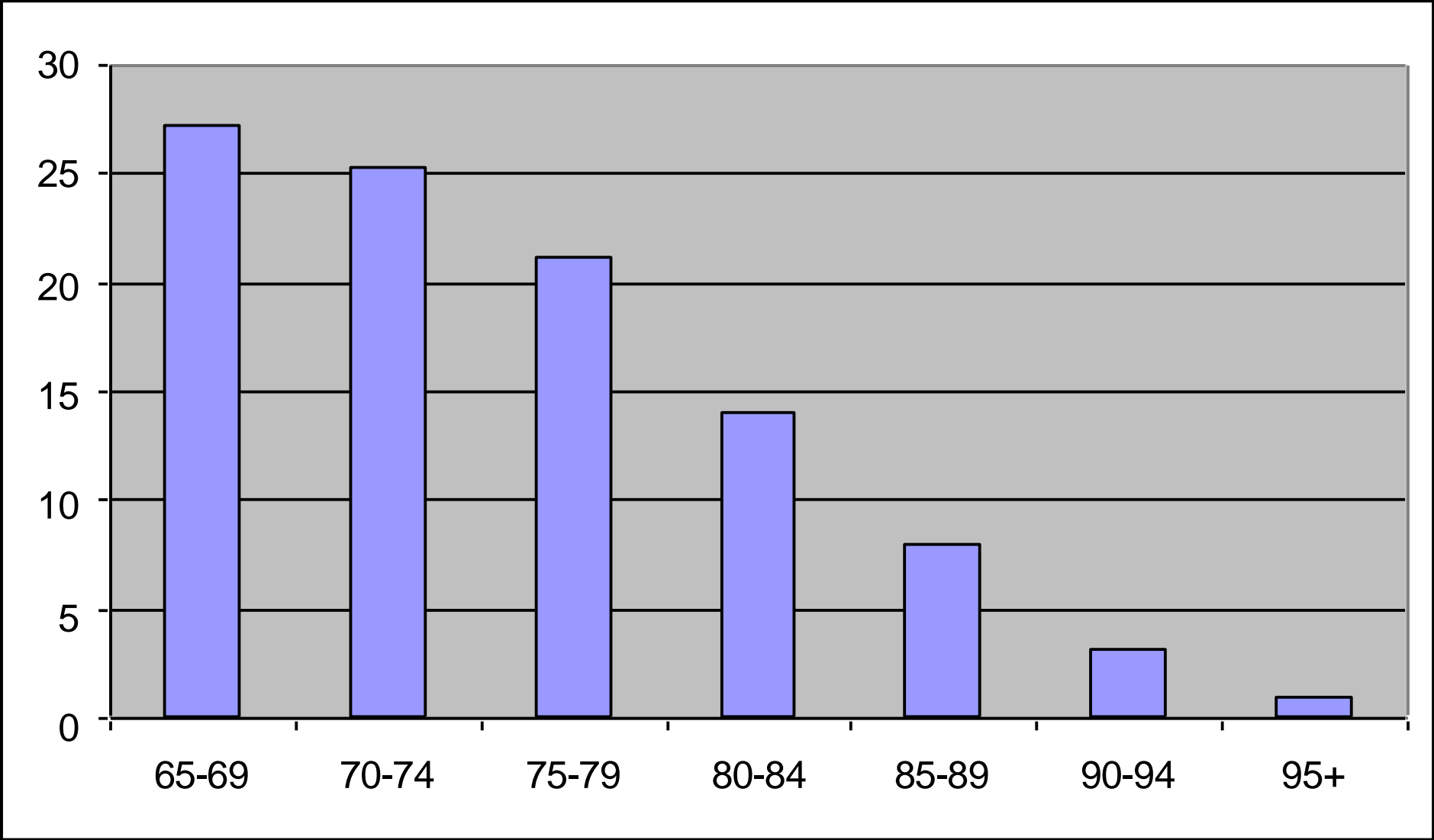
United States  
62.7%

Source: U.S. Bureau of the Census, 1993 from 1994 Press Release, *Updated National/State Population Estimates*, CB94-43; 2020 from "Population Projections for States, by Age, Sex, Race, and Hispanic Origin: 1993 to 2020," *Current Population Reports*, P25-111, U.S. Government Printing Office, Washington, DC, 1994.



