

Small Subjects, Big Lessons: The Myth of Proper Exposure

Proper Exposure Does Not Necessarily Make a Proper Photograph

By David Hayden

I was looking through a collection of winter photographs recently when I found myself stopping on one image longer than the others. The composition was reasonable. The exposure appeared fine. The image was sharp. If I had shown it to someone else, they likely would have moved on without a second thought.

And that is a problem, we don't want people moving past our pictures without a second thought. The goal is to hold attention.

The snow looked gray. Not dramatically gray. It still looked like snow. It simply didn't feel anything like standing there had felt. And that memory brought back another photograph from years earlier. A wedding portrait where I remember spending an unusual amount of time worrying about the bride's dress and the groom's tuxedo.

Not the people. The clothes. The dress was bright white. The tuxedo was nearly black. Both occupied a significant portion of the frame. Every exposure adjustment seemed to improve one while creating a new problem with the other.

Back then, I had not even thought of those problem as being cut from the same cloth. Both photographs forced me to address something I had not fully appreciated when I first learned photography.

Cameras and photographers are not trying to solve the same problem.

That statement may sound odd, after all, cameras are specifically designed to make photographs. In fact, the longer I photograph, the more I find myself appreciating the difference. A camera measures light. That is its job. An extraordinarily sophisticated camera measures light extraordinarily well.

The thing is that photographs are not made from light alone. They are made from decisions. Cameras and photographers both make decisions but often have different goals. For example, a photographer knows:

Snow is supposed to be bright.

A black tuxedo is supposed to be dark.

A sunset is often supposed to contain shadows.

Sometimes the photograph depends on preserving exactly the thing the camera is trying to normalize. The camera is not wrong, it simply has a different responsibility than the photographer. It is just making exposure decisions based on what it has been programmed to identify as middle grey

I suspect most photographers encounter this realization long before they can explain it. Maybe it happens while photographing snow for the first time, photographing the moon, or snapping wedding photos for the first time.

The specifics may vary but the recognition remains surprisingly consistent. The photographs simply do not live up to expectations.

I think exposure is one of the most misunderstood aspects of photography. For example, think about pictures of white sand or snowy days in bright sunlight. Our human experience is that snow is bright white. The camera sees it as too bright and makes adjustments to bring it down to a light grey so there is more detail in the highlights.

Ultimately it is up to the photographer to determine the exposure settings that bring the photograph into alignment with their vision. But exposure is highly nuanced and the product of the interdependent settings. These settings are the basis for what is taught as the Exposure Triangle:

- Aperture.
- Shutter speed.
- ISO.

Together they determine exposure.

That explanation is accurate as far as it goes. But the problem is that many photographers get the impression that exposure is primarily a technical exercise. The reality is, the choices you make to get the desired exposure, greatly influence composition. And, just as importantly, exposure decisions bring with them compromises and artistic opportunities.

Let's explore them one by one starting with aperture.

Aperture

All cameras from the earliest camera obscuras to the most expensive professional digital camera today at their simplest level are black boxes with a hole / lens for focusing an image. That image may be focused on walls, tracing paper, ground glass, chemically treated plates, film, or digital sensors but regardless, the principle and result are the same.

In our world, the world of photography, the hole that focuses the image is known as the aperture. Camera apertures are measured in F-stops.

One of the most important concepts about F stops you should know is that F-stops ARE NOT a measure of absolute size of the focusing hole. F-stop is actually a descriptive term for the ratio of the size of the hole to the focal length of the lens in use.

Ratio as we know from grade school math is a term synonymous with fraction. We use fractions every day. $\frac{1}{4}$ tank of gas, $\frac{1}{2}$ cup of sugar and so on. As the denominator (bottom number) of the fraction gets larger the thing being measured gets smaller.

A practical example might be, would you rather have $\frac{1}{2}$ ton of gold or $\frac{1}{8}$ ton of gold.

