Southern Illinois University Press Art Creation Guidelines*

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The following instructions are intended to guide you in creating art for your book. Any questions about your overall art program should be directed to your acquisitions editor.

* Pages 2-8 of these guidelines are based on the digital image standards of the University of Chicago Press and have been adopted by the Association of American University Presses (AAUP). The material on those pages was prepared by the AAUP.

1. Overview

There are several factors to consider when attempting to reproduce illustrations in printed books. Quality of original illustrations is foremost, but we also consider scanning resolution, the paper books will be printed on, and printing presses. Failure to consider any one of these factors can lead to problems when books are on press and to disappointment with finished books. To avoid this, we prefer to handle scanning your photographs and illustrations. If this is not possible, have a professional graphic arts service bureau scan your art to specifications below. Prints from digital files, submitted as art to be scanned, are not acceptable. Scans that do not meet these guidelines may be rejected. The guidelines set forth in this document pertain strictly to black and white digital art.

What Is Digital Art?

Digital art is any image that has been captured through scanning or digital photography, or that has been created using a software program.

Types of Digital Art: Scans and Computer-Based Drawings

Scans

Scans (or bitmap files) are images composed of pixels—the smallest building blocks of bitmapped art. The figures on the right show two basic types of scans. Figure 1.1 is a continuous-tone scan, and figure 1.2 is a bi-tonal scan.

RESOLUTION The number of pixels per unit of measure to form an image. In the United States, image resolution is calculated per inch, hence the abbreviation ppi.

CONTINUOUS-TONE SCANS (8-BIT) In continuous-tone scans, each pixel is one of 256 shades of gray, ranging from pure white to solid black. Because each pixel can vary in tonality, transitions from light to dark are smooth and realistic—as long as the ***RESOLUTION*** is high enough. Photographs and drawings with fine transitions between light and dark, such as figure 1.1, are ideal candidates for continuous-tone or 8-bit scanning.

BI-TONAL SCANS (1-BIT) In bi-tonal scans, each pixel can be only one of two values: 100% black or 100% white. Images that lack gray values, such as figure 1.2, are good candidates for bi-tonal scanning.

TIP ON TERMINOLOGY

Continuous-tone images are often referred to as "photographs." In Adobe Photoshop, the term **Grayscale** is used (Menu: Image › Mode).

Bi-tonal images are often referred to as "line art" or "monochrome" images. In Adobe Photoshop, the term **Bitmap** is used (Menu: Image › Mode).

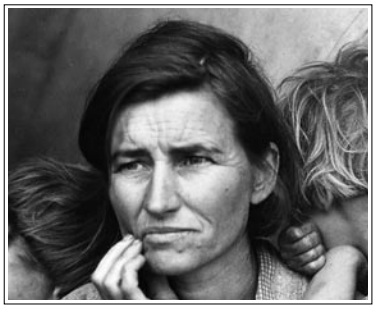

Fig. 1.1

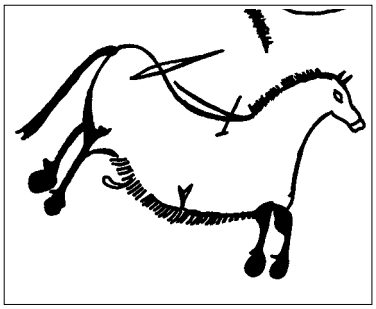

Fig. 1.2

Computer-Based Drawings

Charts, timelines, graphs, and other quantitative information–based images are often created (as opposed to being scanned) using a vector-based drawing application. Vector-based drawing applications build images by using mathematical formulas to describe points, lines, and shapes. Unlike scans, which depend on proper resolution for realistic rendering, vector graphics are resolution independent and can be enlarged to any size without loss of quality. See figure 1.3.

