the HIDDEN COLORS

Practical Color Theory for
Photography and Post-production

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THE HIDDEN COLORS; Practical Color Theory for Photography and Post-production

Book 1 in the series
Color in Photography and Digital Imaging

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Gry Garness is Norwegian born, the daughter of broadcaster Bjørn Hansen and artist Rigmor Hansen. She relocated from the Arctic city of Tromsø to London in 1991 and now spends her time between Cadiz, Spain, and London.

She had since 2002 worked as a retoucher and Photoshop trainer/consultant, and is also a photographer and has autored several e-books. Gry's background has prepared her well for where she is today; she worked in Norway as a hair & makeup artist for a number of years, whilst moonlighting as a radio and TV presenter. After graduating from London College of Printing in 1995 she has enjoyed a successful career within photography – shooting fashion, music and advertising for clients such as Body Shop, Sure, American Express, Polydor, British Airways, Martini, Marie Claire, Black Book, Scene and Atomica magazine.

She has retouched for the BBC, Talkback Thames and various media companies, Max Factor and other make-up brands, and covers & publicity for many British household names within music, such as Westlife, Sugababes and Paul Weller. Her training and retouching clients include photographers, retouchers, design agencies, publishing companies, picture libraries, broadcasting companies and printers.

TIPS FOR USING THIS BOOK
This is an interactive book and hence not designed for print. Many of the images reveal an underlying image when you roll the cursor over it. Usually the red caption text will tell you when there's a roll-over. All the cyan text highlights will reveal a text box which will pop up if you put the cursor over it. The same goes for any colored dots. The pop-up quotes from various artists can be ignored or enjoyed, and the same goes for the gray pop-ups. They are there to give a few extra facts, more in-depth information, and small 'asides' that could otherwise break the flow of reading. There are a few red links to websites in the e-book, for which you will need an internet connection.

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This book is dedicated to my mother, an artist who mixed her vivid powder pigments with linseed oil, and who during her apprenticeship as a painter made me her own little apprentice.

COLOR AS WE SEE IT

Audio is disabled in the Preview version.

Color is all about perception and deception. The biggest secret to success is knowing how to manipulate the viewer's mind – or should I perhaps say the viewer's brain? The brain is in fact the true organ of vision, but it can be easily tricked, and can even see colors that are not actually present in an image. It's a sensation that occurs in the brain in response to stimulation of the color receptors in the eyes.

This experience of color varies from person to person and from time to time, depending on the environment. The human eye is incredibly sensitive, but it isn't very trustworthy when it comes to color because it tends to adapt and re-calibrate itself to the viewing conditions. This is why we for example don't pay much attention to the yellow cast from a good old-fashioned tungsten light bulb.

Look at the image of the girl on the next page, and judge the color of her dress. To most people with 'normal' color vision it appears pale pink. But the dress is in fact the only part of the image that is neutral black & white. There is a Cyan overlay on the rest of the image. Move the cursor over the image to see the original, and then press the cursor to see the applied RGB Curves adjustment. This is an illustration of how the brain can be deceived through simultaneous contrast. Even when the conscious brain is aware of a given color scheme, the viewing experience can completely override what we know as a fact, and we have no way of physically controlling the sensation. If you're wondering why it appears so – it's all about the hidden colors!

Humans were hard-wired to perceive colors long before we mastered language. We rely on it to identify objects, and to judge the quality of things, such as good or bad meat, the health of a plant, or reactions in human skin, such as blushing. We use it to convey emotion and meaning, to attract attention and to organize things. In photography the use of color can be carefully controlled and manipulated to evoke certain moods and feelings; notions of nostalgia, joyfulness, romance, mystery and pretty much any mood.

