Photoshop Elements 3 – Brightness and Contrast

Exposure

When you shoot a picture the lighting is not always ideal, so pictures sometimes may be under- or overexposed.

A well-exposed image will have a good spread of tones from light to dark with details in both the shadow and highlight areas.

An underexposed image has not received enough light. The shadow and midtone areas in an underexposed image are too dark.

An overexposed image has received too much light. An overexposed image will have little detail in highlight areas and the midtone areas will be too bright.

We can correct for exposure problems with Photoshop Elements. This will be the subject of this lesson.
The Brightness and Contrast Controls

Open the image Austin.jpg and save it as Austin_1.psd.

Rotate the picture so that it is upright.

This picture obviously is underexposed and needs brightening. Choose Enhance, Adjust Lighting, Brightness/Contrast from the main menu.

A window will appear with two slider bars. Move the two bars so that the image appears to be better exposed. The Preview box must be checked in order to see the effect of the adjustment on the image.

Usually it is better to adjust the brightness first and then the contrast. You may need to go back and forth between the two to get the best apparent exposure. This is a difficult image, which is very underexposed. You will not be able to make it look perfectly exposed.

When you have done the best you can, save the image with a new name, Austin_2.psd.


**Tonal Values**

Digitized images actually are made up of tiny spots called picture elements or “pixels.” The color of each pixel in an image is a combination of three color channels: red, green, and blue (RGB). Photoshop Elements works with 24-bit color images – 8 bits per channel. Remembering that a “bit” refers to a digit in the binary number system, this means that there are $2^8$ (or 256 in base-10) possible levels of brightness for the colors in each channel. The levels of brightness are called **tonal values**.

- Tonal value = 0  no color
- Tonal value = 126 an intermediate shade
- Tonal value = 255 the most intense color possible

The overall color of a pixel is determined by the tonal values of each color channel making up the pixel. Consider some examples:

<table>
<thead>
<tr>
<th>Pixel</th>
<th>Red</th>
<th>Green</th>
<th>Blue</th>
<th>Overall Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>255</td>
<td>0</td>
<td>0</td>
<td>Red</td>
</tr>
<tr>
<td>#2</td>
<td>0</td>
<td>0</td>
<td>255</td>
<td>Black</td>
</tr>
<tr>
<td>#3</td>
<td>255</td>
<td>255</td>
<td>0</td>
<td>White</td>
</tr>
<tr>
<td>#4</td>
<td>127</td>
<td>127</td>
<td>127</td>
<td>Gray</td>
</tr>
<tr>
<td>#5</td>
<td>255</td>
<td>255</td>
<td>0</td>
<td>Yellow</td>
</tr>
<tr>
<td>#6</td>
<td>255</td>
<td>255</td>
<td>175</td>
<td>Light Yellow</td>
</tr>
</tbody>
</table>

The point of this is that each pixel has three tonal values associated with it, one for each of the three primary colors. The tonal value for each color expresses its brightness. The color and the brightness of each pixel is determined by its three tonal values.

**RGB Histograms**

A **RGB histogram** is a plot of all the tonal values (three per pixel) for all the pixels in an image.

The histogram of an image is useful for making changes that can improve the lighting of an image – its brightness and contrast in particular.

As an example, the majority of the tonal values in the histogram shown here are on the left-hand side of the graph. Since most of the pixels are dark, this image will be low key and dark.

\footnote{Blue is the complement of yellow. Red and green alone produce yellow. Adding some blue subtracts from the yellow, giving light yellow}
Consider this picture and its RGB histogram from the Elements “Levels” command.

Note that almost all the tonal values are piled up to the left in the histogram. This picture is **underexposed**, leaving almost all the pixels with colors of low brightness.

This picture, on the other hand, has most of the tonal values on the right-hand side of the histogram. This picture is **overexposed**, leaving almost all the pixels with too much brightness.

This **flat** picture has all its tonal values piled up in the center – no really dark pixels and no really bright ones.
In this histogram, on the other hand, the bulk of the tonal values are either on the right or the left side. All the pixels are either dark or bright, with few in between. This is characteristic of a **contrasty** image.

There are two reasons why we care about histograms.
- A small change in viewing angle can have a major effect on the brightness of the thumbnail image shown on the LCD screen of a digital camera, so it frequently is difficult to judge whether a picture is properly exposed. Most digital cameras will display a histogram along with a picture, which will help you determine if the exposure was acceptable.
- The **Enhance, Adjust Lighting, Levels** menu choice in Elements allows you to adjust tonal values in an image. Adjusting their tonal values is the best way to adjust the overall brightness and contrast of an image.

### The Levels Controls

Open **Computers.jpg** and save it as **Computers_1.psd**.

In Elements, selecting **Enhance, Adjust Lighting, Levels** will display the RGB histogram of an image.

The small slider **Input controls** below the histogram allow you to adjust which pixels in the image have tonal values of 0 (pure black), 255 (very bright), or 127 (middle tone).
That this image is flat is apparent from both its appearance and its histogram – all the tonal values are piled up in the center of the histogram.

First, move the left input control until it meets the left side of the set of pixels shown in the graph.

This sets the tonal values of the darkest pixels in the image to pure black and darkens the image in the process.

Now, move the right input control until it meets the right side of the set of pixels shown in the graph.

This sets the tonal values of the brightest pixels in the image to the brightest possible and brightens the entire image in the process.

Click on OK.

If you look at the histogram of the adjusted image, you will see that the tonal values now are spread over the entire range. A wide range of tonal values is characteristic of a well-exposed image.
Levels Control – A Guide to Adjusting Tonal Values

1. Make a picture brighter

Open Austin_1.psd.

Slide the right input control toward the center until it meets the right edge of group of pixels.

