My Prints Doesn’t Match the Monitor

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Is Trying to Match the Monitor and the Print A Fool's Errand? - Short answer, "Yes"

The Monitor

- Emits light.
- RGB colors.
- Higher color space.
- Dependent on settings.
- Dependent on viewing environment.

The Print

- Reflects light
- CYMK colors
- Smaller color space.
- Dependent on the printer inks and the paper.
- Dependent on viewing environment.

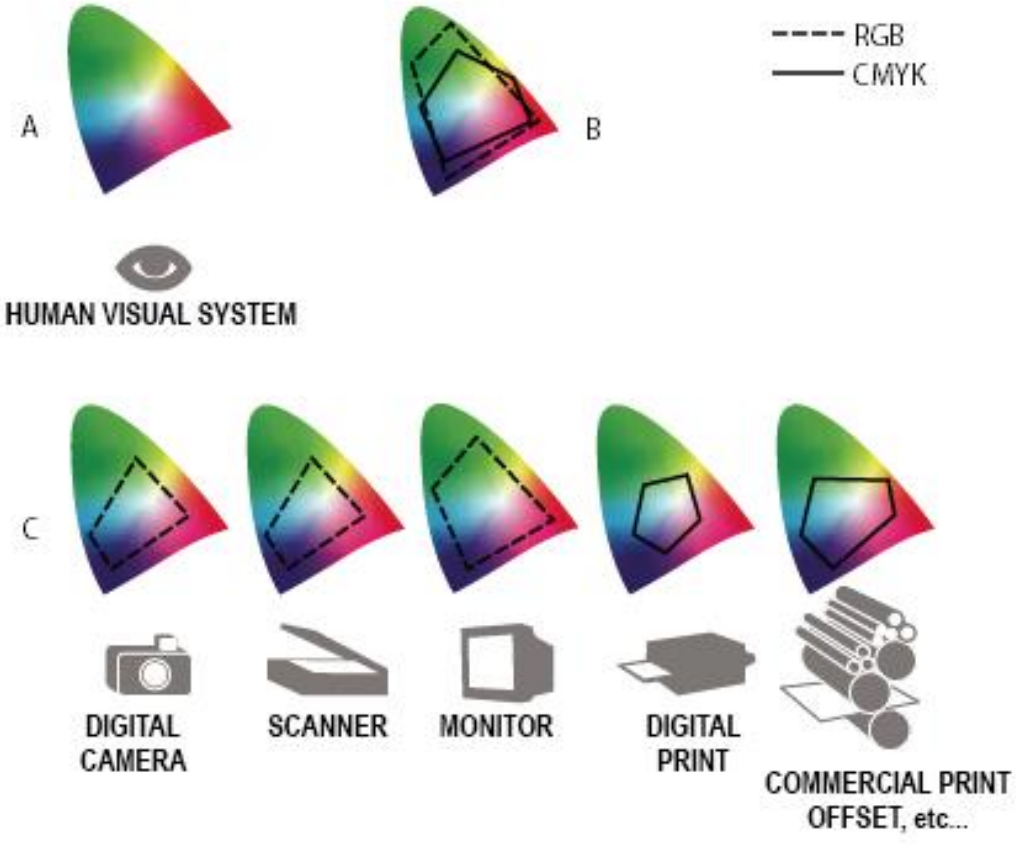
All Hope is Not Lost

- Have realistic expectations. Mine are:

  Produce a print that meets my artistic expectations (knowing it will not exactly match the monitor).
- Calibrate your monitor.
- Control the editing environment.
- Use ICC profiles for color prints.
- Control your print viewing environment.
- Know your printer and papers.
- Learn to soft proof.
- Print early and print often.