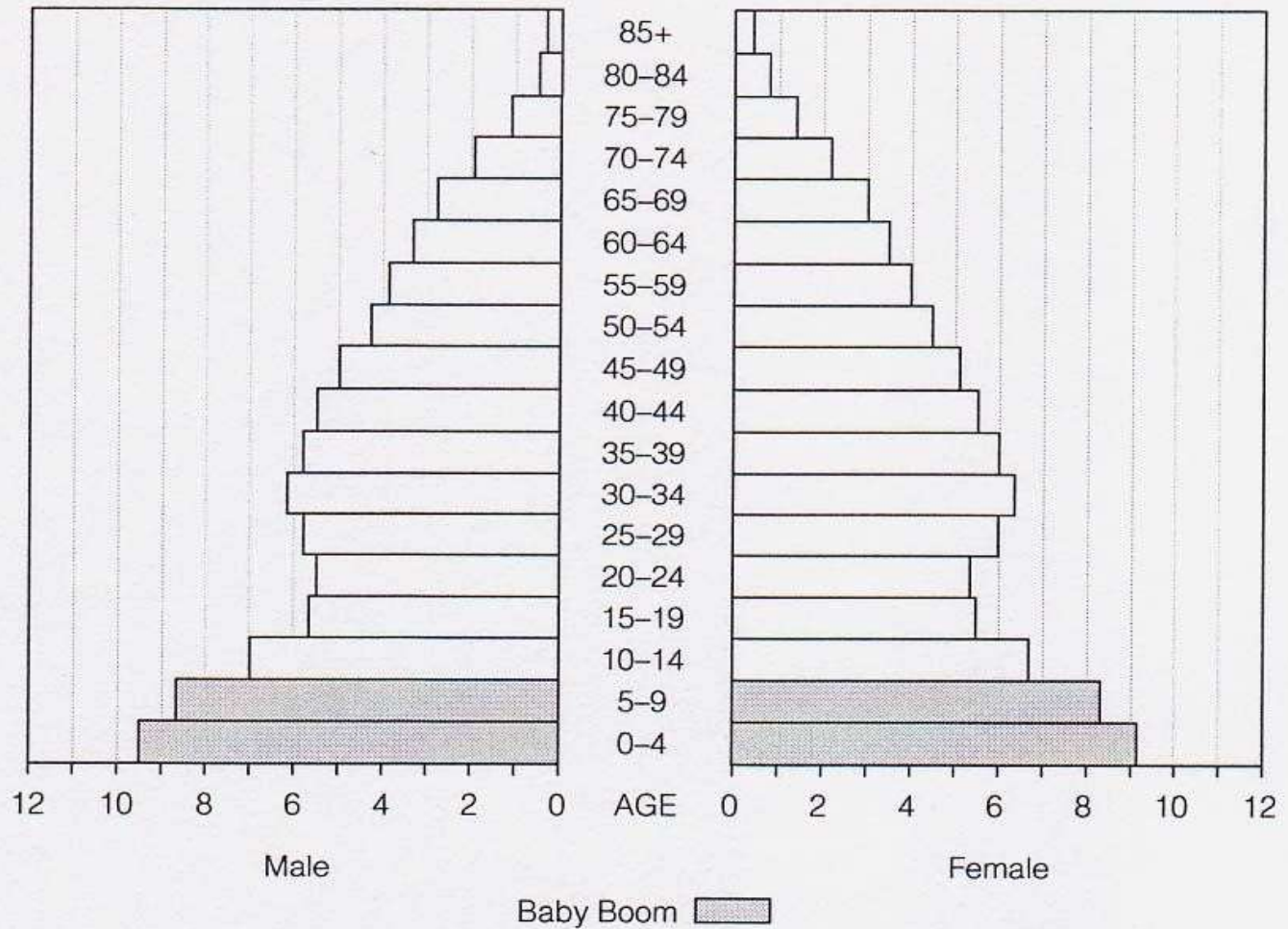
# The Histogram

- ***Histogram***: a graph showing the differences in frequencies or percentages among categories of an **interval-ratio** variable. The categories are displayed as contiguous bars, with