Commercially it's always useful to be conscious of colors in terms of their reputation and history. With a confident grasp of the symbolic values of colors we can help clients in their choice of branding colors, as well as using color symbolism in our own work. Color confidence comes into play when we choose locations, backgrounds, props and clothes, and when manipulating images in post-production. A particular hue can signify different things to each person, and it spontaneously promotes emotional responses. Color animates subjects, and it can bring images to life. It's loaded with symbolism, yet the different symbolic aspects of colors can often appear contradictory. In this book I've taken a close look at some key colors, and compiled a 'personality profile' for each of the most common hues.

So why do we need so much control of color? Surely, as photographers, we can simply pick up a camera and shoot something colorful. Well, this is absolutely true, but that's exactly how an amateur goes about taking a snapshot. A professional image-maker should perhaps be a little bit more sophisticated than that. Often, the best use of color lies in the ability to restrain it – in some cases for technical reasons, but in other cases for purely visual effect. In a world saturated with an array of colors – all competing for attention – we can learn a lot from artists, and bring a new level of color control into the imagery. A dedicated study of color will enrich the work we produce. It will improve the dynamics of image storytelling, meaning and emotional response. It will also benefit portfolios and website composition.

There are many perceptive tricks we can learn from fine art. Most of them relate to how colors affect each other. Although it's technically easy to change the color of an object in Photoshop, it's also easy to cross the boundaries of believability. There are plenty of cringe-inducing results of unrestrained color manipulation on the internet. I have nothing against breaking the rules or creating disharmony, but as the saying goes, you have to learn the rules before you can break them. Thankfully, those rules are not so hard to grasp, and this book introduces some essential color theory.

There are lots of practical tips, for example on how to judge the impact of illumination, how to set up your computer environment, and on shoot planning; for example considering time of day and weather. We look at how colors affect each other. When subject color faithfulness is critical, the wrong color background can cause havoc with the experience of the subject's colors, while clever use of background color can really enhance the hero product's own color. We also look at how different skin tones are affected by context color.

Here's also a slightly sensitive issue. One in ten men, and one per hundred women, suffer from some degree of color blindness. Many of those who experience

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this to a moderate degree are actually not aware of it, because color is such a subjective experience. Nevertheless, there is an actual benchmark for correct color perception, and therefore also a threshold for incorrect perception. Many of us spend fortunes on top-end monitors, printers and on calibration of these devices. Now if only the same attention was paid to the accuracy of our human viewing instruments...

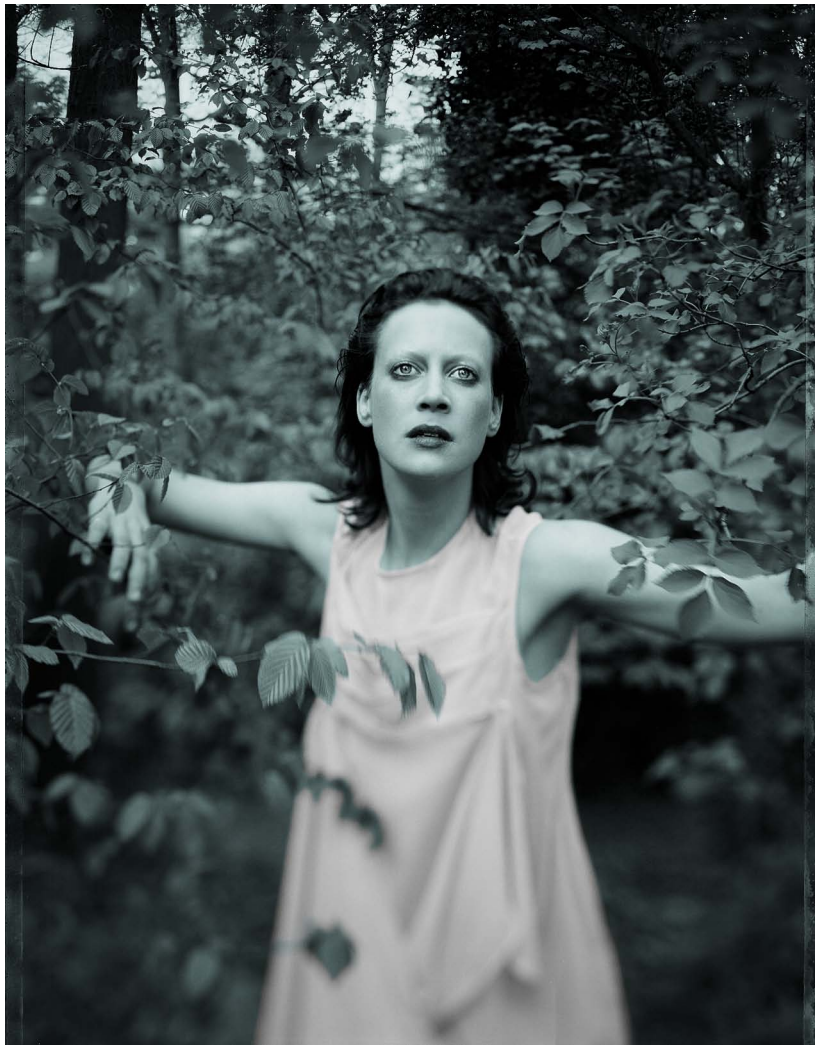
Color harmony theories can be a starting point for experimentation, or an aid in planning a styled shoot or mood board. You may not always aim for harmonic color in your work, but in that case you really do need to know some essential harmony 'rules' – in order to break them properly! It's wise to pay special attention to the 'hidden colors', which are the colors that are not necessarily present in the actual image, but are clearly perceived by our eyes. We have a typical example of such a color on this page. Our challenge as image-makers is to avoid the unintentional use of these colors, and to instead use them to our advantage, making images appear more lively with less use of saturation.

