

Small Subjects, Big Lessons: Distance Changes Everything

By David Hayden

One of the advantages of photographing small subjects is that they make it difficult to fool yourself. A landscape can hide a lot of assumptions. Portraits can too. There are so many variables at work that it is often difficult to know exactly why a photograph succeeds or fails.

A simple object sitting on a tabletop is less forgiving. Because it doesn't move or pose. It doesn't care what explanation you've invented for what you're seeing. It only reveals current conditions.

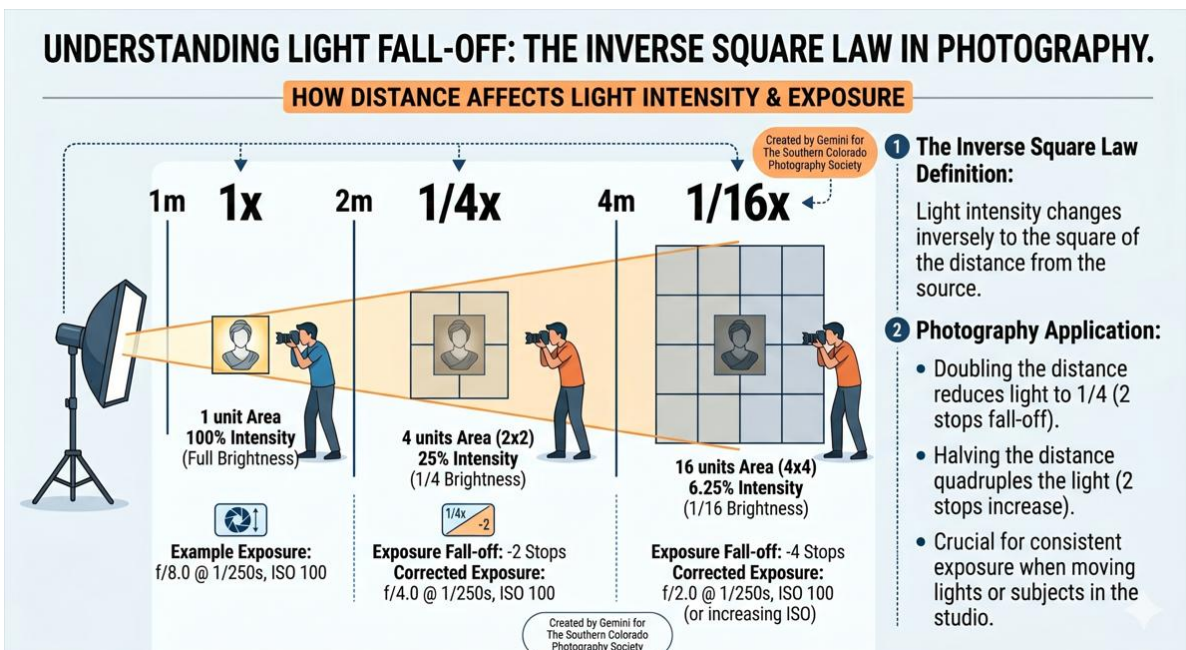
For the past few lessons, we've spent a fair amount of time moving lights around. Sometimes the goal was to change the direction of the light. Sometimes it was to make the source effectively larger or smaller. We watched shadows become softer. We watched reflections change shape. We discovered that a surprisingly large number of photographic problems could be explored with a lamp, a diffuser, and a patient subject.

What we haven't addressed is the importance of distance. The distance between the light source and the subject, not the distance from the camera to the object, that is for a future lesson.

You will often hear photographers talk about light fall-off. But what does that mean exactly?

Light, the very essence of photography, is not a flat, uniform entity. It dances and diminishes, painting your scene with gradients of brightness and shadow. This phenomenon, known as light fall-off, is a powerful tool for photographers to sculpt the mood and story within their frames.