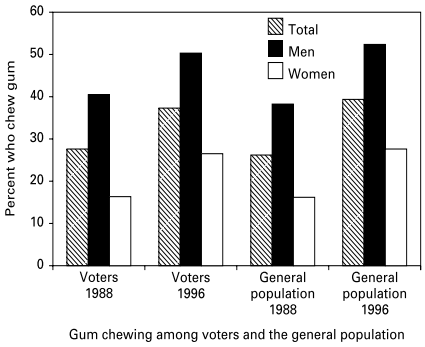

Fig. 1.3

Figure 1.1: *Migrant Mother* by Dorothea Lange. Courtesy of the U.S. Farm Security Administration Collection, Library of Congress. Figure 1.2: Drawing by R. Dale Guthrie.

2. Image Resolution for Continuous-Tone Scans

Resolution is a major factor in determining the quality of all scans. Resolution is the number of pixels per unit of measure (inches, in the United States, hence the abbreviation ppi) used to form an image. In general, photographic scans intended for print usage should be at least 300ppi at the final size for reproduction. Resolution should be determined at the scanning stage based on the qualities of the originating image: (1) whether it is continuous-tone or bi-tonal and (2) the size of the original. For further guidance, see the table below.

FILE FORMATS

Scans should be submitted as EPS or TIFF files

IMPORTANT NOTE: Files in the following formats ***will not*** *be accepted: GIF, PSD, PNG, or BMP.*

A Word on JPEGS

The JPEG format is commonly used for file transfer because of its high compression qualities (smaller file size makes it easier to transport). Unfortunately, JPEG compression is accomplished by discarding some of the data that makes up the image. Each time a JPEG is opened, edited, and resaved in the JPEG file format, image degradation results.

If you acquire an image from a library, museum, or stock photo agency, request the EPS or TIFF format. If JPEGs are the only file format available, do not open, edit, or save the image before submitting it.

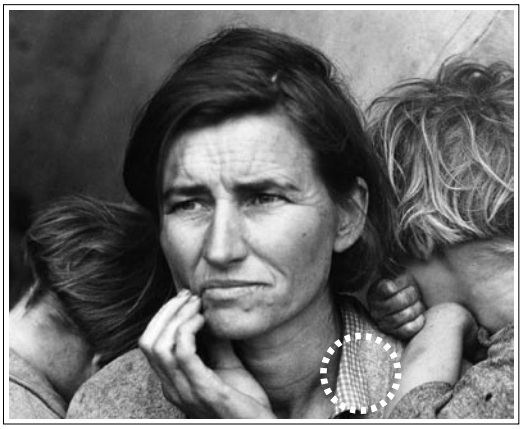

Fig. 2.1 – 300ppi

Fig. 2.2 – 72ppi (Note the pixelized edges and loss of details.)

FIGURE 2.1
Example of a properly scanned, grayscale photograph at 300ppi. This resolution setting is suitable for high-quality offset print production.

FIGURE 2.2
Example of a photograph scanned at 72ppi, resulting in an image that appears blurry or out of focus. ***PIXELATION*** is another phenomenon associated with a low-resolution scan. Low-resolution settings are not suitable for print.

FIGURE 2.3
Example of a low-resolution scan to which resolution has been artificially added.

Fig. 2.3 – Scanned at 72ppi; with resolution artifically increased to 300ppi. (Compare the circled areas in the figures. Note that there is little improvement in detail in fig. 2.3 after resolution has been added.)

PIXELATION A phenomenon in bitmap images that results from insufficient resolution or over-enlargement. Individual pixels become visible, especially on the edges of objects, creating a stair-stepped or jagged look.

Continuous-Tone or Bi-tonal?

To determine whether you should scan your original art in continuous-tone mode (8-bit) or in bi-tonal mode (1-bit), consider the following:

- If your original is a photograph or fine art drawing that contains multiple levels of gray tones, you should scan the original in *continuous-tone mode*.
- If the original is a line drawing without gray tonalities, and consists of only black and white lines and shapes, you should scan the original in *bi-tonal mode*.

Determining Resolution Settings for Continuous-Tone Resolution Scans

Size of Original (inches)	Resolution (ppi)
Smaller than 5 x 7	600ppi
5 x 7	300ppi
8 x 10	300ppi

Save all scans in the TIFF or EPS format.

3. Halftones: A Necessary Step in the Printing Process

What Is a Halftone?