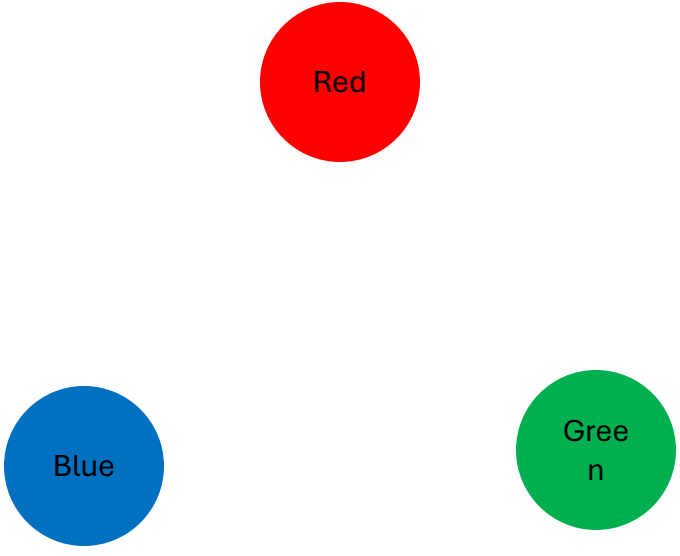
Some Basics

From the “real world” to the print

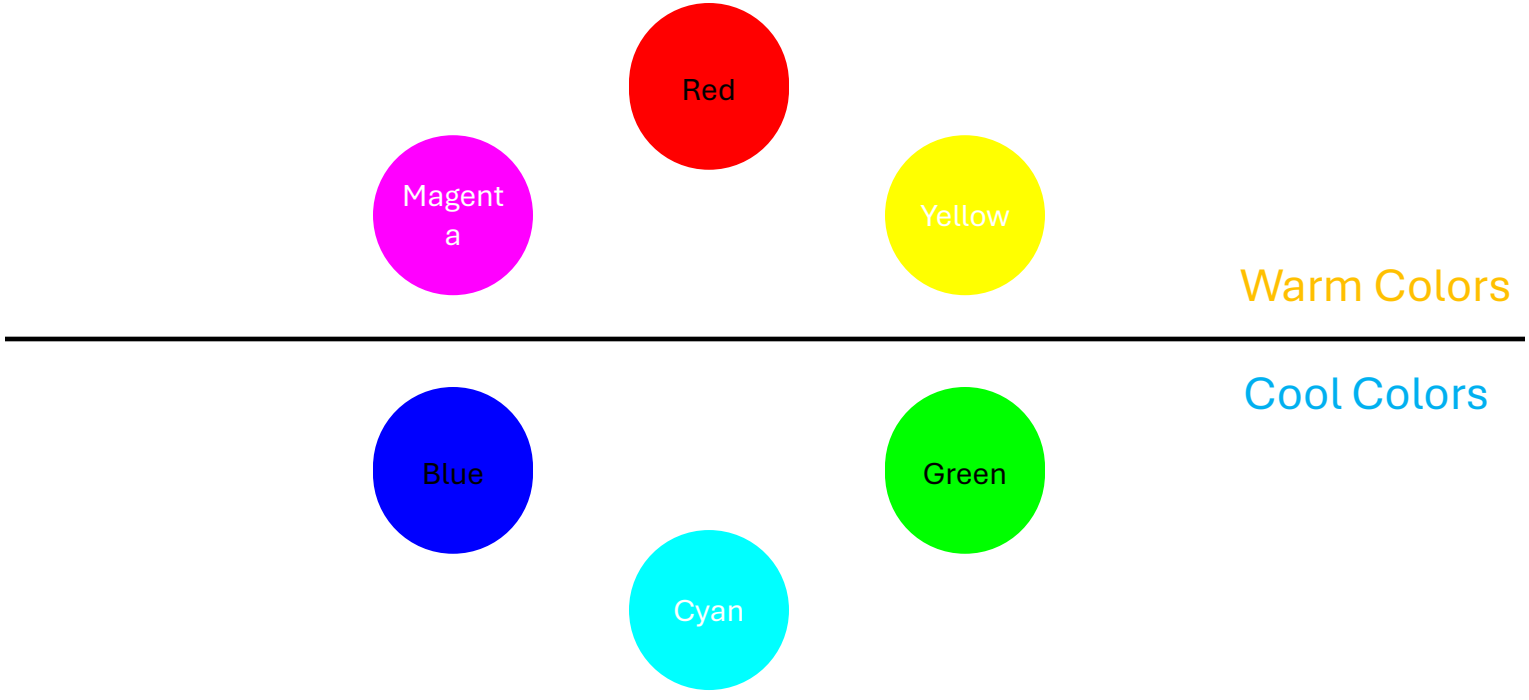