An f-stop is written as a fraction: $f/2$, $f/8$, $f/16$. The 'f' stands for the focal length of your lens. So, if you have a 100mm lens set to $f/2$, the aperture opening is 50mm wide ($100 \div 2 = 50$). Because it is a fraction, as the bottom number gets larger, the physical hole gets smaller." When we need to let more light into the camera for proper exposure, we use F-stops with smaller denominators like $F/1.4$, $F/2.8$, $F/3.5$, etc. And

when we need to cut light to prevent over exposure, we use F-Stops with larger denominators, F/11, F/16, F/22 and so on.

Who cares, if the image is properly exposed, life is good, right? Not necessarily!

A concept photographers are acutely aware of is depth of field. Depth of field is a description of the perceived depth of focus in an image. Controlling depth of field is very important for isolating a photographer's subject, drawing the viewer's attention to the subject, and making more aesthetically pleasing images. There are four factors that all work together to determine depth of field. They are:

1) The focal length of the lens.

Long lenses have shallower depth of field at any given distance and aperture than their wide-angle counter parts. Very wide-angle lenses have extreme depths of field even at wider apertures and close distances.

2) The distance from the subject to the camera.

The closer any subject is to the camera, the narrower the depth of field. When the subject is at the minimum focusing distance for the lens, the depth of field will be as narrow as possible for any chosen aperture. This really becomes apparent with close up photos. A medium length lens, with a large aperture at a close distance can create a portrait where one eye is in focus, but the nose and ears are not.

On the flip side, when the subject is very far away from the camera depth of field is insignificant. Take for example a picture of the moon, any aperture will be appropriate so long as it renders a sharp image and allows for proper exposure.

3) The aperture of the lens.

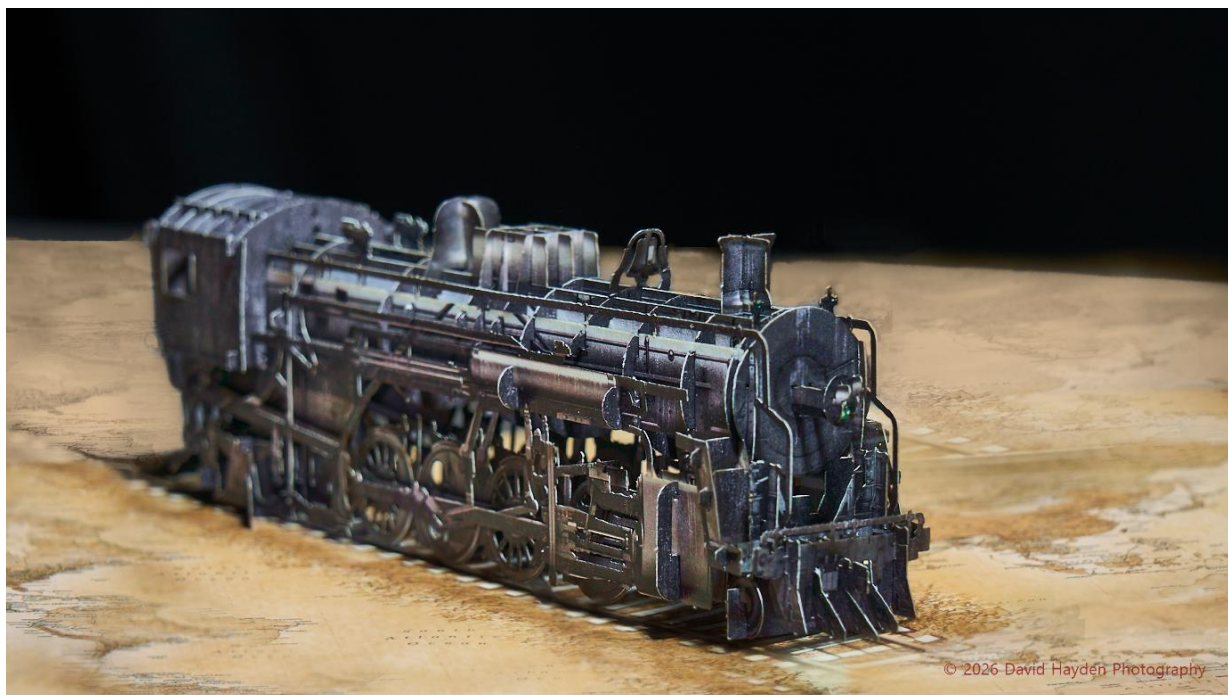
When the aperture is wide open (smaller F numbers) depth of field can be very shallow depending on the length of the lens and the distance from the subject. Your use of aperture to control depth of field can have a profound effect on the aesthetic quality of your pictures. By using shallow depth of field you can isolate your subjects and reduce distractions.