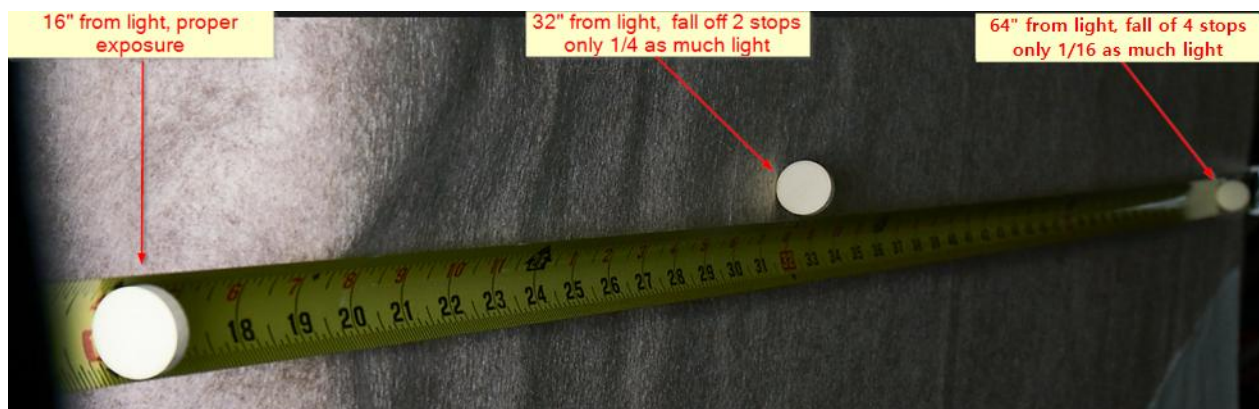
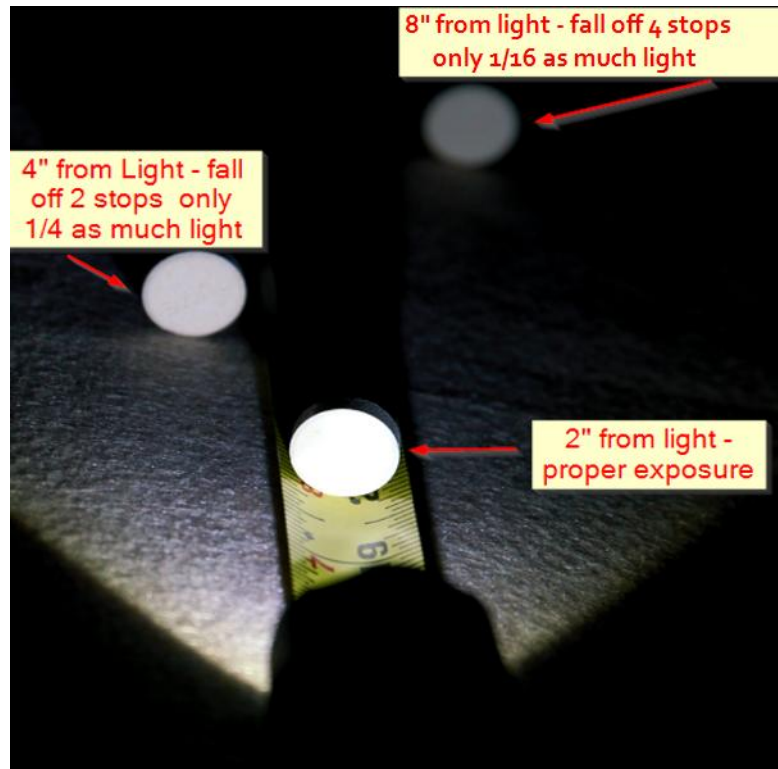
However, as you move the light source towards or away from the subject, the change in the intensity of the light is NOT linear. Meaning, if you double the distance from the subject to the light source, you don't just lose $\frac{1}{2}$ the light. You actually lose $\frac{3}{4}$ of the light.



What matters for light fall-off is how much the distance from the light to your subject and to the background or other objects differs; it is these changes in distance that control the fall-off.

For example in the images below I show two examples. The first example shows the light fall off from 2" to 4" to 8". The second image shows the light fall off from 16" to 32" to 64". What you'll see is that the light fall-off pattern is identical. Every doubling of distance reduces the available light by an additional two stops.

NOTE: It's not the distance from the camera to the subject that matters, but the distance from the light source to the subject. There is a simple formula to describe this, which we'll get to in a moment.



Look at the shadows.

Look again at the pictures above. Notice how fast the shadows turn from subtle to black over the course of just 4". When the light is very close the highlights are very bright compared to the shadows and the fall off is immediate.

In the lower image where the light source starts at 16" away, the light fall-off is much more gradual. If you had a subject on the 24" line, it would get a fair amount of light even though it's 8" away.

A practical application of this effect is using the distance between subject and the light source in relation to the distance from the subject to the background. The closer you put your subject to the background, the more the subject will tend to blend into the background. By bringing the subject closer to the light source the brighter it becomes and the more it stands out against the background.

As you can see from the examples above, if the background is twice as far from the light source as the subject it will be 2 stops darker.

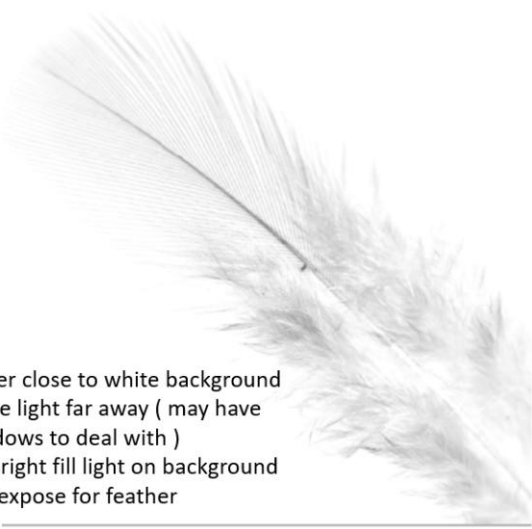
Studio vs Sunlight

This is all very easy to control in a studio. Put your subject a foot from the light source and the background 8 feet from the subject and it will become mostly black.

