

LIGHTING YOUR SUBJECT

WHAT IS LIGHT?

What we call light is the visible part of the electromagnetic spectrum. White light from the sun can be divided in colours using a prism (Newton 1666) revealing the ROYGBIV colours.

Daylight light at noon in an overcast sky has a colour temperature of 6500 degrees Kelvin – often referred to as “daylight” but is actually quite cool. Natural daylight ranges between 4000 - 6500 degrees depending on conditions and the time of day. Daylight light under clear sky would be between 5000 and 5500 degrees Kelvin.

TYPES OF LIGHT

Available Light

Available light can be defined as any light source that is available to, but not provided by, the photographer – this can be sunlight, moonlight, or any artificial light source that illuminates your subject matter.

Artificial Light

Artificial light can be defined as any source of light that does not exist in the location where you are photographing. In other words, light provided by the photographer. It can be a flash, flood lights, a torch, a candle or any other source of light.

Supplementary Light

Supplementary light can be defined as any light source that the photographer uses in addition to the natural (or available) light that illuminates the subject matter. A reflector is a good example of a supplementary light – even though it is merely reflecting the available light into parts of the image not normally illuminated.

CHARACTERISTICS OF LIGHT

Hue

The hue of the light is the colour of the light. It might be the colour temperature of the light source illuminating the subject matter, or it might be a light source of a particular colour. For example, Indoor lighting is often made up of several different types of light source – Fluorescent, incandescent, Halogen or LED, in addition to any light from the exterior that may be illuminating part of the subject matter.

Intensity

The intensity of the light refers to how much light is available – full sun at midday has a very high intensity, giving strong shadows and harsh highlights, whereas at either end of the day the sun has lower intensity. Sunlight being diffused through cloud or fog has a high intensity, but acts as a giant lightbox, giving diffuse shadows and lower contrast. This is the ideal light source for photographing a forest, for example.

Luminosity

Luminosity refers to both the brightness of the light source and the reflective properties of the subject matter being photographed. A dark object will absorb much of the light falling onto it, requiring a brighter light source to give adequate illumination. Polarised ocean or water has a low luminosity, whereas snow and ice are highly reflective. If a bright or dark area dominates the frame, some adjustment of exposure will be necessary to achieve “optimal” exposure.

Direction

The direction of the light source illuminating the subject matter is critical in providing clues to the dimensionality of the subject matter being photographed. The direction of the light can be from the back, front, side, overhead or below. In each instance, the direction of the light source will give dramatically different characteristics to your subject matter.

Colour and Colour Casts

Direct sunlight is regarded as being neutral or pure white, but it depends on the time of day as morning or afternoon light is warmer. All artificial light sources have a characteristic colour cast – a dominance of one or more colours in the light being emitted. Fluorescent lighting has a strong green cast, mercury vapour has an orange cast, incandescent lights are very warm and LED lights can vary in their colour cast depending on their specification and manufacture.

Temperature

The temperature of the light source will give markedly different characteristics to an image. Unfortunately, the human eye naturally compensates for colour temperature changes, so it is difficult to assess the colour temperature without taking one or more test images in a given situation. Today's modern cameras do a good (but not perfect) job of adjusting the Auto white balance to compensate for different colour temperatures. Adjusting the colour temperature (white balance) in an image can be an effective tool in conveying the mood the photographer intends for the image. Cool temperatures generally have a feeling of melancholy or sadness, whereas a warmer temperature generally conveys a more happy and joyful mood.

Source – Point (Sun) or Diffuse (Overcast)

The source of the light falling on your subject can define its appearance. Light from the sun can be considered as a point source as all the light rays from the sun are effectively travelling in the same direction. Direct sunlight gives distinct shadows and high contrast to your subject matter.

When sunlight is interrupted by cloud or fog, the light is diffused into light that travels in multiple directions, giving a very soft appearance with minimal shadows.

Artificial light sources can appear as either a point source (flash) or a diffuse source (soft box or reflector).

