

Sarah's Skin color by the numbers - June 10th 2009

As discussed last week, the CMYK values for midtone skin color (not highlights or shadows) generally fluctuate around the following values:

- 1) *Cyan = 1/4 Yellow*
- 2) *Magenta + (0-10) = Yellow*
- 3) *Black values rarely exceed 0*

We all know that human skin exhibits considerable variety, however. Caucasians, for example, have very different coloring than those of African descent, and we observe considerable variety even within a particular ethnicity. You can – and should – let your eyes guide you as you correct skin color; after all, you know best what your subject looked like when you shot him or her. It's helpful, however, to have additional guidelines as a jumping off point for achieving accurate color.

In General: Dark Tones vs. Light Tones

Dark Tones and Light Tones transcend ethnicity. In all ethnicities, there are both very light and very deep variations, many of them conforming to specific geographic locations; Scandinavian people, for example, are typically far lighter than Mediterranean people (though both groups are characterized as Caucasians).

Putting dark and light tones in terms of CMYK values reveals several things:

- 1) **Darker** skin colors usually exhibit a higher percentage of cyan
- 2) **Fair** skin usually has very low levels of cyan
- 3) **Darker** skin colors have greater color density: higher levels of Cyan, Magenta, Yellow, and (sometimes) Black altogether
- 4) **Lighter** skin colors have low color density: lower levels of Cyan, Magenta, and Yellow — and a Black value of zero
- 5) **Both very light and very dark** skin colors often exhibit levels of magenta that approach or equal the yellow values*

* In his book *Skin*, author Lee Varis points out that, with darker tones, higher levels of cyan combine with yellow to create greenish tones. The best way to counter that? Raising the magenta values. As a result, darker skin very often has a higher percentage of magenta (occasionally equaling – but not exceeding – yellow). Extremely fair complexions, on the other hand, often have blue or pink undertones which are expressed by keeping yellow values low (close to the magenta values).

Caucasian: Adults vs. Children

The skin of adult Caucasians tends to conform neatly to “the rules,” with yellow almost always somewhat higher than magenta.

Adult Caucasian Skin (typical CMYK ratios)

- 1) *Cyan = 1/5 – 1/3 Yellow*
- 2) *Magenta + (3-10) = Yellow*

The skin of Caucasian children and babies also conform to the basic guidelines, but the skin is usually lighter and pinker than that of their adult counterparts. When attempting to reproduce aesthetically pleasing color in Caucasian children, magenta will often equal – but still should not exceed – yellow. This is often achieved by bringing down both cyan and yellow (to result in very low percentages overall).

Of note: Very fair skinned adults (especially blondes and redheads) often have light skin with blue/pink undertones – very similar to what you'd see in most babies and young children.

Child/Baby Caucasian Skin (typical CMYK ratios)

- 1) *Cyan = 1/6 – 1/4 Yellow*
- 2) *Magenta + (0-5) = Yellow*
- 3) *Lower CMYK values overall (vs. Adult Caucasian)*

Asian and Hispanic

Asian and Hispanic skin tones tend to be very similar in that both ethnicities tend to exhibit higher levels of yellow – often as much as 15 points higher than the magenta value. The tricky thing is to be careful not to create a green cast.

Two things are likely to introduce a greenish cast when working with Asian/Hispanic tones:

- 1) Dropping magenta considerably (to make it much lower than yellow) means you are pulling up on the green curve.

Instead, try raising the yellow (pull down on the blue curve).

2) Increasing the cyan value with darker skinned people means a prevalent combination of yellow+cyan (=green). You can counter this effect by pulling down on the green curve. It's not uncommon to see more magenta (perhaps only 5 points lower than yellow) as tones get darker.

Of note: Central American Hispanics (apparently especially in the Andes, according to Dan Margulis) have skin around the same darkness as other Hispanics, but with even more magenta (closer to equal proportions).

Also of Note: Tan/dark Caucasian skin often looks very similar to medium-light Hispanic skin

Asian/Hispanic Skin (typical CMYK ratios)

- 1) Cyan = 1/4 - 1/2 Yellow
- 2) Magenta + (0-15) = Yellow
- 3) Black values may exceed 0 if skin is dark
- 4) May have higher CMYK values overall (vs. Adult Caucasian)

African

People of African heritage almost always have darker skin than Caucasians and very often also have deeper color than Asians, Latinos, Native Americans, and other ethnic groups. Because skin color tends to be darker/deeper, we see (as discussed above) disproportionately higher levels of cyan and higher overall levels of C, M, Y, and K. Light skinned African Americans (and non-Americans) often have skin tones similar to those of Asian descent. As tones get darker, cyan gets higher, and this (together with high levels of yellow) results in a "greenness"; counter the greenness by increasing magenta.

African Skin (typical CMYK ratios)

- 1) Cyan=1/3-1/2+ Yellow
- 2) Magenta + (0-10) = Yellow
- 3) Black (K) values almost always exceed 0 (sometimes considerably)
- 4) Higher CMYK values overall (vs. Adult Caucasian)

Seek Out Source Images

The above is just the tip of the iceberg; by no stretch have I covered the vast array of skin color groups out there. A really good way to get sample numbers is to go to a stock photo site and download comp images of people with similar skin tones to your subject; open the comp images, and check the numbers. Those pics often (but not always) have great color, and as long as you are careful about what you choose, such images can be a big help if you just don't know where to start.