All continuous-tone scans must become halftones in order to be printed. A halftone is an image formed by breaking up a continuous-tone image into a pattern of dots of varying sizes. In the lighter areas of the image, the dots are very small. In the darker areas, the dots enlarge to overlap each other. When printed, the dots, though clearly visible through a magnifying glass, merge to give the illusion of continuous tone to the naked eye.

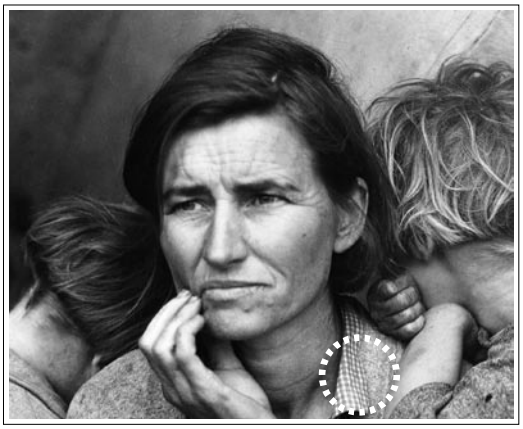

Fig. 3.1 – Printed halftone

Figure 3.1 has been scanned from an original photograph.

Fig. 3.2 – Halftone dot pattern

Figure 3.2 is a detail of figure 3.1. Note the dot pattern.

Scanning Books and Magazines

MOIRÉ In printing, an undesirable pattern created by the overlapping of halftone screens. Moirés occur when printed images are scanned and not properly *descreened*.

DESCREENING A process by which evidence of the original halftone screen pattern is removed. This can be achieved through the use of software and/or mechanical filters.

In general, you should avoid using previously printed images (such as halftones from books and magazines) as your original art, as they can result in unwanted pattern effects called ***MOIRÉS***. Printed photographs contain a dot pattern as a result of the halftone process, so scanning printed images creates an overlapping array of patterns: (1) the pattern present in the printed piece and (2) the new pattern created from the scan. When these two patterns overlap, a moiré is formed. While ***DESCREENING*** techniques can be used to minimize the effect of moirés, these techniques usually result in a softening of detail in the image.

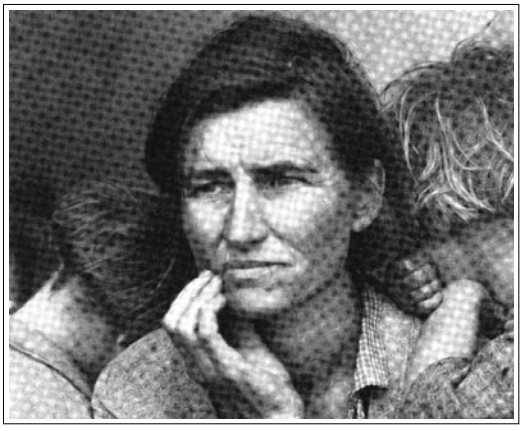

Fig. 3.3 – Moiré pattern

Figure 3.3 has a moiré pattern that is unpleasant to look at and unsuitable for print production.

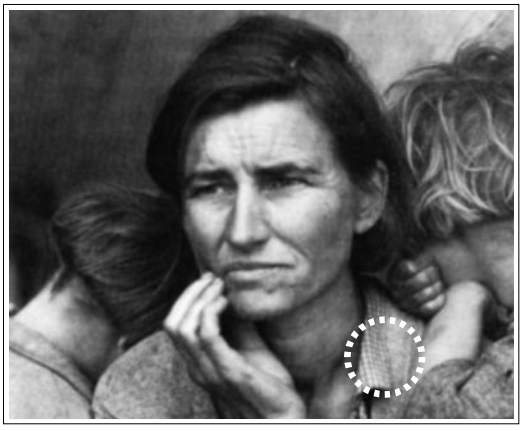

Fig. 3.4 – Descreened

Figure 3.4 has been descreened but the photographic details have been diminished as a result. (Compare circled areas in figs. 3.1 and 3.4.)