Each primary color has its own personality and its own behaviors, and you'll find some interesting facts about each color and realationship to other hues.

And finally, just for the sake of inspiration, I'll introduce you to some photographers and painters who are well known for their colorist credentials. You'll also find lots of quotes in the book; some are wise and some are just funny, but I hope they both educate and entertain you!

What is the color of the girl's dress?

Roll the cursor over the image to reveal the original Black & White image. Press the cursor to see the curve and mask that creates the Cyan color that distorts the perception of neutral Black & White.



SIMULTANEOUS CONTRAST

This phenomenon refers to the way which the color of one object affects another. Here is a typical example of simultaneous contrast, where the girl's neutral gray dress seems to become dusky pink. It's simultaneously 'infected' with the complimentary of the overlaid Cyan – Red, through a process in the brain. We can understand this phenomenon when we know that the eye (brain) demands equilibrium in color, and therefore itself restores this balance through generating this light-red complementary hue. The brain is trying to produce an overall light gray. In effect, the brain is striving for harmony. This effect does not only affect gray, but also any two colors that are NOT complementaries, and especially if they have a similar brightness level.

If the Black & White image appears to be a bit warm (red) when you first roll over to reveal the original, you are experiencing yet another phenomenon, SUCCESSIVE CONTRAST. These type of distortions are always playing with our perception. If you wait a moment you'll find that it will revert to neutral.

The phenomenon of color adaptation was first identified and published by the scientist M.E. Chevreul, in 1939. To me, it's a great example of color that 'hides' in the image and emerges unexpectedly and often unintentionally.

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THE DIGITAL KITCHEN

Chromatic Adaptation is the brain's response to exposure to a color over a period of time. Prolonged exposure to a particular color, such as red walls or a blue background on the computer screen, will cause an afterimage of the complementary color – in the case of the blue background, yellow.

OUR EYES CREATE AN AFTERIMAGE

Remember the red circle back on p.13. After staring at it for a short while, you may have seen a blue-green after-image. The same principle applies to the colors we surround ourselves with in our working environment. Our peripheral vision – the ability so pick up things through the corners of our eyes – is also sensitive to color, so even if you're not exactly staring at a patch of color, it will impose itself on the retina, and create a constant state of afterimage.