From *Color Graphic Services*

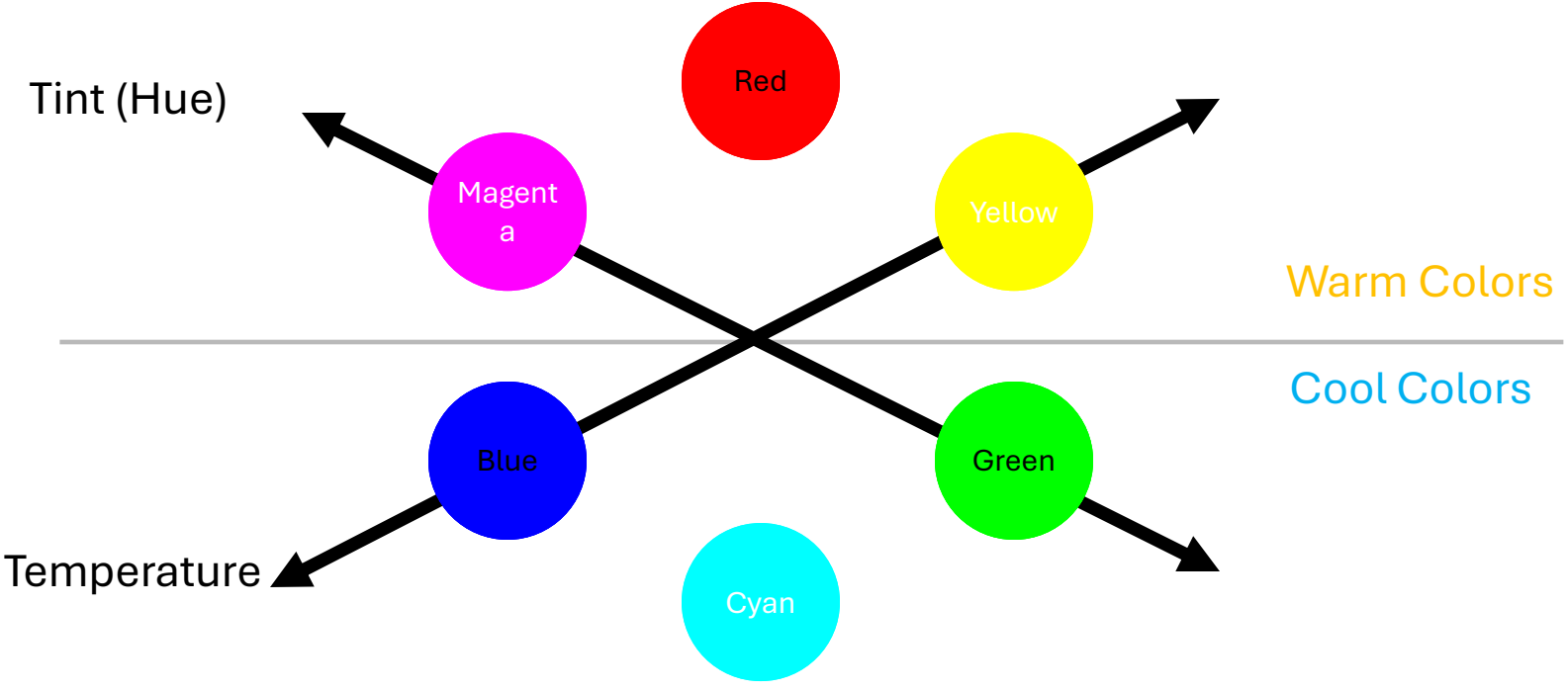
Primary Colors in Photography (RGB)