4. Image Resolution for Bi-tonal Scans

Resolution determines the quality of all scans. Resolution is the number of pixels per unit of measure (inches, in the United States, hence the abbreviation ppi) used to form an image. In general, bi-tonal scans intended for print usage should be at least 1200ppi. Resolution should be determined at the scanning stage based on the qualities of the originating image: (1) whether it is continuous or bi-tonal and (2) the size of the original. See the table below for further guidance.

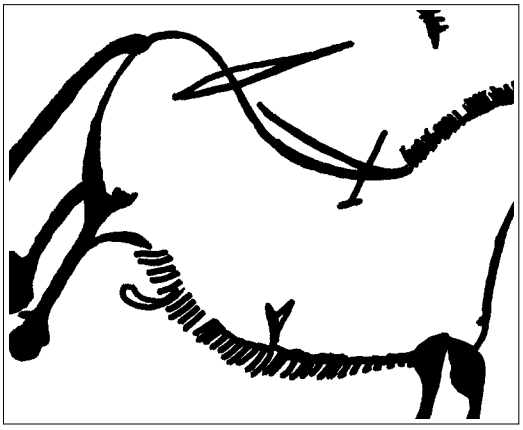

Fig. 4.1 – 1200ppi

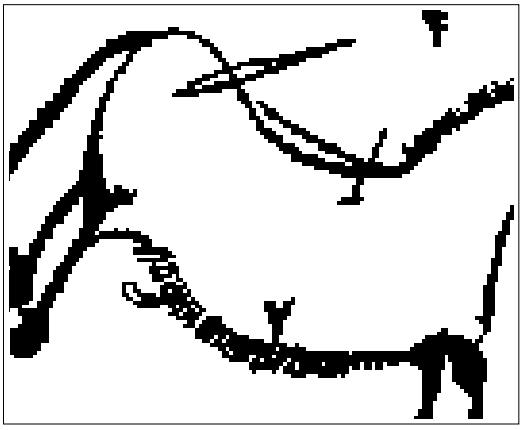

Fig. 4.2 – 72ppi

LINE ART Images that contain only solid blacks and whites.

PIXELATION A phenomenon in bitmap images that results from insufficient resolution or over-enlargement. Individual pixels become visible, especially on the edges of objects, creating a stair-stepped or jagged look.

FIGURE 4.1
Example of properly scanned ***LINE ART*** at 1200 ppi. This setting is ideal for high-quality offset print production. Note the smooth curves.

FIGURE 4.2
Example of line art scanned at 72ppi, which results in an image that appears blocky and sharp-edged. ***PIXELATION*** will occur if line art is scanned at low resolutions. Low-resolution settings are *not* suitable for print.

FIGURE 4.3
Example of a low-resolution scan to which resolution has been artificially added. This is still inadequate for printing.

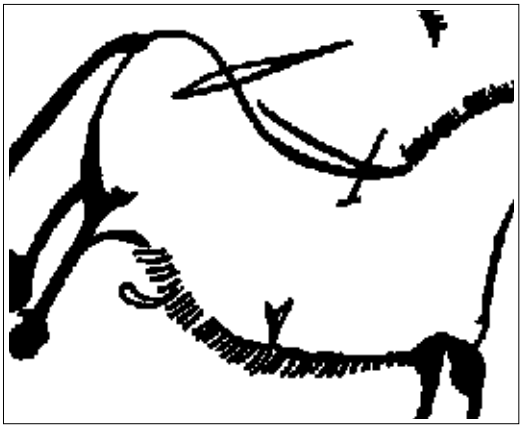

Fig. 4.3 – Scanned at 72ppi; with resolution artificially increased to 1200ppi

Continuous-Tone or Bi-tonal?

To determine whether you should scan your original art in continuous-tone mode (8-bit) or in bi-tonal mode (1-bit), consider the following:

- If your original is a photograph or fine art drawing that contains multiple levels of gray tones, you should scan the original in *continuous-tone mode*.
- If the original is a line drawing without gray tonalities, and consists of only black and white lines and shapes, you should scan the original in *bi-tonal mode*.