width proportional to the width of the category and height proportional to the frequency or percentage of that category.



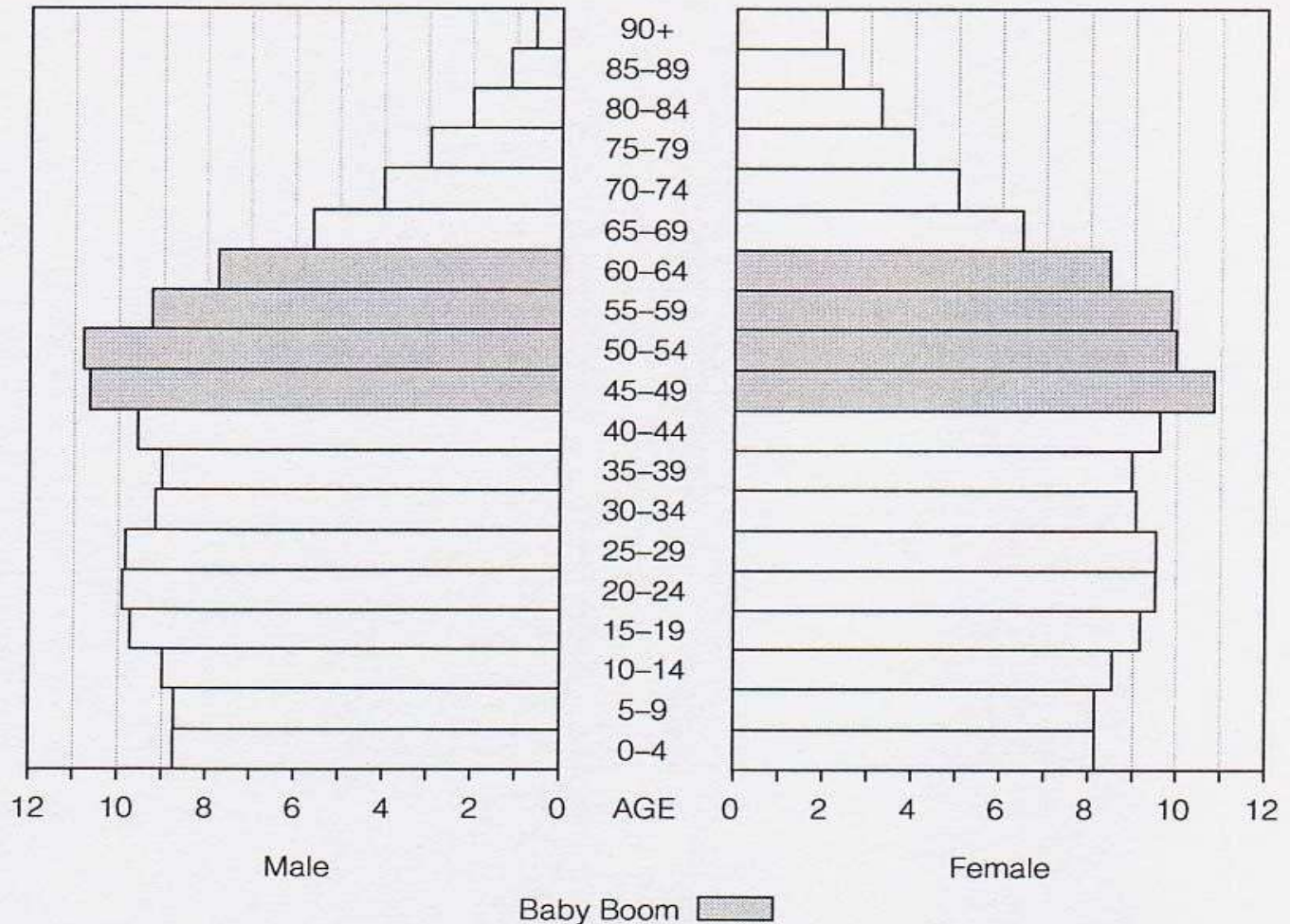
**Figure 3.7 Age Distribution of U.S. Population 65 Years and Over, 2000**