Natural or Artificial (Flash, Artificial Light)

Natural light is generally considered to be sunlight, with its own characteristics, although the moon could also be included in this definition. Any other light source is thought to be “artificial” because it is introduced into the scene by the photographer. This includes studio flash, on or off camera flash, continuous lighting, reflectors, diffusers, and anything else you can think of to add light to a scene.

LIGHT MODIFIERS

One of the simplest light modifiers is a reflector that uses the existing light source to add light back into the unlit side of your subject matter. This technique is particularly useful in portraiture, where a reflector can be used to provide a diffuse amount of light to reduce shadows. They are easily controlled and positioned to great effect.

Diffusers and scrims are another way to modify an existing light source or add another light source with a diffuser (scrim) controlling the intensity and direction of the additional lighting.

Barn doors and cutters are used with studio flash or continuous lighting to control where the light falls on a subject

Flash lighting, either on or off camera provides a handy source of lighting for many subjects, particularly backlit subjects. On camera flash is not a good light source generally as it provides front on lighting with no direction. Off camera flash or flash as a fill source is much more satisfactory.

Using flash on camera and bouncing off a wall or ceiling provides an excellent additional light source for indoors photography. The power output of the flash will need to be adjusted for the additional distance to the subject matter and the reflectiveness of the wall or ceiling. Avoid coloured walls as they can introduce a colour cast to your image.

TECHNIQUES

Backlighting – the light source is behind your subject matter. To get correct exposure you will need to meter off your subject matter (spot mode) to avoid underexposure of the subject matter. Care should also be taken to avoid flare from a light source pointing directly into your lens. Backlighting can give dramatic and interesting lighting to everyday subject matter. Sometimes it may be necessary to add some fill light to avoid under exposure of the subject or over exposure of the background.

Side lighting is a more typical approach, where the shape of the subject matter is revealed by the light raking across the surface. Intense side lighting can be modified with reflectors to reduce contrast, if needed.

Front lighting is generally the least successful option, however for some types of subject matter, such as architecture, it might be the preferred option. Front lighting normally results in a lack of definition in your subject matter and a quite flat result with little or no modelling. It also depends on the time of day, front lighting at or near sunset will provide almost no modelling, but closer to midday you will have some definition with the sun higher in the sky.

A combination of side and front lighting can be obtained by placing the main light at 45 degrees to the shooting line. Some fill light may also be required in this instance.

Fill lighting can be used with any direction of light other than front lighting to modify the shape and direction of the light. Reflectors, flash or torchlight can be effective sources of fill light.

Top/Bottom Lighting - placing the main light directly over the subject or beneath the subject can end with some dramatic results. These lighting angles can be most striking, particularly with portraiture.

When using artificial lighting in a studio situation, you can use a single light source (continuous or flash) combined with a reflector to balance shadows, or two light sources, if available. Generally a lighting ratio of 2:1 works well, with the secondary light/reflector providing half the illumination of the main light. If using two light sources of equal power, to obtain a lighting ratio of 2:1 the second light source needs to be 1.4 times the distance that the main source is from your subject matter. This is because light falls off in intensity in accordance with the inverse square law – double the distance and the intensity drops to $\frac{1}{4}$ of the original. This law also applies to the range that flash guns can reach from the source – the intensity drops off rapidly, so you need to manage the distance from your subject matter.

Controlling the Light

Flash is an underutilised accessory by most photographers as most people only try using flash as the only light source, mounted on the camera. This usually gives flat and uninteresting results due to the lack of modelling, but the best use of flash is either on camera as a fill in light source, or off camera where some direction and modelling can be obtained. Modern dedicated flash units are controlled by the camera and using “TTL” (Through The Lens) control of the flash can give very good results. To use a flash off camera you will need a trigger of some sort, or a small flash on camera that triggers the main flash unit.

Flash can also be very effective if bounced off a wall or ceiling but be aware of any colour cast that may be introduced from a coloured wall or ceiling. Bounce flash uses the wall or ceiling to act as a giant diffuser, softening the harsh light of the flash for more pleasing results.

Modern flash units can be controlled by the camera settings, where compensation of the flash exposure can be made. Sophisticated flash units also have controls on the unit for further options, including zooming the flash head to provide coverage for a range of focal length lenses.