You can also use a very large depth of field to enhance landscape photos where the image appears very sharp front to back corner to corner. It also helps to create layers that give a sense of dimension. The foreground is a layer leading to a stand of trees that are a layer between the foreground and the mountains in the distance.

4) The size of the image relative to the viewing distance.

Small images up close appear to have a larger depth of field than the same image blown up to a much larger size. But view a giant image on a billboard from 30 yards away and it can appear to have a greater depth of field despite its size.

A tabletop can be a great laboratory for studying the effects of aperture on depth of field. Since most tabletop photography is done in near proximity of the subject, the depth of field effects are immediately apparent.



100MM, F10, camera 15" from front of subject. The depth of field is only a few inches.

Tabletop Exercise: What Do I Intend?

For this exercise gather three small objects. They do not need to be photographic subjects. A coffee mug, a saltshaker, and a book work nicely. The important thing is that they can be placed at different distances from the camera.

Arrange the objects so one is close to the camera, one is in the middle distance, and one is farther away. Place your camera on a tripod if you have one. If not, simply keep your shooting position as consistent as possible.

Focus on the middle object and take three photographs.

For the first photograph use the widest aperture available on your lens.

For the second photograph use an aperture somewhere near the middle of its range.

For the third photograph use a relatively small aperture such as F/11 or F/16.

Keep the focus point on the middle object for all three photographs.

Adjust shutter speed or ISO as necessary to maintain proper exposure.

When you compare the images, resist the temptation to immediately decide which one is best. Instead ask a different question.

What changed?

The middle object remained the same. The focus point never moved. Yet the relationship between the objects changed dramatically. In one image the middle object may seem isolated and important. In another it may appear connected to everything around it. Neither result is inherently better.

What you are really seeing is attention being directed. Aperture does not merely control exposure. It influences what the viewer notices first.

This is one reason landscape photographers often choose smaller apertures while portrait photographers frequently choose larger ones. They may be standing in identical light yet trying to create entirely different photographs.

The camera records the scene; you decide what deserves attention.

To push your experience a little farther, repeat the lesson but this time zoom the camera out to its maximum zoom and at its minimum focusing distance. Notice how shallow the depth of field is at the maximum aperture (F2.8, F3.0, F4.0, F5.6) and how much more of the scene comes into focus as you tighten the aperture to F11/F16 or higher if you have it.

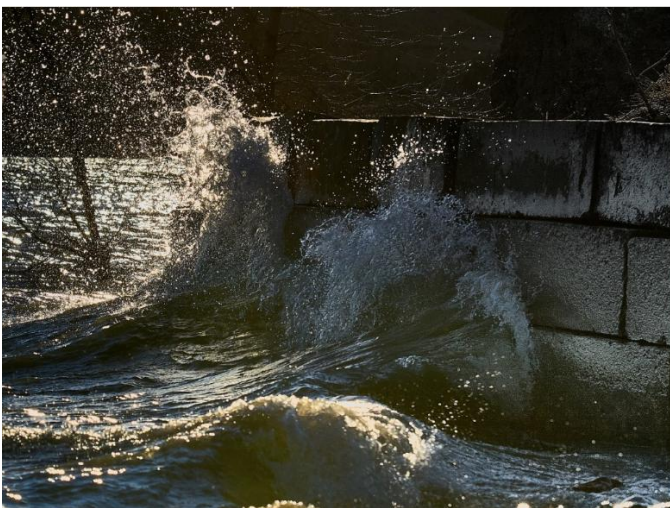
Shutter Speed

The way I think about our next leg of the triangle, shutter speed, is rarely about exposure. I like to think in terms of how much time do I want to capture.