THE ROOM ENVIRONMENT

The viewing environment is critical when 'cooking' color, because ***chromatic colors*** can cause de-sensitization to the hues of the image. ***Bright white walls*** will make the image appear darker. If the lighting in the room is dull, this may not be a problem, as the walls will in effect appear gray. Colored walls are more of a problem. Due to peripheral vision, the wall color will impose itself on the retina, even when looking at the screen. Strong color will diminish your judgement and even a subtle tint may be almost just as bad when it comes to distorting the experience of color. It's also a bit of a myth that we have to work in total darkness. There should be *some* light in the room, but it should be fairly dim, and not too warm. It's best to go for daylight lighting, such as daylight halogen bulbs, perhaps bounced indirectly off a white wall or ceiling. Daylight fluorescent tubes are also available, but these are harder to control in terms of the direction of illumination. Try to avoid direct light hitting the screen.

This is my own working space. It's deliberately dull! The only chromatic object is the chair, and that is outside the working field of vision. If you roll over the image you'll see a much funkier version, but notice how the walls and background change your sensitivity to the subtle colors in the image, and how the contrast of the blacks pops out against the brighter wall. If you are accustomed to a neutral viewing environment you'll probably find it quite painful to look at!

REFLECTANCE

If the colors that surround you happen to be large, smooth surfaces, such as desks, walls, or even a screen background, then the colors will bounce around, off other surfaces, and even reflect back to the computer screen. In digital suites and studios we tend to obsess about wall color and sometimes forget about the desk surface, which is often a golden wood color. If you can't change the desktop, at least it's possible to use a neutral gray underlay, such as a graphics cutting mat. I always paint my desks with Hammerite matte silver paint, and keep the walls matte white and sometimes blackboard-gray. I also try to keep shiny or reflective objects out of my immediate visual field. A hood on the screen helps keep the reflectance off the screen surface, at least from the sides and the top, but it won't shield the bounced color from a desk. Some screens come with a hood, and it's also possible to form a temporary hood out of cardboard or ***black cinefoil (BlackWrap)***.

TRANSMITTED LIGHT

Transmitted light shines straight into our eyes, and when it's colored it will have an immediate and direct impact on color vision. When I train people in Photoshop and retouching I see a lot of purple-background Mac screens and various blue screen backgrounds. When working on a single image it may be possible to work in ***Full Screen mode***, but when making fine comparisons between two images, a non-neutral background causes havoc with those fine tuned color instruments – your eyes. If you study the previous page you'll also be reminded of how the ***lightness*** of the background affects the perception of the image on screen. Mid-gray is always best, and has become a standard in the industry. This is why I'm a bit perplexed about ***Photoshop CS6*** and ***Lightroom*** having chosen such a dark default background. On the next pages we look at how this can be changed, and how you can in fact work very effectively with three different backgrounds in Photoshop.

THE SCREEN

Have you ever been in a TV shop where the TV screens look the same? I'm sure you've noticed that they all vary in brightness, saturation and hues. TVs are factory calibrated, but this is a basic calibration that doesn't take into account the individual screen. The likelihood of this scenario on an uncalibrated PC screen straight from the factory, is more than 99%. Therefore we make sure our working computer screens are optimized and balanced correctly. This is done using a calibration device, and this is the first step in ***color management.*** Without calibration we have no way of knowing if the screen is giving a correct color representation, whether it's too bright or dark, too contrasty, or even has an unwanted built-in color cast, rendering the colors 'untrue'. Monitor calibration aims to match the individual screen to a well-established ICC standard, to the best ability of the device. It tunes up the video card in the computer, to deal with the color quirks, the brightness of the output, and the ***gamma***. Even if calibration isn't a perfect science, it will take you much closer to perfection – not to mention the peace-of-mind you'll feel when you can trust what you see on screen. This way you know that when you reduce a blue cast in the image, you're not simply reducing a screen cast.