Determining Resolution Settings for Bi-tonal Resolution Scans

Size of Original (inches)	Resolution (ppi)
Smaller than 5 x 7	2400ppi
5 x 7	1200ppi
8 x 10	1200ppi

Save all scans in the TIFF or EPS format.

5. Charts, Graphs, and Maps

Preparing Charts and Graphs

PROPORTIONS

Typically, charts and graphs are printed in books at sizes ranging from 3" x 3" to 4" x 7". However, most people create their drawings at a larger size. This means the drawing will have to be reduced to fit within the dimensions of the book. The relationship between font size, rule weight, and final printed size should be considered when creating drawings. See **exhibit A** for an example of acceptable figure layouts.

STYLE

1. One consistent line weight is preferred, but use no more than two rule sizes.
2. Use one font point size throughout the figure. If two sizes are used, they should vary from each other only slightly—for instance, 10 pt and 12 pt as opposed to 10 pt and 18 pt.
3. Font styles should be used sparingly. In most cases, there is no reason to use bold or italic.
4. Do not use all CAPS as this decreases overall legibility.
5. Use tints sparingly and only if you are submitting digital originals using one of the recommended software programs listed below. Use solid black and white where possible. Tint variations that are not easily distinguishable from each other may confuse the reader. Use 20%, 50%, and 80% tint values.
6. Patterns: If you are submitting laser prints and areas of a figure need to be distinguished with more variation than solid black and solid white allow, then patterns should be used. Do **not** submit laser prints that include tints.

ANTICIPATING THE EFFECTS OF REDUCTION

Line Rules

1. The minimum rule size should be no smaller than 1 pt in the large original.
2. Maximum rule size should be no larger than 2 pts in the large original.

Typography

If you are working with oversized art, reduce your printouts by 50% to ensure that the fonts will be easily readable when sized for the book page. Refer to ***Preparing Charts and Graphs: Exhibit B*** *(page 8)* to see how these combined principles can affect a chart's clarity.

Preparing Maps

It is strongly recommended that all maps be prepared by a professional cartographer and that they be coordinated to match a book's design.

How to Submit Final Art to Publishers

LASER PRINTS

Many of the programs used to create charts and graphs, such as *WordPerfect*, *Microsoft Word*, *PowerPoint*, and *Excel*, **cannot** output valid ***POSTSCRIPT*** files. These programs are meant for more limited use in presentations or for output via desktop printers. However, prints from these applications may be submitted and scanned successfully if these basic guidelines are adhered to:

1. Follow the rules of proportion and style as indicated in the section above.
2. Provide printouts on smooth, bright white laser paper.
3. Set the resolution of the laser printer at a minimum of 600dpi (dots per inch).
4. Use patterns instead of tints to distinguish different areas. See item 6 in the Style section above.
5. Label all figures clearly.

POSTSCRIPT An Adobe programming language used to describe pages, graphics, and fonts. The PostScript language tells output devices how to render data as pages.

DIGITAL FILES

Digital files are acceptable if they have been created in one of the following programs: *Adobe Illustrator*, *Macromedia Freehand*, or *CorelDraw*. These guidelines should be adhered to:

1. Follow the rules of proportion and style as indicated in the section above.
2. Include all fonts used in digital drawing with your submission, by running the "PACKAGE" or "COLLECT FOR OUTPUT" function in your software program. This gathers the art file, and all of its components into one folder, including fonts and artwork files. Send us the "packaged" folder.
3. Include all images placed within digital drawings with your submission (see #2 re: "packaging").
4. Save digital drawings in the *EPS FILE* format.
5. Include laser prints of all digital image files with your submission.

EPS FILE An abbreviation for encapsulated PostScript file. A type of file used to encode graphics so they can be embedded in a larger PostScript file.

Preparing Charts and Graphs: Exhibit A

Proportion Sizing in Figure Layouts

Charts and graphs are usually drawn at sizes larger than can be used in a book. Reproduction sizes commonly range from 3" x 3" to 4" x 7". To fit on the pages of a book, the original drawings must be reduced in size. The relationship between font sizes, rule weights, and final printed sizes should be considered when constructing the original figures.