When photographers first learn about shutter speed, it is often presented as simple exposure control. If there is not enough light, leave the shutter open longer. If there is too much light, shorten the exposure time. This seems like an obvious choice, the trouble is that it prioritizes exposure over creativity.

The moment something in the scene begins to move, shutter speed becomes much more than an exposure setting. It becomes a creative decision. In many situations, it may be more accurate to think of shutter speed as a compositional tool that happens to affect exposure than an exposure tool that happens to affect composition.

Consider a stream flowing over rocks. A fast shutter speed can freeze individual droplets and reveal texture and detail that our eyes may not even notice. A long exposure transforms the same water into smooth ribbons of light and tone. Neither photograph is more correct than the other. Both are properly exposed. Yet they communicate very different things to the viewer.



The same is true of wildlife, sports, street photography, and even landscapes. Clouds moving across the sky can be frozen into distinct shapes or stretched into long streaks that emphasize the passage of time. A cyclist can be frozen in mid-stride or photographed with a panning technique that creates a powerful sense of speed and motion.

The important point is that shutter speed influences how time is represented in the photograph.

Think back to our discussion of aperture. Aperture influences what receives the viewer's attention by controlling depth of field. Shutter speed influences how the viewer experiences time. Fast shutter speeds often create a feeling of precision and immediacy. Slower shutter speeds can suggest motion, energy, calmness, or even the passage of time itself.

This is one reason there are no absolute rules for shutter speed. The proper shutter speed is not necessarily the fastest shutter speed you can achieve. Nor is it the slowest. The proper shutter speed is the one that best supports your intent for the photograph.

As photographers we are often taught to avoid motion blur. Yet motion blur is not a flaw any more than shallow depth of field is a flaw. Both are tools. Like every tool in photography, their value depends entirely on how well they help us communicate what we saw, felt, or imagined when we pressed the shutter.

One of the more interesting things about long exposures is that they allow the camera to record a version of reality we never actually see. Moving water becomes smooth. Clouds become streaks. Busy streets become empty. The photograph stops being a record of an instant and becomes a record of accumulated time.

Tabletop Exercise: Recording Time

For this exercise, place a small object on a table. A coffee mug, toy train, figurine, or other stationary object will work nicely. Position the camera on a tripod and compose your image.

Make three photographs.

The first should use a relatively fast shutter speed.

The second should use a moderate shutter speed.

The third should use a long exposure of several seconds.

For the first photograph, keep everything in the scene stationary.

For the second photograph, slowly move your hand through part of the frame while the shutter is open.

For the longest exposure, move your hand completely through the scene several times during the exposure.

Compare the three images.

The object on the table should remain largely unchanged. The moving hand, however, will appear differently in each image. At faster shutter speeds it may be frozen. At moderate shutter speeds it may appear blurred. During the longest exposure it may become translucent or disappear almost entirely.

The camera is recording the same scene. What changes is how much time it records.

The exercise demonstrates something photographers have used creatively for generations. Long exposures can soften moving water, create star trails, blur crowds, or even make people disappear from a busy street scene. The subject itself may remain unchanged while movement becomes part of the composition.

Shutter speed is not merely controlling exposure, it is determining how time will be represented in the photograph.

ISO: The Great Misunderstanding

ISO is one of my favorite topics and the third leg of our discussion of the Exposure Triangle. It is technical, a little geeky, and admittedly those are things that tend to attract me.

The real reason it is one of my favorite topics, however, is that when ISO is understood it can be used with intention and confidence rather than as a last resort.

I have lost count of the number of times I have heard photographers talk about increasing ISO as though it were some kind of failure. Aperture is where they wanted to be. Shutter speed is where they wanted it. Then, reluctantly, they raised the ISO because they felt they had no other choice.