Figure 3.10 **U.S. Population by Gender and Age, 1955 (in millions)**



Source: U.S. Bureau of the Census, *Current Population Reports*, 1992, P23-178.

Figure 3.11 **U.S. Population by Gender and Age, 2010 (in millions)**



Source: U.S. Bureau of the Census, *Current Population Reports*, 1992, P23-178.



# The Frequency Polygon

- *Frequency polygon:* a graph showing the differences in frequencies or percentages among categories of an **interval-ratio** variable. Points representing the frequencies of each category are placed above the midpoint of the category and are jointed by a straight line.

Source: Adapted from U.S. Bureau of the Census, Center for International Research, International Data Base, 2003.

### Population of Japan, Age 55 and Over, 2000, 2010, and 2020

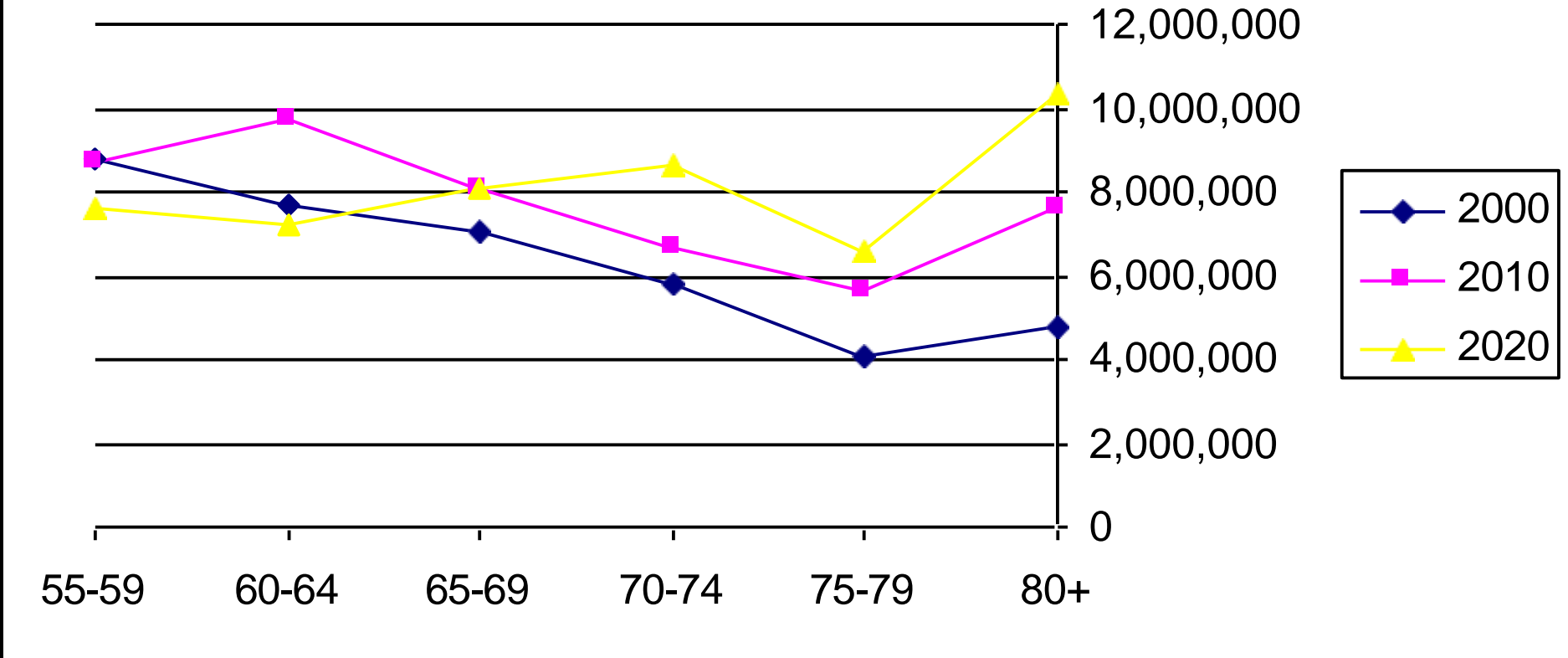
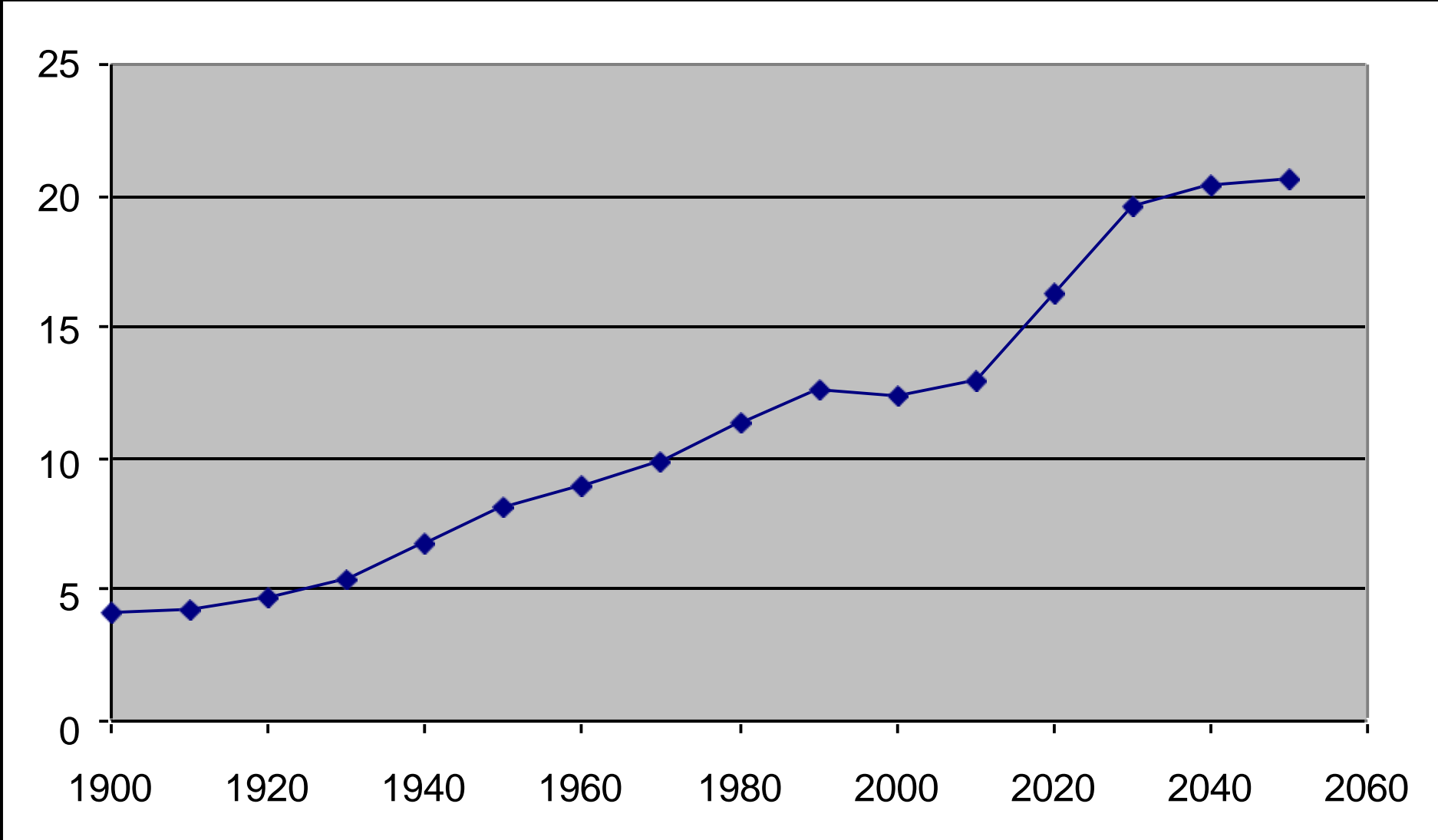