See the comparisons below for a clarification of the requirements of ***VECTOR IMAGES***.

VECTOR IMAGES Vector-based drawing applications such as *Adobe Illustrator* and *Macromedia Freehand* build images by using mathematical formulas to describe points, lines, and shapes. Unlike scans, which depend on proper resolution for realistic rendering, vector graphics are resolution independent and can be enlarged to any size without loss of quality.

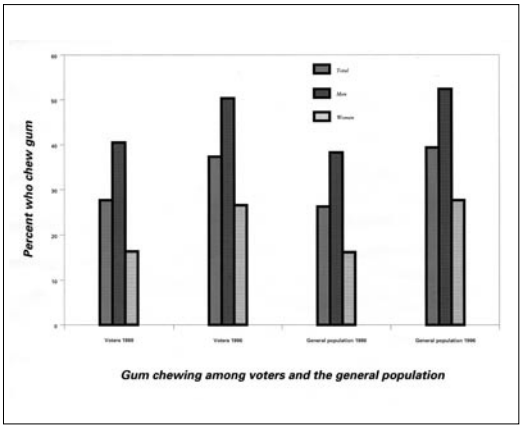

Fig. A1

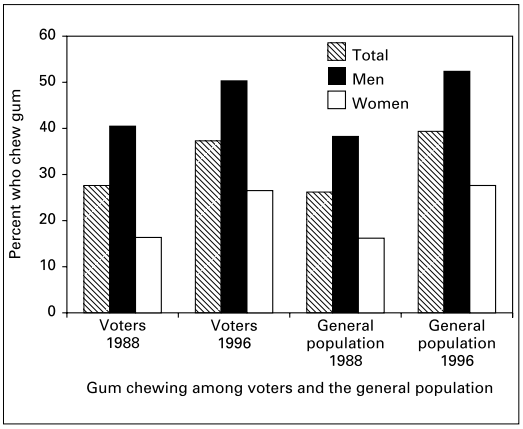

Fig. A2

Figure A1 shows a chart reduced to the size dimensions of the printed page. Note the illegibility of the legend and column/row headings. The bar shadings are too similar in tone as well.

Figure A2 depicts the same chart redrawn with the final production size in mind. Bars are clearly distinguishable, all text is legible, and the line rules are not faded.

PREVIEW reproduction size by printing out figures at a width of between 3 and 4 inches. You can also use a photocopier to reduce figures to that size.

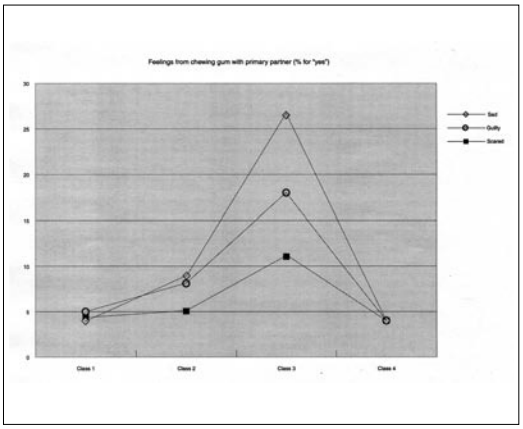

Fig. A3

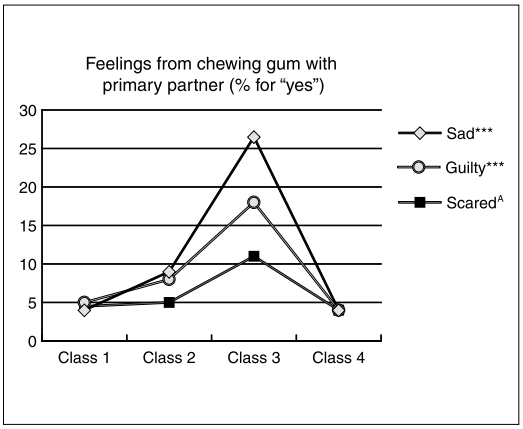

Fig. A4

Figure A3 illustrates a line graph in reduced size that will print poorly if no adjustments are made. The type is rendered unreadable. Also, the graph points are lost within the background shading.