I understand the feeling. There was a time when high ISO settings carried significant penalties. Noise increased rapidly, image quality suffered, and photographers learned to avoid those settings whenever possible.

Modern cameras have changed that conversation considerably. The tradeoffs still exist, but they are often different than many photographers imagine.

Let's start with the first misunderstanding, and that is that ISO equals sensitivity.

In the film days that was pretty much true. Faster films had larger grains that could absorb more photons, in a sense making the film more sensitive to light. Even then, I think that description was a little simplistic, but it was close enough for most conversations.

Digital cameras work differently.

In a digital camera, ISO is largely a process of amplifying the signal reaching the sensor. Unfortunately, the camera cannot amplify only the information we want. It also amplifies noise that is already present in the image. As the ISO increases, that preexisting noise becomes more visible.

Most photographers first notice this in the shadows.

The reason is fairly simple. Shadow areas contain less information for the camera to work with because fewer photons reach the sensor. As a result, the signal is weaker and noise tends to become more apparent when the image is amplified.

Once I understood that ISO was amplifying preexisting noise rather than magically creating it, I began looking at low-light scenes differently. Instead of asking how high I could push the ISO, I found myself paying more attention to the shadows.

That realization changed the way I approached low-light photography. If shadow detail mattered, I needed to make sure I captured enough information in those shadows before worrying about anything else.

The obvious downside is that bringing the shadows up often means pushing the highlights closer to their limits. If the situation allows, slowing the shutter speed or opening the aperture may solve the problem. But as we have already discussed, those decisions come with compromises of their own. Once shutter speed and aperture are where we want them, our remaining choice is often to increase the ISO and amplify the signal.

This brings us to another concept photographers should understand: dynamic range.

Every camera has what is commonly referred to as a base ISO. The exact value varies from one camera to another, but it is the setting where the sensor generally delivers its greatest dynamic range and highest image quality. For most cameras it is a relatively low ISO setting, often around ISO 100.

Some modern cameras also have what is known as a dual-base ISO, where a second amplification stage can improve performance at specific higher ISO settings. The engineering behind that is interesting but well beyond the scope of the exposure triangle.