Figure 3.11. Population of Japan, Age 55 and Over, 2000, 2010, and 2020

# Time Series Charts

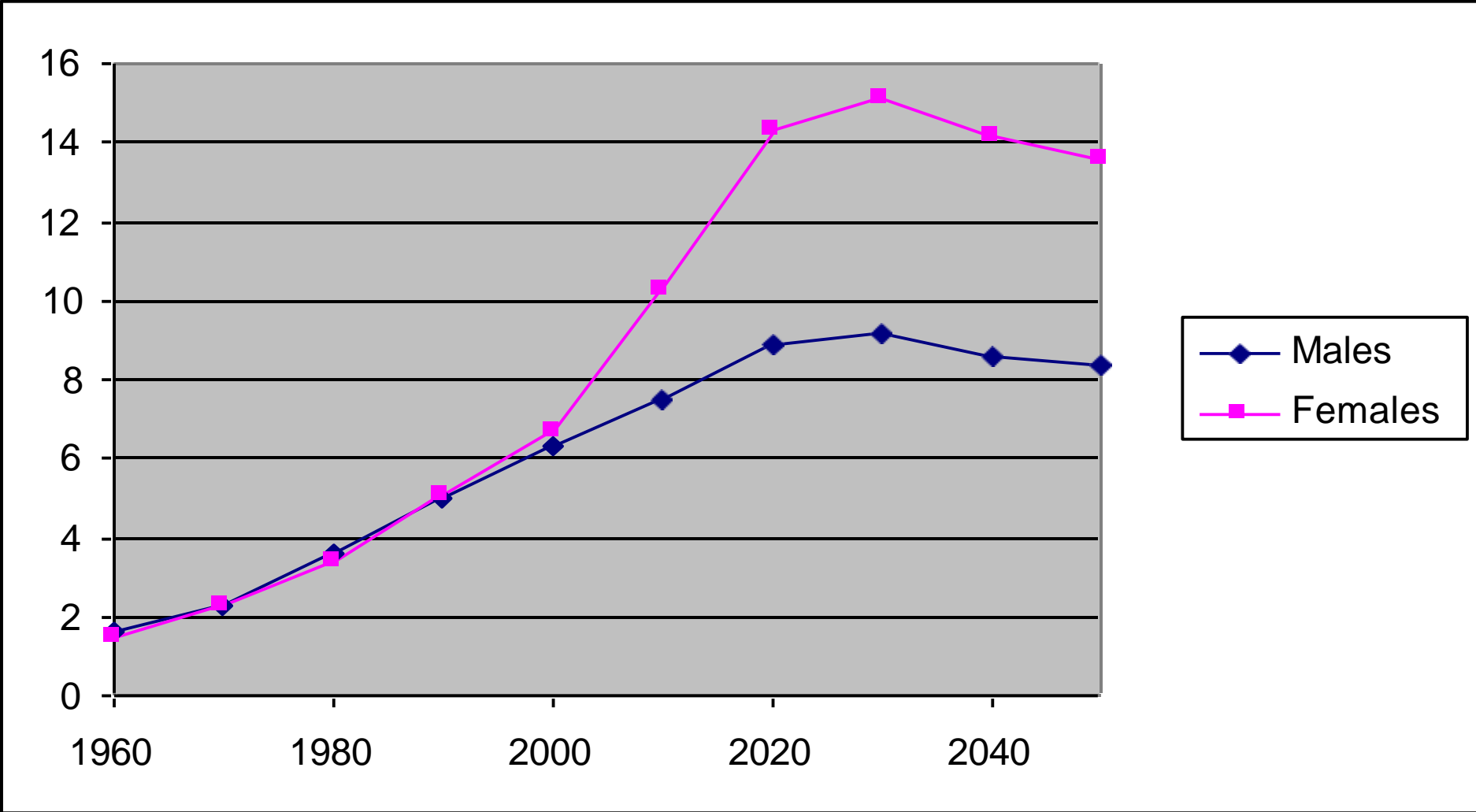
- ***Time series chart:*** a graph displaying **changes** in a variables at **different points in time**. It shows time (measured in units such as years or months) on the horizontal axis and the frequencies (percentages or rates) of another variable on the vertical axis.

Source: Federal Interagency Forum on Aging Related Statistics, *Older Americans 2004: Key Indicators of Well Being, 2004*.



**Figure 3.12 Percentage of Total U. S. Population 65 Years and Over, 1900 to 2050**

Source: U.S. Bureau of the Census, "65+ in America," Current Population Reports, 1996, Special Studies, P23-190, Table 6-1.



**Figure 3.13 Percentage Currently Divorced Among U.S. Population 65 Years and Over, by Gender, 1960 to 2040**

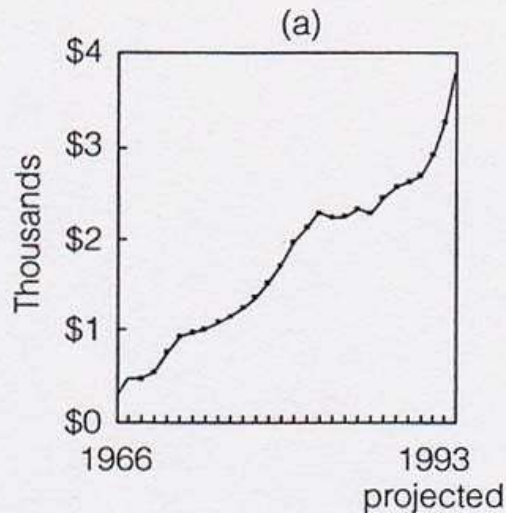
# Distortions in Graphs

Graphs not only quickly inform us; they can quickly **deceive** us. Because we are often more interested in general impressions than in detailed analyses of the numbers, we are **more vulnerable** to being swayed by **distorted graphs**.

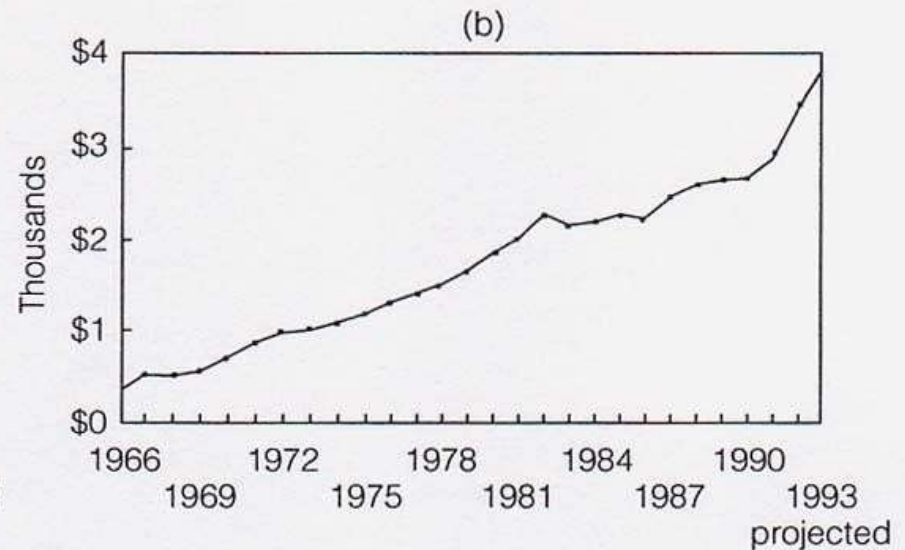
- *What are graphical distortions?*
- *How can we recognize them?*