Figure A4 provides the same information as figure A3 but is laid out according to the accepted guidelines. The text is now readable and the plotted points are clearly defined.

Preparing Charts and Graphs: Exhibit B

Anticipating the Effects of Reducing Image Size

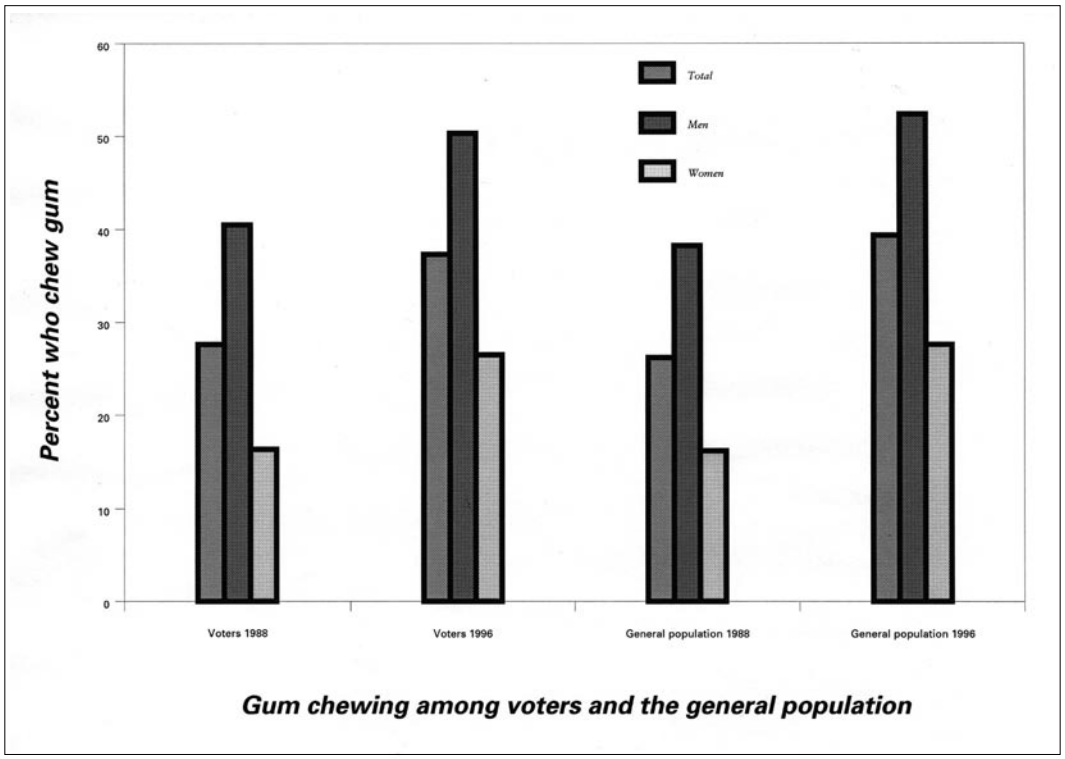

Fig. B1 – Original size chart before reduction

LINE RULES

Bounding rules that appear **thin** in the reduced image may fade and disappear when printed. The **minimum** rule size should be no smaller than 1 pt in the large original.

The boldness of rules that are too **thick** around data columns adds unnecessary emphasis. The **maximum** rule size should be no larger than 2 pts in the large original.

FONTS

Column and row headings that are legible at full size may become unreadable when reduced to fit in a book. If you are working with oversized art, reduce your printouts to the width that will be used in the book to make sure your type is clear.

Use one font throughout the figure. If two different sizes are utilized, they should vary from each other only slightly (e.g., 10 pt and 12 pt, not 10 pt and 18 pt).

Font styles should be used sparingly. Generally, there is no reason to use bold or italic.

Do **not** use all CAPS as this decreases overall legibility.