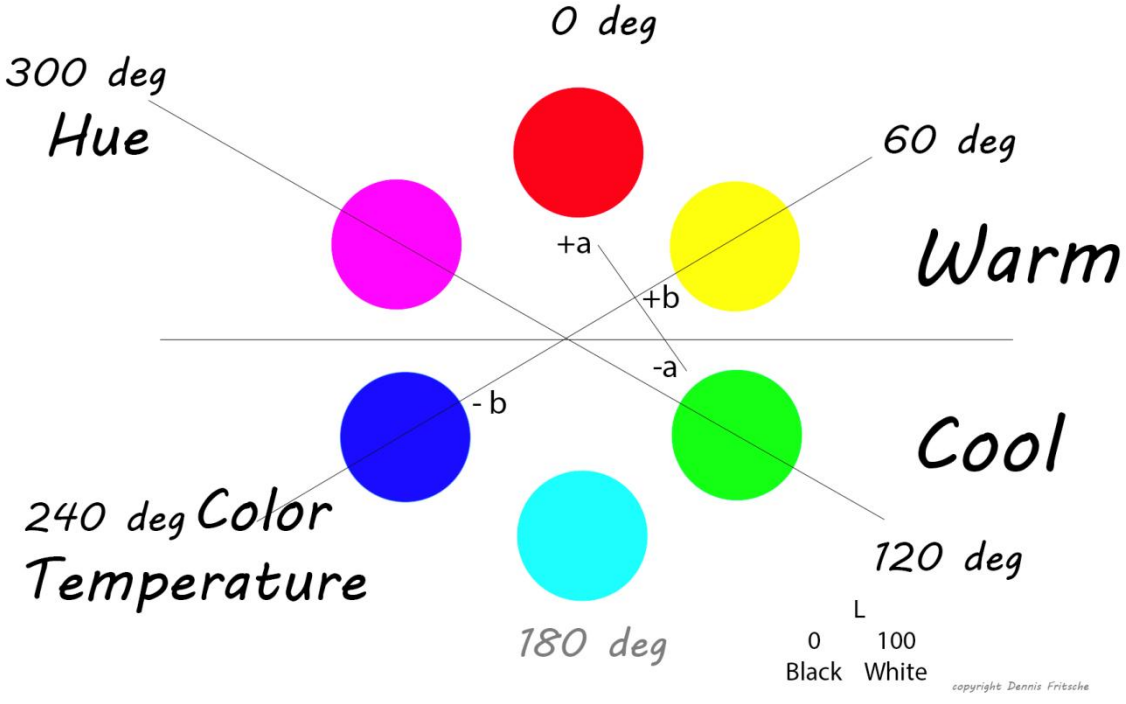


Add the Secondary Colors (CYM)



White balance controls




0 deg
300 deg
Hue
60 deg
+a
Warm
+b
-a
- b
Cool
240 deg Color
Temperature
120 deg
180 deg
L
0
Black
100
White
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What is “white balance”

- White balance is adjusting the colors to make the subject appear “natural”.
- When we view white piece of paper under different light our brain adjusts the color for us and makes things “natural” and comfortable.
- When we take a picture, the subject takes on the color of the light and it is much more apparent that there could be a colorcast.
- We can adjust the colors at the time of capture or in post processing.
- While shooting, use your camera’s setting or create a custom white balance setting for the lighting conditions.
- In post processing, use the color picker or custom set the colors.
- Doing this guarantees that white, grays, and blacks are neutral and that the other colors are correct.

Is White balance important?

- Yes. It is an important part of the photograph.
- If you are photographing people or products, you will want to be very careful about getting a neutral white balance.
- Otherwise, the white balance is an artistic decision. Some like it hot and some like it cold.
- I shoot outdoor scenes under natural light with the camera set at “Daylight”. And will occasionally adjust based on the scene. This renders
  - Neutral daylight
  - Cool shadows
  - Warm sunsets
- The “Automatic” settings are also good

Two Main Problems We Encounter in Matching the Print and Monitor

Colors Don't Match	**Print is Too Dark**
• Monitor not Calibrated • Not using printer ICC profiles • Colors are Out of Range for the Paper and Ink • Image editing environment	• Monitor is too bright • Image editing Environment • Print viewing environment • Not using printer ICC profiles