# Shrinking and Stretching the Axes: Visual Confusion

Figure 3.16 **Cost per Child Enrolled in Head Start Program**



Cost per Child  
Graph Showing  
Skyrocketing Increase

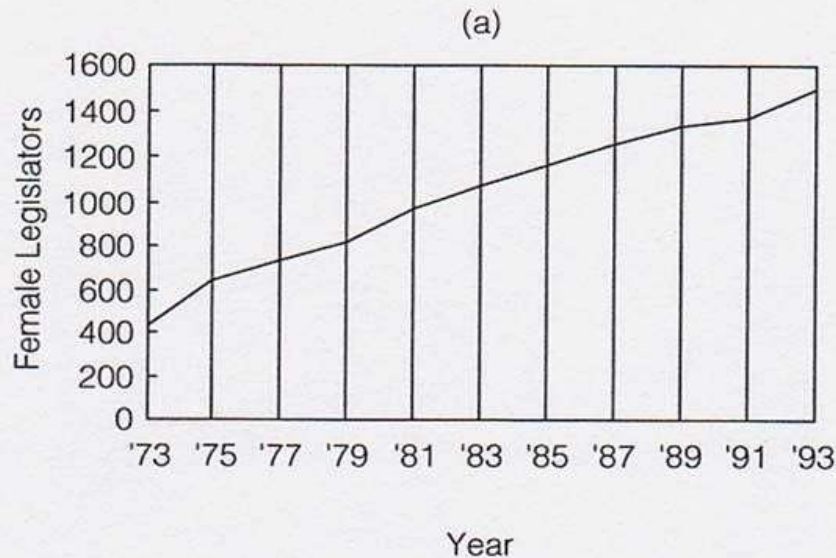


Cost per Child  
Graph Showing  
More Moderate Increase

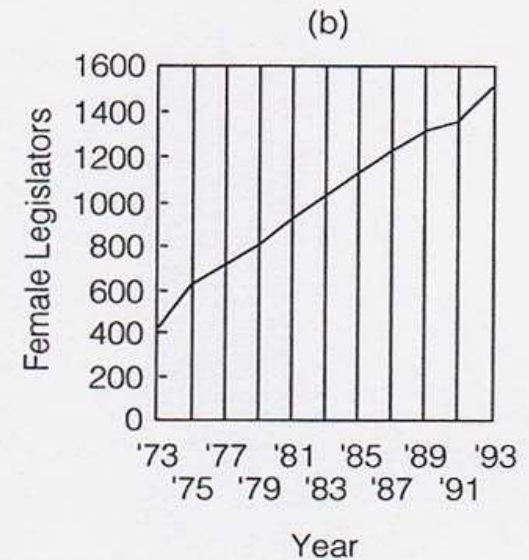
Source: Adapted from *USA TODAY*, March 15, 1993. Copyright 1993 USA TODAY.  
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# Shrinking and Stretching the Axes: Visual Confusion

Figure 3.17 **Women in U.S. Legislatures, 1973 to 1993**



Graph Showing  
Moderate Increase



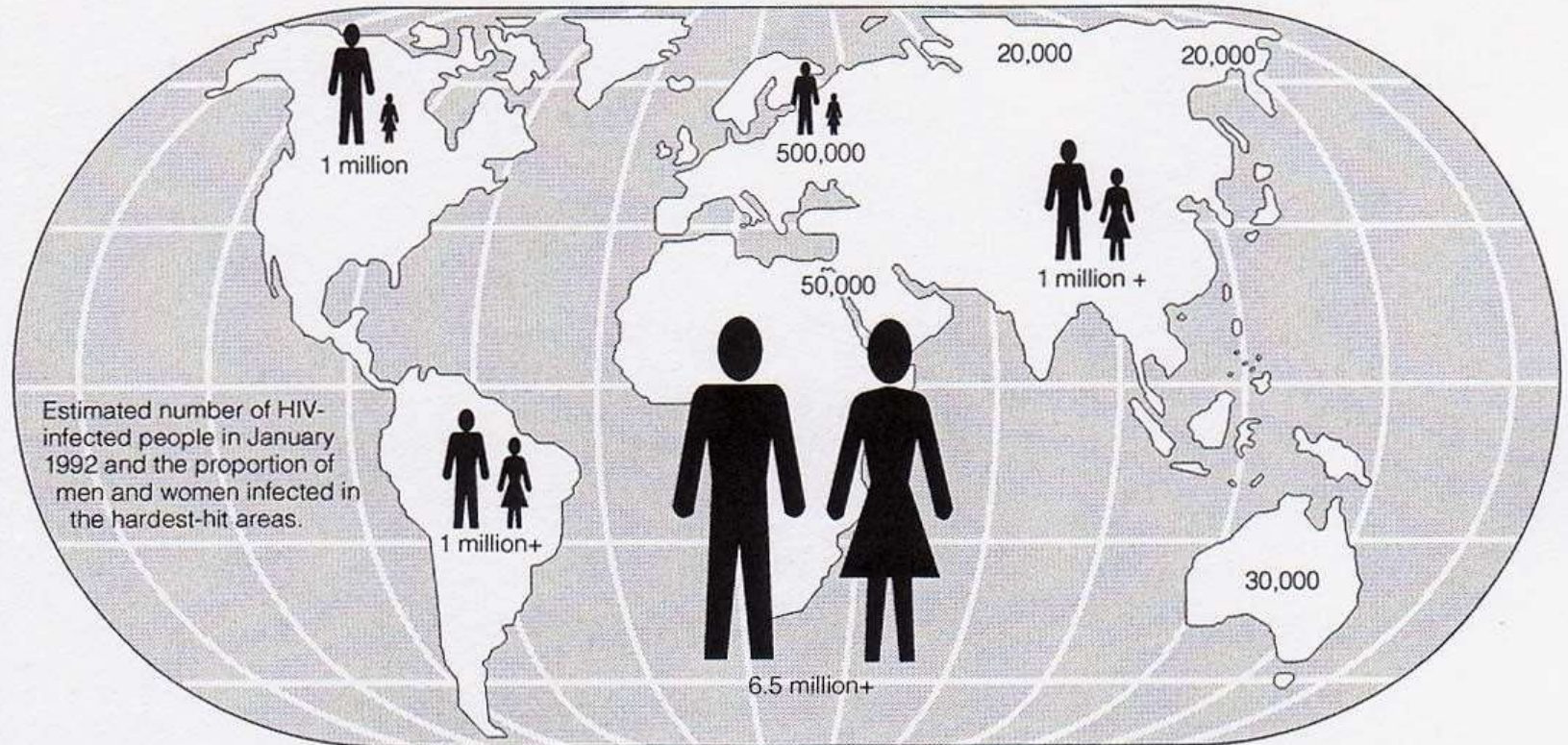
Graph Showing  
More Substantial Increase