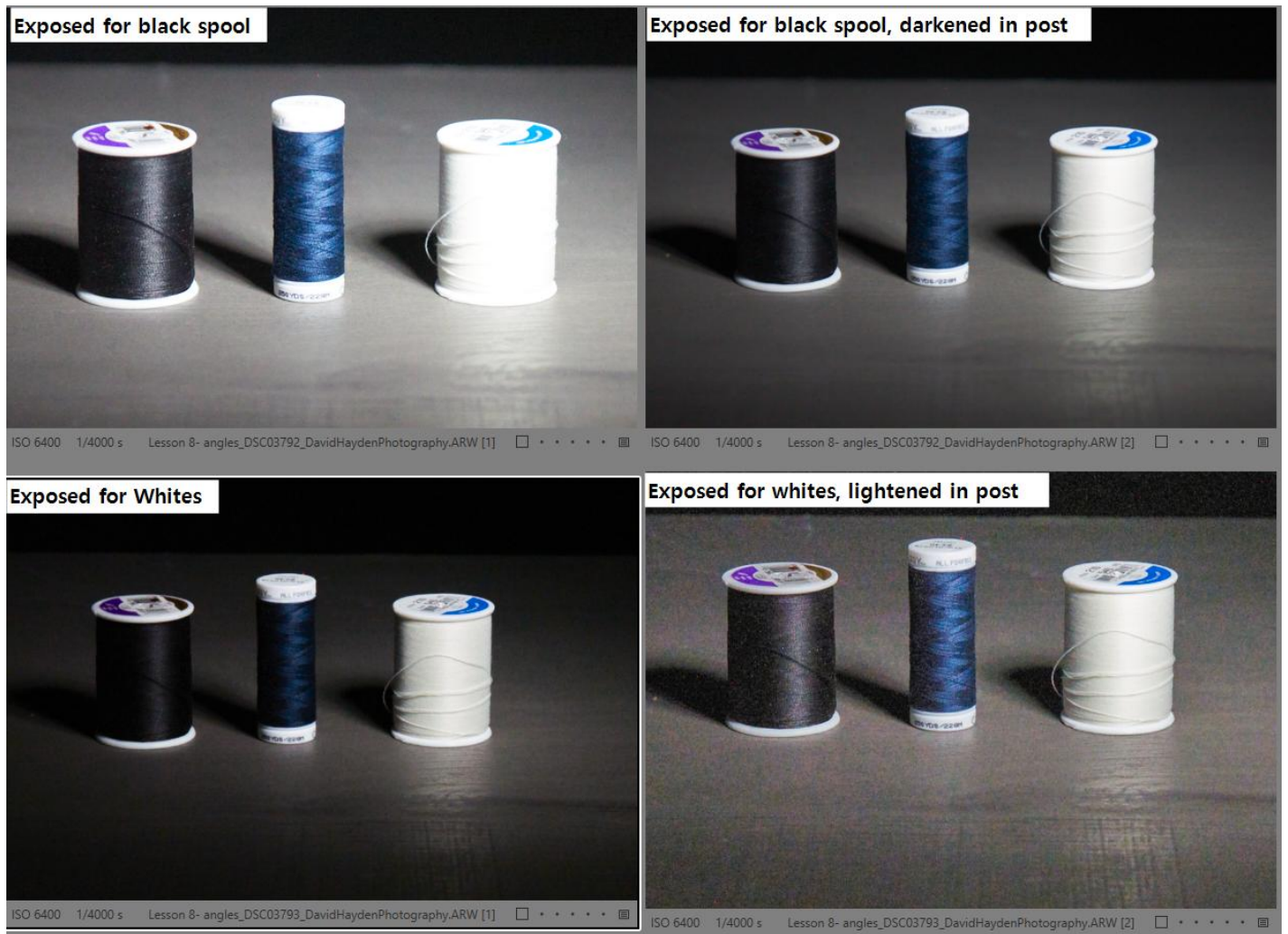
What matters photographically is understanding that image quality, like depth of field and shutter speed, is part of the negotiation.

As we move away from a camera's base ISO, dynamic range generally begins to decrease. Most photographers first notice the increase in visible noise. What I tend to notice is something slightly different.

I notice the highlights become less forgiving. Bright clouds begin to lose subtle texture. Snow becomes a little less nuanced. Stage lighting on a performer's face can lose some of the tonal transitions that give it shape and dimension.

The image may still be perfectly usable. It may even be excellent. There is simply a little less room for interpretation later.

Like aperture and shutter speed, ISO is not about finding a perfect setting. It is about understanding the compromise and deciding whether that compromise supports the photograph you are trying to make.



Notice when exposed for the black spool and lightened there is little detail in the white spool. And the added noise in the black spool when trying to raise the shadows in the image exposed for the white spool.



Tabletop Exercise: The Black Spool and the White Spool

For this exercise, gather one very dark object and one very light object. Black and white coffee mugs work nicely. So do dark and light spools of thread, which were used for the examples in this article.

Place the objects side by side and illuminate them with a single light source from one side. The goal is to create a scene containing bright highlights and deep shadows.

Set your camera to a relatively high ISO setting such as ISO 3200 or ISO 6400.

Make three photographs.

For the first photograph, expose to preserve as much shadow detail as possible.

For the second photograph, expose to preserve as much highlight detail as possible.

For the third photograph, use the highlight-preserving exposure and then attempt to recover the shadow detail during processing.

Compare the results carefully.

Look beyond the overall brightness of the image.

Examine the white object.

Examine the dark object.

Look for changes in texture and tonal transitions.

Look for the appearance of noise in the shadows.

Ask yourself a simple question, if you could only preserve one, which detail matters more to the photograph?

Most textbooks emphasize the “exposure” triangle.

Personally, I think of it as the Composition-Compromise triangle.