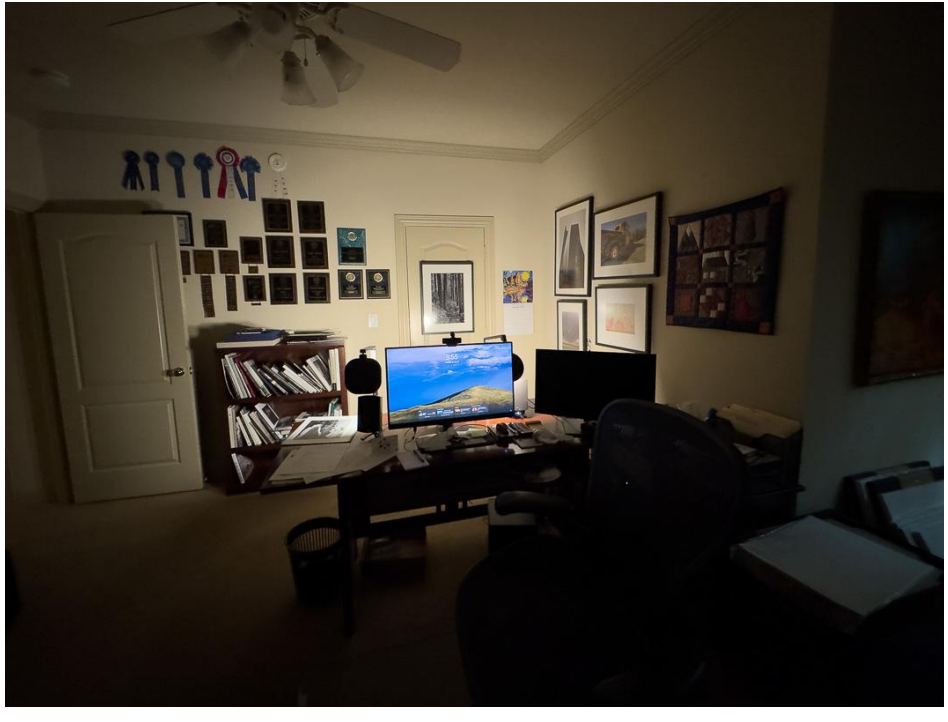
Good color management and coping strategies are essential to achieving repeatable results.

Color management

- Your camera, monitor, and printer each interpret colors differently. And they each have a different range of colors they can represent.
- *Color Management* refers to calibrating (profiling) all your devices to know standards so that you have a better chance of getting the color you want.
- A good overview can be found here. http://www.xritephoto.com/ph_learning.aspx?action=browse
- Your camera is profiled by the software manufacturer such as Adobe (for RAW) and is generally acceptable. You can profile your camera with a device such as the *Color Checker Passport*.
- Your printer/paper combination is profiled by the paper manufacturer (.icc profile) and is generally very good. You can make custom profiles with a colorimeter.
- You must profile (calibrate) your monitor.

Editing Environment

- Try to keep a consistent environment.
- Avoid direct light on the monitor to minimize reflections.
- Keep the room illumination low but not dark.



Monitor Calibration

- Monitor calibration consists of
  - A color measuring device (colorimeter)
  - Software
- Colorimeters
  - Calibrite (previously i1Display) *Display Pro ($279)*
  - Calibrite *Display 123 ($119)*
    Display devices - Calibrite - United States
  - Datacolor *SpyderExpress Colorimeter ($119)*
    Color Management Tools - Color Management | Datacolor
- Software – supplied by the colorimeter maker or the monitor maker.
- My recommended settings are
  - Advanced (may need to adjust your monitor)
  - Set luminance to 75 for my room (125 for normally lit room)
  - Target White Point D65
- A profile for your monitor is generated and saved. The system automatically uses it when you start up.