Source: Adapted from Marty Baumann, *USA TODAY*, February 12, 1993. Copyright 1993 USA TODAY. Reprinted with permission.



# Distortions with Picture Graphs

Figure 3.18 **Estimated Number of HIV Infections in 1992**



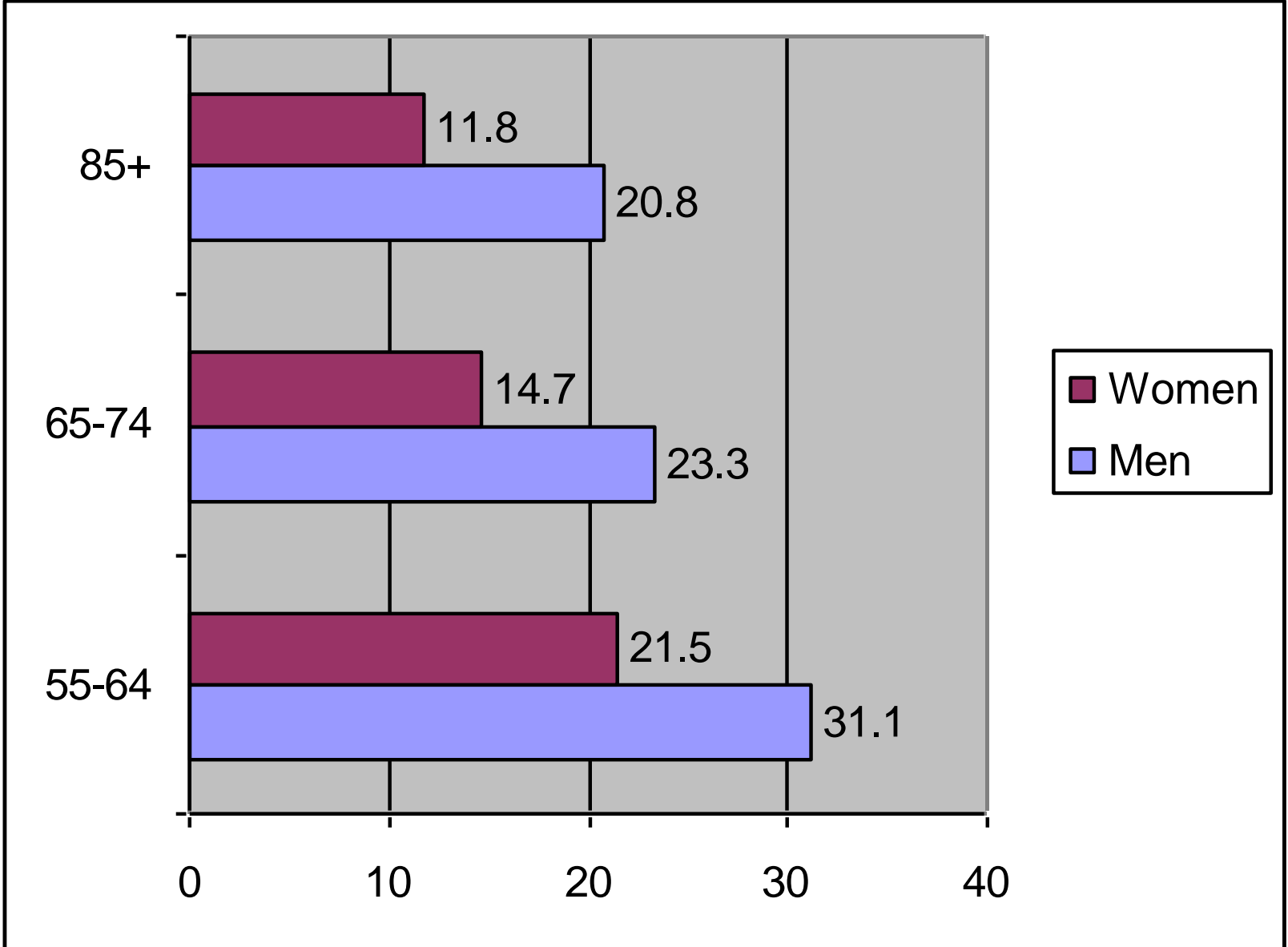
Source: Adapted from *The New York Times*, June 28, 1992. Copyright © 1992 The New York Times Co. Reprinted by permission.