COLOR MANAGEMENT

This is ***not*** a book about color management. The next book in the series is all about that. Achieving color fidelity and keeping consistency is such a massive subject that I cannot sum it up here. That said, it doesn't take a lot of work to implement. But ***knowledge*** of how digital color works is the key to getting it right, and knowing what ***not to do*** is just as important as knowing ***what to do***. Good color management will also save you time, ink and paper costs in printing, and will help you work with speed and confidence. It makes the creative process more gratifying and the good results easier to come by.

Above: This is how different an image can appear on different screens. Roll over the image to see how a calibration would give consistent viewing.

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THE THREE PHOTOSHOP VIEWING MODES

Photoshop has three screen modes for different kinds of viewing. The idea is that you use them for different kinds of work. The Standard mode may be used when working on several images and comparing them. The full-screen mode with menus is ideal for working on one image, and the black full-screen mode is good for judging contrast. It's easy to toggle through them, using just the F key.

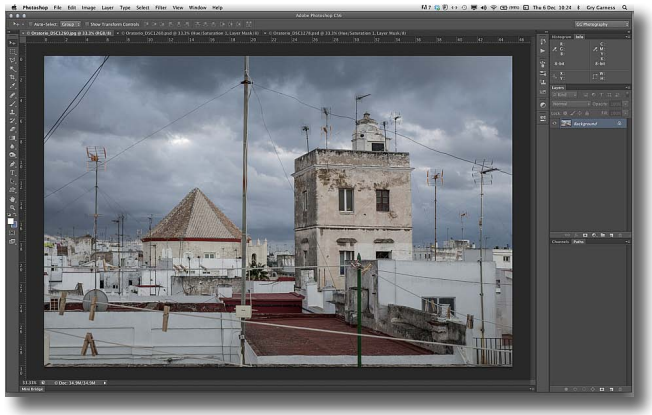
THE COLOR THEME

Until CS6 the tools were always medium gray and it was not possible to change it. In Photoshop CS6 the 'Color Theme' of the tools and panels is by default a very dark gray. This is meant to help you focus on the image. It probably does do that, but it has some other effects too, which I'll discuss on the next page. But lets focus for a moment on the three screen modes.

STANDARD SCREEN MODE

By default the images sit neatly in ***tabs*** and you only see one image at a time. If the images are ***un-tabbed*** they can float on the background. I recommend setting also the ***computer background*** to a neutral middle gray. With images tabbed, you'll only see the Photoshop background. Photoshop's own background has always been gray, so that you won't be distracted by patterns or colors. However, you can change it, and I'll show you an example of that on the next page. The image below shows the tabbed mode.

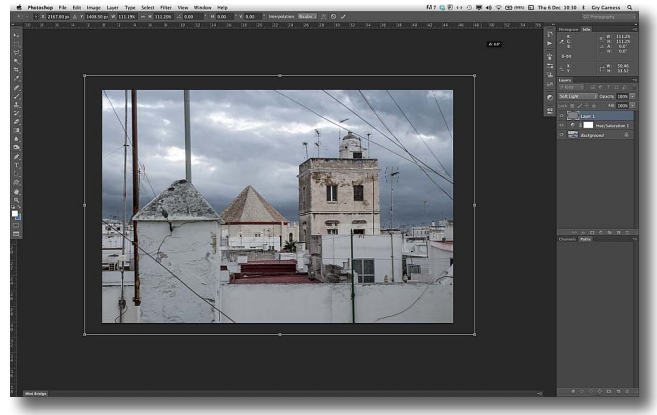
Roll over the image to see the images un-tabbed, and click/press to see a distracting purple Mac background.



FULL SCREEN MODE WITH MENUS

This mode also has a gray background. Traditionally it has been middle gray, but in CS6 the default color is the same dark gray as standard mode. See the next page for how this can be modified. The image floats on the background without any image frame, so it can be positioned on the screen more freely. It's great when transforming and rotating, and you really focus on the image. It's my usual working mode. Because I zoom in and out a lot, the neutral gray background is perfect for most color corrections, giving a neutral base to judge colors against, and most of all, no distractions.