It's also worth noting that ideals may or may not reflect real life. For example:

- 1) In real life, very young babies often exhibit some jaundice (and yellow values may be more than 10 points higher than magenta), but that's very rarely desirable to reproduce in your images.
- 2) The "rules" preferring yellow to magenta reflect an aesthetic that most viewers prefer images that are warmer and more saturated than real life.
- 3) The Western World (the Americas and Europe) seems to prefer an appearance that is somewhat tanned – even if a subject is blue-white pale in real life. Conversely, the ideals of many Eastern nations (notably China and India) suggest a look that is lighter than reality.

These are all things to keep in mind as you work on your corrections.

Sample Images, Sample Numbers

Let's take a look at some CMYK color samples from people of a variety of ethnicities.

Here's the first pic:



INFO			
R:		C:	
G:		M:	
B:		Y:	
8-bit		K:	
		8-bit	
X:		W:	
Y:		H:	
#1C:	1/ 1%	#2C:	38/ 38%
M:	21/ 21%	M:	66/ 66%
Y:	23/ 23%	Y:	67/ 67%
K:	0/ 0%	K:	26/ 26%

Girl #1 (Fair skinned Caucasian Child): The cyan values are extremely low here (1%), and this should really be no surprise given that the skin is so fair. Magenta (21%) and yellow (23%) are almost equal, with yellow slightly higher on the forehead. Note that the rest of the face — including even the chin is much pinker, with magenta likely exceeding yellow. The color looks great, but it could be tweaked by pulling down on the red curve just a bit - this would introduce a little bit of cyan (I'd go no higher than 5%) and would also reduce the overall magenta slightly.

Girl #2 (Dark skinned African American Child): Here we see very high levels of cyan (38%) and magenta (66%) values that nearly equal yellow (67%). Because the skin is very dark, there is also a considerable amount of black (26%). This is pretty consistent with the rules discussed above. The cyan looks a little high, but reducing it (by pulling up on the red curve) is likely to cause the magenta values to surpass yellow, and increasing the yellow to 76% (double the present level of cyan) would likely make the skin look green. This is one that I would almost certainly leave as is, as her skin color - to my eye - looks gorgeous. Also note how much higher the overall numbers are for the African American girl; the values total 197 vs. the Caucasian girl's 45. With darker skin color, the ink used is more dense; again, exactly what you should expect to find.

One more picture (sorry - no male photos today! 😊):



INFO			
R:		C:	
✗ G:		✗ M:	
B:		Y:	
8-bit		K:	
		8-bit	
+		□	
X:		W:	
Y:		H:	
#1C:	38%	#2C:	17%
✗ M:	71%	✗ M:	38%
Y:	77%	Y:	50%
K:	38%	K:	0%
#3C:	36%	#4C:	4%
✗ M:	64%	✗ M:	14%
Y:	78%	Y:	14%
K:	26%	K:	0%

Woman #1 (African American): Like the young girl above, we're seeing very high levels of both black (38%) and cyan (38%); this is typical of dark complexions. This woman has a slightly more yellow (77%) than magenta (71%), but she doesn't look the least bit greenish, so there's no need to add magenta here (adding more is likely to make her start looking purple). Cyan is coming in at just show of 1/2 yellow, which is great. The colors here look perfect.

Woman #2 (Asian): This Asian woman has a medium complexion - I'd characterize her as neither pale nor dark. Cyan (17%) is coming it at just barely more than 1/3 the yellow value (50%), and yellow is 12 points higher than magenta (38%). I might pull the yellow up a point or two just to keep cyan at under 1/3, and if this made her start looking greenish, I might pull up the red curve just a touch to bring down the cyan. It looks pretty great as is, however.

Woman #3 (Asian - Indian): This woman has a fairly dark complexion, and we can see that both cyan (36%) and black (26%) are registering pretty high. In relation to the other colors, however, we're still doing fine. The cyan is exactly 1/2 the value of the yellow (78%), and magenta comes in at 14 points below yellow (64%), which is within the 15 point guidelines. To me, this color looks absolutely incredible.

Woman #4 (Fair Skinned Caucasian): This woman has an extremely fair complexion not unlike the little girl we saw above. Yellow and magenta are equal, which is fine, though yellow could be a point or two higher without a problem. At 4%, cyan is between 1/3 and 1/4 the value of yellow (14%); with her complexion so fair, I would have expected to see cyan a little lower (relatively speaking), and I'd probably adjust either by increasing the yellow a couple of points or just by pulling up the RGB curve altogether, which would brighten her complexion overall (and would, in the process, reduce the cyan). Note that the total CMYK values are very low (32 points total) - again, this is typical of very light/pale complexions.

Note that the two images above both involve multiple subjects, and it's not uncommon to have to adjust the skin color of each subject separately. To do so, masking is required. We'll begin to discuss that down the road (perhaps next week - I'm not sure what we'll be covering yet!).