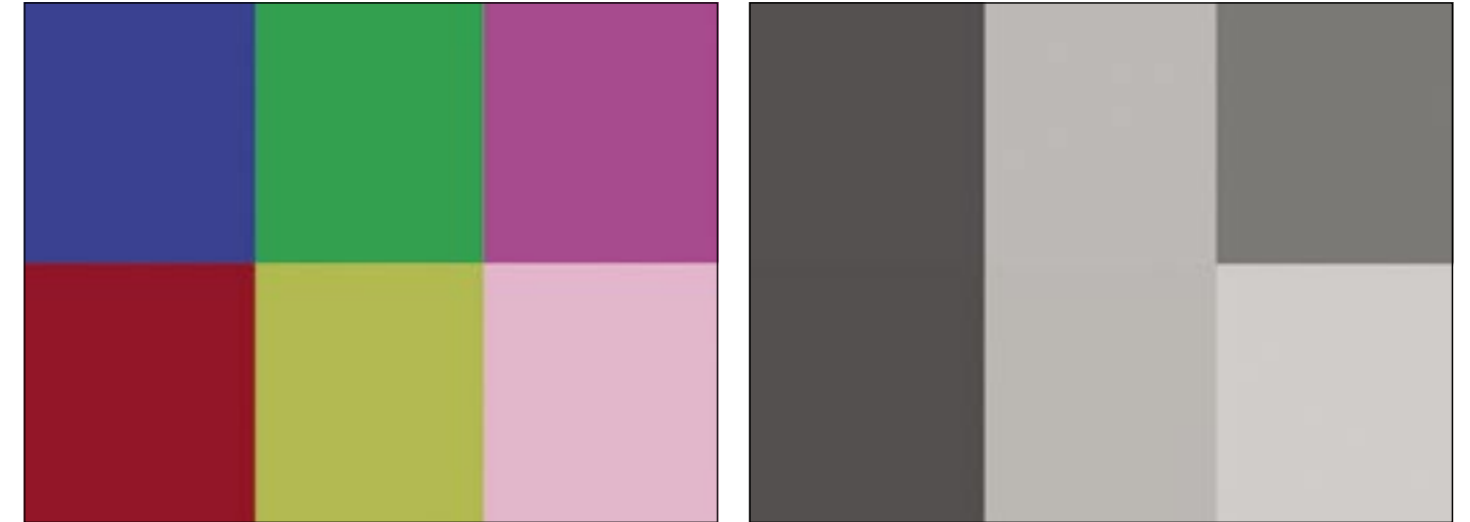


## Converting RGB to **Black & White**

The fundamental concepts



**Converting RGB to Black & White is a topic very widely discussed and written about, as there are so many ways to do it. However, some fundamental concepts are often over looked when addressing the issue. Contrast is one of those concepts and, in particular, why Photoshop's default greyscale conversions often seem to lack the contrast of their RGB source files. David Harradine explains.**



The terms 'black and white' and 'greyscale' may be used interchangeably throughout this article and, for all intents and purposes, they mean the same thing. The term 'black and white' suggests black ink and paper white, whereas the term 'greyscale' refers to the various shades of grey achieved by that black ink. The term 'monochrome'—or one colour—also means basically the same thing, with the key difference being that the one colour may be something other than black. So although the vast majority of the time the word 'monochrome' implies black and white, technically it could be implying any single colour and paper white. But enough splitting hairs, lets look at the process of converting our colour source files to rich high contrast black and whites.

### The quest for reliability

When we take an RGB file and select Image > Mode > Greyscale, Photoshop takes 30% of the Red channel, 60% of the Green channel and 10% of the Blue channel, and blends them in to a single greyscale channel. Depending on the nature of the RGB image, this can have great, average or disastrous results, hence the never-ending quest for a better, more reliable method.

However, given the old 30/60/10 system yields such a broad range of results, we can safely assume that no one method is going to work wonders on every type of image we throw at it.