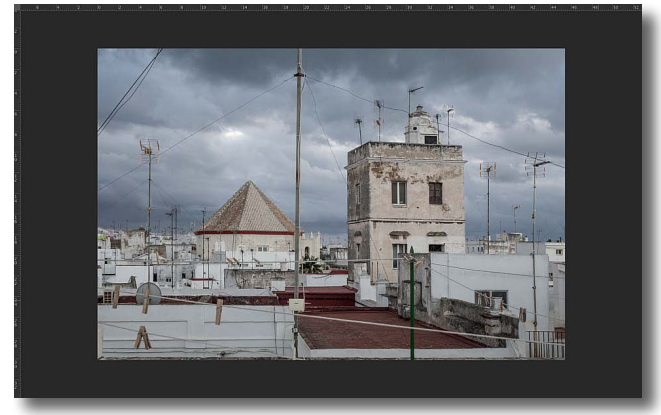
The image below shows a layer being transformed outside its boundaries. Roll over the image to see the image zoomed in, and note that there's no frame around it.



FULL SCREEN MODE (without menus).

This mode has always had a black background in Photoshop, but in CS6 it's been changed to the same dark gray as the other modes, and now I'm not quite sure what the point of it is. I suppose it's good for looking at the image without the distractions of panels and menus, and making use of the full screen. If you're going to do any actual work in this mode, you need to know your shortcuts. It has no menu or Panels, but if you hover the cursor over the right edge of the screen the panels will pop up temporarily.

The image below shows the default CS6 fullscreen mode, without any panels. Roll over the image to see the panels, that can be temporarily popped up as described above. Note that there's still no menu.



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CHANGING THE PHOTOSHOP MODES

Having only one color background for all three modes is a missed opportunity, but the colors can be altered in order to make the modes into a tool for judging color and contrast. This way we can get a good sense of how the image will present itself in a different environment, such as in print or on a website. Here's how you do it in Photoshop CS6 and in earlier versions.

If you like the CS6 dark background theme, I hate to put a damper on your enthusiasm, but it really plays havoc with the perception of contrast! Images appear to pop out more on a dark screen, and of course that gives some instant gratification! The trouble is that while you get the sensation of brilliant whites and you adjust to get rich blacks to compete with the dark interface, you end up plugging the shadows and ignoring washed out highlights. The latter can be fixed but it's harder to retrieve shadow detail later.

Don't get me wrong, I'm totally positive to a viewing environment that gives a good 'pop' to the image, but that's for the ***end user***, or the consumer of the image. The creators of images need an environment that displays the image to reveal all its faults, and optimize the image to suit a range of environments. Then we can later treat versions of the images to suit a certain kind of print, or a website with a particular color. What's so great about being able to customize the workspace and interface, is that you can create a range of different scenarios to preview the image in. It's just a question of how to organize it to fit the way you work. I'm going to show a way that really works for me.

THE COLOR THEME IN CS6

In ***Photoshop>Preferences*** you'll now find a new ***Color Theme*** section. This relates to the background of the Panels and the Tools, and the surrounding frames. For any retouching to be reproduced in print, or on a variety of backgrounds, we need a mid-gray theme which avoids perceptual distortion caused by simultaneous contrast. I therefore change the Color Theme to the one ***lighter than the default***.

THE STANDARD MODE

I tend to use the standard screen mode for assessing the whites and the contrast of an image, and also for side-by-side comparisons. By customizing the Standard Mode background to ***R:252 G:252 B:252 – 3*** points away from absolute white – it calibrates the eye to the detailed highlights and mimics the relationship between an exhibition image with a white matte/passepartout around it, or a print on paper. On the ***Standard Screen Mode*** drop-down, choose ***Select Custom Color***, and in the ***RGB*** of the Color Picker, set the ***252 in R, G and B***.