One important thing to consider when using flash as a fill in light on your camera is that the controlling factor for the flash exposure is the aperture being used. The flash duration is between $\frac{1}{10,000}$ to $\frac{1}{1,000}$ of a second, depending on the subject and distance and is controlled by the camera’s metering. As this exposure time is a lot shorter than a typical exposure (between $\frac{1}{60}$ to $\frac{1}{200}$ of a second when using flash), the actual exposure time has no effect on the flash exposure and is only effective in recording the “background” exposure – the elements in the image that are not illuminated by the flash. Therefore, the background exposure can be adjusted (compensated) by changing the shutter speed and not the aperture.

Using “slow synchronization” for the flash will allow the use of longer shutter speeds, all the way down to the maximum duration (30 seconds or longer). This enables the use of motion effects where the background (and subject) will show movement with a part of the image frozen. You also have the option of using front curtain synch (when the flash fires immediately the shutter is opened) or rear curtain synch (where the flash fires just before the second curtain of the shutter closes).

Experimenting with these options with long exposures can lead to some very creative outcomes.

When using reflectors such as purpose made items, cardboard, polystyrene or walls and ceilings, it is important to remember that the amount of light reflected will be much lower than with a second light or flash, therefore the placement and positioning of the reflector will be critical. The best way to evaluate the effectiveness of these materials is to take some test exposures and adjust the lighting and reflectors accordingly.

When using flash on or off camera, as long as the exposure is being controlled "TTL" the camera will control the duration of the flash (flash units always fire at full power, only the duration changes) and in most cases give good control of the exposure. In these situations, using the matrix or segment metering in the camera is the best option, but in unusual situations, such as having your subject matter against a very dark background, spot or centre weighted metering should give better results.

Metering for a variety of subject matter, whether using flash and/or supplementary lighting or not, the best option is nearly always to use the matrix or segment metering option. Where there are dramatic differences in illumination in parts of the image, some compensation or alternative metering methods may be necessary.

Difficult lighting conditions might be better served by using an incident light meter, however as very few photographers carry one, a better method is to adjust the camera metering type and/or applying exposure compensation after making a test exposure.

When recording RAW data, white balance or colour temperature is not fixed, so it can be set and adjusted in the RAW processing stage. The question remains however, what setting to use when capturing images? Auto white balance used to be very hit and miss, but with improvements in technology over several years, the auto setting has become much more reliable. There are people who will argue you should always shoot with one setting, like "Daylight" as you have a known starting point, but this just means that more often than not your recorded white balance is going to be a long way off. Using auto white balance will mostly be somewhere near what suits an image, so is recommended as the best all round solution.

There are of course, many situations when the auto white balance will be way off, such as the example used of the temperate rain forest image from Tasmania. Here the prevalence of vibrant green mosses will skew the auto white balance towards magenta, but it is easily adjusted in the RAW processor, remembering that the "correct" white balance is what looks right to you, not necessarily a technically "correct" rendering.

Lighting Ratios

Monochrome images, processed from an RGB raw file generally would be rendered in higher contrast than a full colour image, or in other words, having a higher lighting ratio than would be used for colour. The limiting factor in recording data will be the ability of the sensor to record values of tone, or dynamic range. Modern sensors are able to record up to 11 or more stops of exposure in a RAW file as the base ISO, with the dynamic range dropping off as the ISO settings increase. In most situations this dynamic range is more than adequate for recording a scene, the exception being a bright sunny day with strong highlights and deep shadows which could have a range of up to 15 stops difference in exposure. For portraiture shooting using artificial light, or a combination of natural light and supplementary lights and/or modifiers, a lighting ration of 2:1 is more common. A gritty portrait of a weather worn male face might accept a higher ratio.

Colour images also are processed from the RAW data, but as colour is a major factor in the composition, a lower lighting ratio would generally be used. The effect of simultaneous contrast – the apparent effect of increased contrast arising from adjacent areas of contrasting colour should also be considered.

For examples of images that illustrate this presentation ,please refer to the PDF document of the PowerPoint presentation.

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