So what is it that makes one RGB image so different to another when it comes to greyscale conversions? Well of course, it's the colour—or, more importantly, how the various colours convert to greyscale.

### Three types of contrast

When we look at a colour image we are in fact looking at three different types of contrast: Hue contrast, Saturation contrast and Brightness contrast. The Hue contrast refers simply to the different colours. For example, a red and a blue will exhibit high contrast as they are such different hues, even though they may be very similar in saturation and brightness. A lime green and an olive will show high saturation contrast, even though they are very similar in hue and brightness. And a pink and a purple will show high brightness contrast, even though they may be very close in hue and saturation.

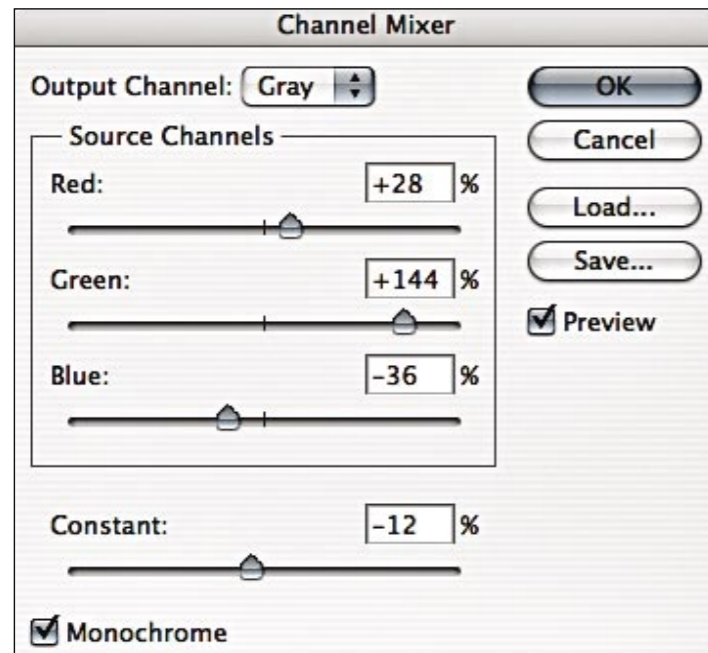
So which of these types of contrast do you think will be most helpful when converting to Greyscale? Well, given that there is no hue or saturation in Greyscale, it would have to be brightness. Hue and saturation are properties of colour; shades of grey all have equal hue and saturation values—namely zero—so no difference, no contrast. Take the example (shown in the diagram above), illustrating this principle. Column one displays hue contrast, column two saturation and column three brightness. See how the blocks of contrast relate to each other once converted to greyscale.

### The Channel Mixer

The classic method for achieving exactly this is using the Channel Mixer (Image > Adjustments > Channel Mixer). Altering the source channel values will produce different Red, Green and Blue channel values, which, by default, results in significant colour shifts. However, clicking the Monochrome (single colour) check box

In RGB there are three types of contrast: hue, saturation and brightness. Once converted to greyscale, only brightness contrast remains. So often colours that appear quite different, in greyscale become quite similar. Now, as is often the case in this game, hidden inside a problem is a solution, and this conundrum is no exception. In fact, I once heard a particularly motivated individual remark: 'there are no problems, only solutions'. I've found this to be a pretty useful mantra. So if the various colours of interest need to have brightness contrast before they are converted to greyscale, lets give them exactly that—with blatant disregard for what it does to the hue and saturation values, as they will not be relevant once converted to greyscale.

Just like 30/60/10, no set of numbers is going to work well for all types of images. The following are only suggestions that you may modify to suit your own images better. However, I've had some degree of luck with Monochrome checked and Red +28 Green +144 Blue -36 and Constant -12. Your mileage may vary.



in the lower left hand corner will produce the greyscale-converted result of this channel mix. You can verify Photoshop's 30/60/10 formula by duplicating an RGB image, converting one to greyscale via Image > Mode > Grayscale and the other via Image > Adjustments > Channel Mixer with monochrome checked and 30/60/10 entered for red, green and blue respectively. The resulting greyscales should be identical.