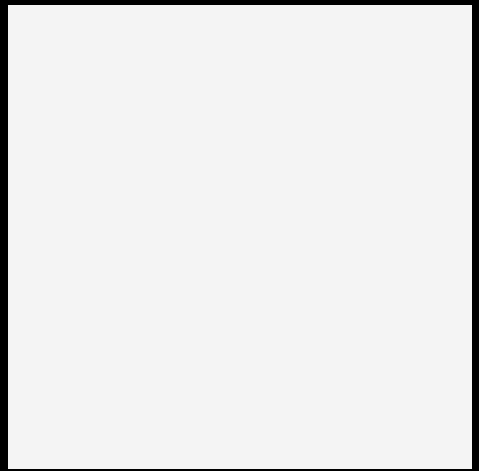
Print Too Dark

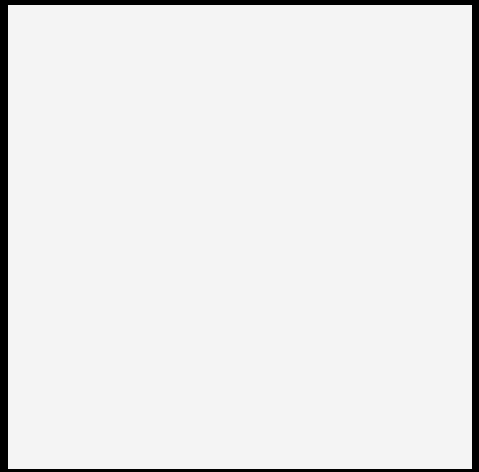
The Issues

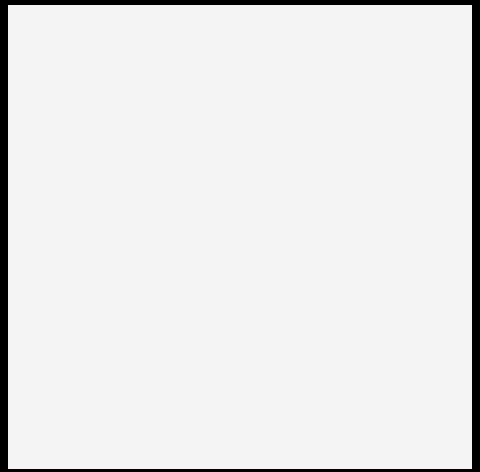
- **Monitor is too bright** - you lower the exposure to make it look right, but then it prints dark.
- **Viewing with a black background** – which makes the image look brighter.
- **Expecting too much** from your printer and paper combination.

Your Brain and its games

- Your brain is very flexible and will change reality to make you more comfortable.
- For instance, a white object in sunlight and incandescent light both look “white” although they are not the same.
- If you stare a photograph on your monitor and keep making small changes to the colors, the image may look reasonable, but you can quickly get out of bounds and have a mess.







Coping

- To cope with your problem brain – keep it off balance
  - Take breaks and look at the real world.
  - Look away from the screen and back again for a brief glance.
  - Flip your photograph upside down.
  - Look at several images at the same time.
- Set Up you editing environment
- Soft Proof to simulate your printer and paper.

Print Viewing

- Print early and often
- Leave the print on display with other prints
- Wait to make additional adjustments
- Try for a controlled viewing environment.

Soft Proof

- Both Lightroom and Photoshop allow you to “soft proof” your image.
- *Soft proofing is a digital workflow process, primarily in Lightroom or Photoshop, that simulates how an image will look when printed on a specific paper and printer combination using ICC profiles. It enables photographers to identify out-of-gamut colors, adjust tones, and minimize, or eliminate, unexpected color shifts before committing to expensive, time-consuming physical prints.* (AI and I agree)
- Demo

Dennis' Practices

- Shoot in RAW format for greatest quality and flexibility.
- Set camera white balance (WB) to *daylight* for all outdoor photography or use *custom white balance*. *Auto* WB works pretty well but can get confused. Try to use the indoor settings for indoor situations.
- In post processing
  - Use the largest color space available – *proPhoto RGB*
  - Calibrated monitor
  - In programs such as Lightroom or ACR, experiment with the different camera profiles.
  - For printing use *.icc* profiles for my paper and printer.

Summary

To achieve repeatable results, use good color management and coping strategies.