2. Make a picture darker

Open TracyArmsCliff.jpg and save it as TracyArmsCliff_1.psd.

Slide the left input control toward the center until it meets the left edge of the group of pixels.

3. Increase the contrast of a picture

We already did this one.

Slide both input controls toward the center until they reach the edges of the group of pixels.
4. Decrease the contrast of a picture

In my limited experience, a combination of other Elements tools (e.g., selecting portions of the image and using shadows/highlights, dodging, and burning) works better for decreasing contrast than Levels.

5. Make midtone values darker (or lighter)

You can make the middle tones in a picture darker by moving the midtone control to the right.

You can make the middle tones in a picture lighter by moving the midtone control to the left.

Practicing Using the Levels Control

The Levels Control is a very important tool. Generally you should use the Levels control to adjust the brightness and contrast of an image.

1. Open JoyceAustin.jpg and save it as JoyceAustin_1.psd.
   - Rotate the image
   - Look at the bricks, wood paneling and metal side of the fireplace. How could you improve the picture by changing its orientation and cropping it. Make these improvements.
   - Use the Levels control to improve the brightness and contrast of the image
   - Save the image as JoyceAustin_2.psd

2. Open Harbor.jpg and save it as Harbor_1.psd. Improve it with the Levels control.

3. Open Spires.jpg and save it as Spires_1.psd.
   - From the RGB histogram, is this picture under- or overexposed?
   - Try moving the midtone slider to darken the midtones slightly.

Note: It usually is a good idea to make tonal value adjustments only once on an image.
Shadows and Highlights

Open Church.jpg and save it as Church_1.psd. This image obviously needs some lighting corrections – the sky and church steeple are fairly well exposed, but the trees in the foreground are way too dark.

Open the Levels window. The histogram is characteristic of a high contrast image, with tonal peaks on both ends, but not many tones in the center.

Adjusting the right or left input controls won’t do much to improve this picture, so changing the levels won’t help us. We need to lighten the shadows without changing the highlights. This can be done with the Shadows/Highlights menu item.

Choose Enhance, Adjust Lighting, Shadows/Highlights from the main menu.

In the Shadows/Highlights window, the Lighten Shadows slide will be set automatically to 50%, which will lighten the shadows in the image somewhat. The Preview box must be checked for you to see the effect of the adjustment.
The shadows in the image still are fairly dark at 50%. Lightening the shadows at a higher percent improves the image even more.

![Image of Shadows/Highlights dialog box and an image of a church.]

Save the file as **Church_2.psd**.

Let’s try another. Open **CIA.jpg** and save it as **CIA_1.psd**. This picture suffers from the same problem as the picture of the church—a fairly well exposed sky, but shadowed portions that are way too dark.

![Image of CIA.jpg and CIA_1.psd.]

Always check **Levels** first. You should find that we can slightly lighten the image by moving the right input control to the left a little. This will have a subtle effect on the clouds in the sky, but won’t change the fact that the trees in the image are too dark.

![Image of Levels dialog box.]
Choose **Enhance, Adjust Lighting, Shadows/Highlights** from the main menu to bring up the Shadows/Highlights window again. Lightening the shadows by 50% gives a fairly decent looking image.

You probably will see that lightening alone brings out the detail in the shadows but leaves the picture flat and lacking in contrast.

To add more contrast to the picture slide the Midtone Contrast slider to a positive value of your choice.

You now will have improved the picture considerably.

Save the picture as **CIA_2.psd**. We will return to this image in the next lesson.
The Burn Tool

The Burn Tool is used to selectively darken a portion of an image. We will use it to darken the light church steeple in Church_2.psd.

Click on the Burn Tool icon on the toolbar.

If you do not see the Burn Tool on the toolbar, right-click on the small triangle in the lower left of the icon in the position shown in the picture at the right. This will show all three tools available, from which you can choose Burn.

The Burn Tool is a subtle tool, usually used to darken the midtones of a relatively small section of an image. Generally we use a low exposure (around 20% or less) for the tool so it does not darken an area too much at once. The church steeple isn’t very large so choose a small size around 20 pixels.

With the Burn Tool active, the cursor will look like a circle when moved over the image. Hold the left mouse button down and sweep the cursor over the steeple. You should see that the steeple becomes darker.

You also might darken the tops of the trees close to the steeple.

Save the image as Church_3.psd.
The Dodge Tool

The Dodge Tool works like the Burn Tool except it lightens sections of the image rather than darkening them. Open Santa.jpg and save it as Santa_1.psd.

Use the Dodge Tool to lighten Santa’s beard and robe.

Practice Problems

Before you move on to the next lesson, plan how you would improve the following images and then make the improvements. Use techniques from all the Photoshop Elements lessons you have worked with so far.

1. NorthChurch.jpg
2. Ship.jpg
3. SteveDelena.jpg
4. Ketchikan.jpg
5. Appian.jpg
6. Calais.jpg

Review Questions

1. What is the exposure problem with the image that has the RGB histogram shown at the right? What would you do to improve the image?
2. What would you do to improve this image?

3. How are the Burn and Dodge tools similar? How are they different?

4. Consider this picture of Old Main. We are interested in pixels in the area of the image indicated by the arrow.

Several possible tonal values for pixels are shown below:

<table>
<thead>
<tr>
<th>Pixel</th>
<th>Red</th>
<th>Green</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>10</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>#2</td>
<td>238</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>#3</td>
<td>10</td>
<td>240</td>
<td>239</td>
</tr>
<tr>
<td>#4</td>
<td>10</td>
<td>23</td>
<td>239</td>
</tr>
<tr>
<td>#5</td>
<td>238</td>
<td>240</td>
<td>239</td>
</tr>
</tbody>
</table>

Which of the five pixels will have a color that you would associate with the indicated area of Old Main? Why?