#### The 100 myth

Many people claim it's crucial that the numbers you end up with after channel mixing add up to 100. But this is really only if you want your image to remain as close to the original RGB brightness as possible. Often, you may wish lighten or darken the image. So although you want to say reasonably close to 100, there is no need to be exact if, say, 120 or 80 produces a preferred result. If you find some useful number combinations that seem to repeatedly work well on certain types of images, you can save them by simply clicking save. I like to have a folder—called 'Settings'—nearby for just this purpose, and I regularly save off .cha files from the channel mixer or .acv files from the curves tab. These files are tiny and can be easily emailed to friends or shared across networks.

#### The Russell Brown method

Another interesting method for altering the colours before they are converted to greyscale, is the Russell Brown method. Named after its creator, senior creative at Adobe, Russell Brown—see [RussellBrown.com](http://RussellBrown.com) for much more fun and games—the Russell Brown technique is as follows (I recommend you record the initial set up as an action, as you do not need to re-invent the wheel every day).

Step One: Take an RGB image you wish to convert to black and white and add a Hue/Saturation adjustment layer, either from the adjustment layer icon at the bottom of the layers palette—that's the half black half white circle—or via Layer > New Adjustment Layer > Hue/Saturation.

Step Two: Drag that new adjustment layer to new layer icon at the bottom of the layers palette—that's the turning page icon. Now you have two Hue/Saturation adjustment layers.

Step Three: Double click on the top adjustment layer and dial the saturation down to -100, this will provide the black and white preview whilst you modify the still present colours.

Step Four: Change the blending mode of the second adjustment layer (the one in the middle) to Color. This ensures the adjustments you make here only affect the underlying colour.

Once you've completed step four, you can stop recording your action. This is the set up complete, and exactly how you will use it every time. Now the creative work can begin. With the middle adjustment layer active—the one with the colour blending mode—start to modify the hue and saturation values. Notice how the colour alterations manifest as tonal alterations within the black and white preview. Try briefly turning off the top adjustment layer to see the effect the middle one is having on the colours. They will, no doubt, look bizarre, but they are providing the best black and white result. For super fine-tuning, you use the drop down menu in the middle adjustment layer to isolate certain colours and further modify just their hue and saturation values. The black and white rendition options are endless.

#### Black & White in the Raw

Another sneaky way to have a very similar level of control over your Raw files in Camera Raw is to utilise the Calibrate tab. Start with a Raw file from which you'd like to produce a nice black and white. In the adjust tab, slide the saturation down to -100 and the contrast to taste—generally quite high. Now turn your attention to the calibrate tab, where you can further modify the colour information via the hue and saturations sliders, but again only see the black and white results. If you find some combinations of calibrate settings that work well for certain types of images, you can save them from the drop down settings menu just above (and slightly to the right of) the word 'calibrate'. This technique is particularly gymnastic under the hood, when you consider a Raw file is, by nature, greyscale and its colour appearance is created by an interpretation of its greyscale tonal values. Here we are then taking that colour rendition of the greyscale file, forcing it back into greyscale, then manipulating its colour interpretation to further enhance the greyscale appearance. You might have to read that a couple of times before it makes any sense, but dizzying as it is, it's exactly what's happening.

#### Optimum results

In fact this technique has now received full recognition in Adobe LightRoom, with the Greyscale mixer allowing you to mix Red, Yellow, Green, Cyan, Blue and Magenta values to achieve optimum black and white results. So remember, often the best RGB to black and white conversion begins by actually thinking about the colours present in the RGB image and not rushing in to single channel greyscale, where all the colour information is lost forever.

*David Harradine is a Photographer, trainer and Adobe Certified Photoshop expert, who regularly presents training seminars around Australia and New Zealand, on Photoshop, Colour Management & Digital Photography. To see full details of his current seminars please visit [www.whack.com.au](http://www.whack.com.au).*