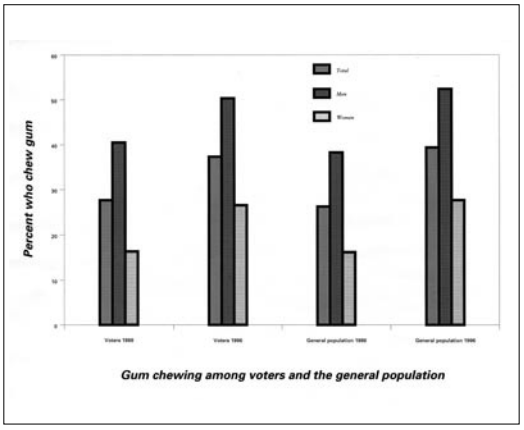

Fig. B2 – Illegible chart after reduction

TINT VARIATIONS

Tint variations that are not easily distinguishable from each other may confuse the reader. To avoid identical columns or graph points, use 20%, 50%, and 80% tint values.

Legibility of the accompanying chart legends and keys should also be confirmed.

Digital Photography

There is a wide range of digital photography equipment available on the market, and the features and quality continue to change and improve. Southern Illinois University Press is not able to provide current, detailed information or advice on digital cameras. If you plan to use digital photography in your book, please send a few sample images to your acquisitions editor for approval before you go on a "photo shoot."

Resolution

Choose a camera with enough resolution to get your desired image size. To produce a publication-quality image, your digital camera must meet certain minimum specifications with respect to resolution. Resolution is measured in megapixels, with consumer cameras now available up to 4 megapixels and higher. A megapixel is a million pixels and is arrived at by multiplying a camera's maximum pixel width by its pixel height. Some common resolutions include 1280 x 960 pixels (1.2 megapixels), 1600 x 1200 (1.9), and 2800 x 2100 (5.9).

Photos taken with a digital camera are not acceptable unless taken with a minimum resolution of 1200 x 1500 pixels (1.8 megapixels). This will allow for a 4" x 5" image of 300 dpi. (A higher resolution, e.g., 2400 x 3000 pixels, or 7.2 megapixels, would be needed for an 8" x 10" image.) Cameras used to take pictures for publishing should typically have resolutions greater than 2 megapixels. Even on a minimal 2+ megapixel camera, you will likely need to change the default setting to the highest quality (i.e., minimum compression).
Of course, high resolutions do not guarantee high-quality images. The CCD sensors of digital cameras, for example, vary widely in quality, which can affect final picture quality dramatically.

Be careful when choosing your camera. Most digital cameras report both the CCD sensor resolution and the "effective" resolution. For example, a camera may report a CCD resolution of 2.11 megapixels but have an effective resolution of 1.92 megapixels (1600 x 1200). The effective resolution is considered the "true" resolution—the absolute limit of detail the camera can capture. Likewise, some cameras feature "interpolation," or resampling, to increase the resolution of the image. Be aware that interpolation cannot add detail that was never there.

Optical vs. Digital Zoom

Optical zoom uses the optics (lens) of the camera to bring the subject closer. The resolution of the image retains its quality. Beware of digital zoom features in cameras. Digital zoom is not really zoom, but merely simulates optical zoom by enlarging a portion of the image. It does this by reducing the resolution. This gives the effect of having zoomed into the scene. In other words, the camera crops a portion of the image and then enlarges it back to size. In so doing, you lose image quality. If you've been regularly using digital zoom and wondered why your pictures seem to lose quality, this may be the reason.

File Format

Use the highest-quality (minimum-compression) setting on your camera. This may be "fine," "high quality," or "uncompressed." Generally, the higher the resolution, the larger the file size. To be high enough resolution, a file probably will be at least 3 to 6 megabytes in size. Thus, if your file is only 1 megabyte, for example, your resolution is not high enough.
Digital cameras rely on jpeg compression to store images, and jpeg file format is usually the default form for digital cameras. This format, however, discards visual information in order to make file sizes smaller. Choose the tiff setting if you have this available on your camera; otherwise, the highest quality jpeg is acceptable.