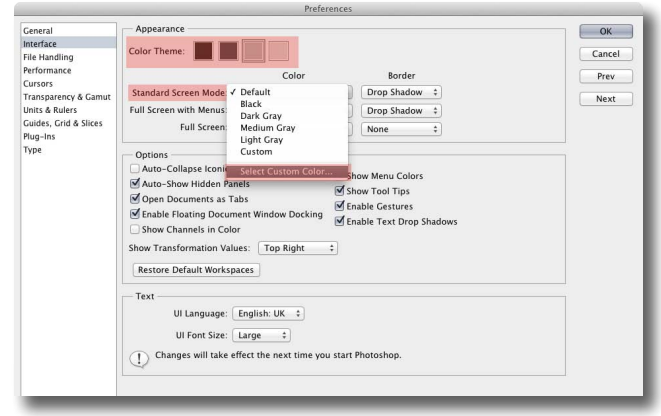
THE FULL SCREEN MODE

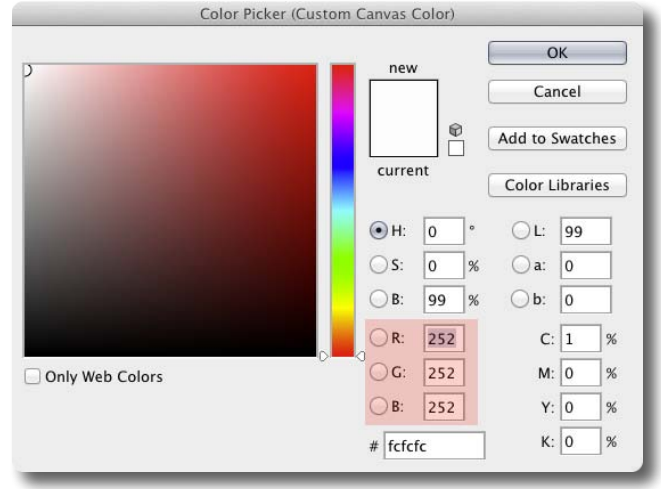
Full-screen is my ***main working space***, and I set it to middle Gray, by doing the same as above, and entering ***R:128 G:128 and B:128***. This gives a perfect neutral mid gray to work against.

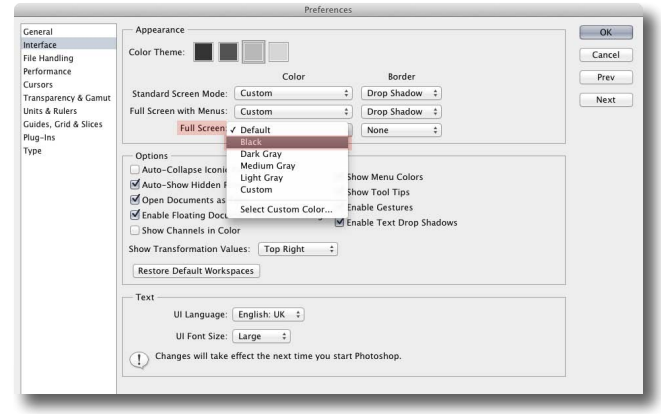
THE FULL SCREEN WITHOUT MENU

You can set the ***Full Screen mode*** simply to ***Black*** for assessing contrast and for judging if the image stands up to the black, or if it just looks milky and flat. Make sure you don't push the blacks too much though! You should still see some detail in the shadows.

Roll-over the images to see the resulting backgrounds







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MORE INFO

This interactive PDF e-book is published February 1st 2013 and will be available from www.grygarness.com

If you do not see the book's page yet, please come back later, and refresh your browser.

'The Hidden Colors' is book 1 in the series
Color in Photography and Digital Imaging

The ***CS3 Color Essentials series*** will be replaced when the next 2 books in the series are published. They will be available from the Eureka Imaging Publications site for an unspecified period.

Other PDF e-books by Gry Garness are available:

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