# Statistics in Practice

The following graphs are particularly suitable for making comparisons among groups:

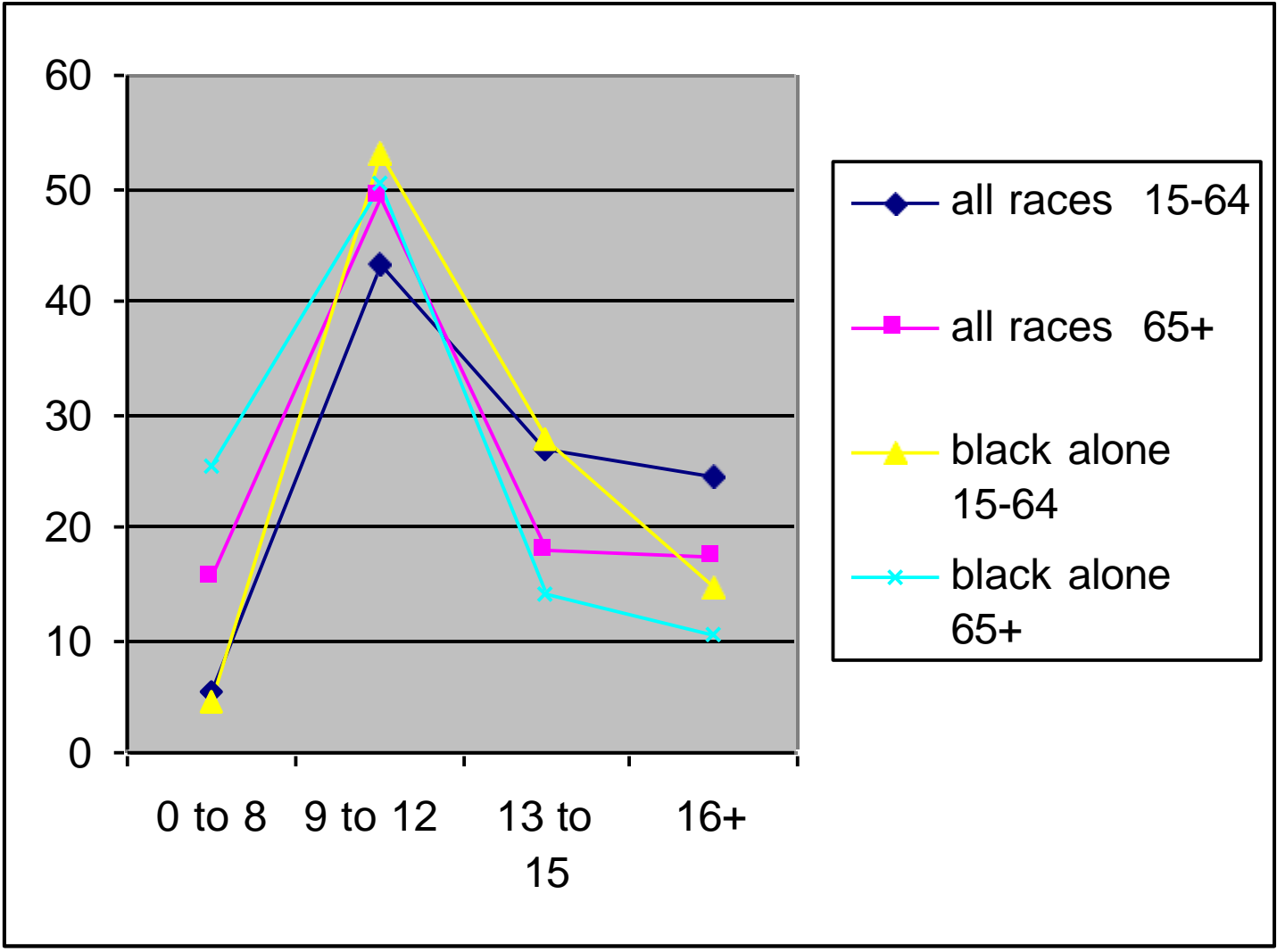
- Bar chart
- Frequency polygon
- Time series chart

Source: Smith, 2003.



**Figure 3.17 Percentage of College Graduates among People 55 years and over by age and sex, 2002**

Source: Stoops, Nicole. 2004. "Educational Attainment in the United States: 2003." Current Population Reports, P20-550. Washington D.C.: U.S. Government Printing Office.



**Figure 3.18 Years of School Completed in the United States by Race and Age, 2003**

# Why use charts and graphs?

## – What do you lose?

- ability to examine numeric detail offered by a table
- potentially the ability to see **additional** relationships within the data
- potentially **time**: often we get caught up in selecting colors and formatting charts when a simply formatted table is sufficient

## – What do you gain?

- ability to **direct readers' attention** to one aspect of the evidence
- ability to **reach readers** who might otherwise be intimidated by the same data in a tabular format
- ability to focus on **bigger picture** rather than perhaps minor technical details