In sunlight, the source is about 93 million miles away, so you cannot meaningfully separate your subject from the background in terms of relative brightness, assuming a clear sky and no nearby reflective surfaces.

So, you need to do other things like use a fill flash or place the subject where it is getting the most light and the surrounding environment is in shadow. Assuming of course you want the background significantly darker than the subject.

Based on what we just discussed, how would you adjust the lights for these 2 images?

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- Feather close to white background
 - Large light far away (may have shadows to deal with)
 - Or bright fill light on background but expose for feather

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- Feather 4x-5x farther from black background as it is from light
 - Light very close to feather

Inverse Square Law

What I've been trying to explain, without getting too technical, is that application of the inverse square law of light intensity. Some rules and guidelines can easily be broken for artistic expression. The inverse square law, however, is a law of physics and immutable. Your job as a photographer is to apply what you know about it to achieve your artistic intent.

Imagine a light source with an initial intensity of 100 units. If you stand 2 meters away from the source, the intensity you experience is 100 units. If you double the distance to 4 meters, the intensity you experience will be 25 units, calculated as: $100 \div 2^2 = 100 \div 4 = 25$

Understanding this formula can help predict the amount of light your subject receives vs the background or surrounding objects. Applying the formula specifically with a tape measure or even by simple estimation will not only help you get the foreground / background separation you want but also help you do it faster with more precision.

Learn by doing!

All this discussion and math only serve to help you intellectually understand how distance affects exposure and shadows. To really get intuitive you have to play around and practice until you don't even need to think about it. In educational theory this is what might be referred to as becoming unconsciously competent.

Set up an object on a table or a person near a wall and illuminate with a flashlight, studio light, strobe or whatever you have that is consistent and you can control.

- First set the light very close to the subject, set exposure and photograph.
- Second, double the distance light source and the subject, photograph without changing your exposure settings.
- Third, without moving the light, properly expose and take a photograph.
- Fourth, compare the photos. How did the exposure change? How did the shadows change? How did the brightness of the subject in relation to the wall change?
- Fifth, without moving the light, move the subject very close to the light source, set exposure and photograph. Compare this photograph with the others comparing shadows, brightness of subject vs. the background and so on.
- Sixth. Move the light 4 or more times the distance away from the subject but not moving the subject. Set exposure and photograph as before and again compare with previous photos.

Spend an hour or two with this exercise and you will really develop a sense for how the distance from the light to the subject and background can really change the feel of the photograph.

It is easy to think of distance primarily as an exposure adjustment. Move the light closer and things become brighter. Move it farther away and they become darker. That is obvious and easily observed.

That explanation works reasonably well until it doesn't.

Tabletop photography reinforced a lesson I had thought about but not put into practice. At some point I began making photographs that should have looked more similar than they did. I used the same subject. The same light. The same modifier. The same camera position.

Yet the photographs felt different. Not simply brighter or darker.

Different.

The shadows seemed deeper and parts of the subject separated from one another. Areas that had previously felt connected suddenly felt independent. The subject now had a clear primary area of interest, with secondary elements receding into deeper shadow.

I remember assuming the answer must be hiding somewhere else. Perhaps I had changed the diffuser or altered the angle of the light. Maybe I had overlooked some small detail in the setup.

The only thing I was changing, however, was distance from my subject to the light.

The first clue came from a mistake. I had a light positioned unusually close to a tabletop subject. Not because I had carefully planned it that way, I simply did not have enough room to move the light farther back.

The resulting photograph had beautiful soft transitions. The shadows rolled gently from light into dark. Exactly as we had discussed in the previous lesson. Nothing about the image suggested hard light.

Yet the shadows themselves were surprisingly deep. That observation lingered with me because it contradicted something I thought I understood.

Many photographers, me included, have a tendency to associate dark shadows with hard light.

The logic seems reasonable enough. A hard light produces dramatic shadows and dramatic shadows are dark. Therefore, dark shadows must indicate hard light.

Except that isn't always true.

A large soft source positioned close to a subject can create shadows with very gentle transitions while still producing substantial contrast. The edge may be soft while the shadows are still deep.

I learned gradual transitions (soft light) and deep shadows are not mutually exclusive. Once I began paying attention to that distinction, I started seeing it everywhere.

Try to visualize this. You want to water a single flower in your garden. Hold the spray nozzle close and almost all the water hits the flower, with very little spilling behind. As you move the spray head farther away, the same spray covers the flower and more of the area behind it.

Very close light can make one part of a photograph feel important while allowing another to quietly retreat. Move the same light farther away and the scene often becomes more democratic. Objects share the light more equally. The photograph feels calmer and more balanced.

Neither approach is inherently right or wrong; the one you choose should match your creative intent.

What I find most interesting is that photographers often spend enormous energy deciding which modifier to use while overlooking how much influence distance has on the final image.

Absolutely, the modifier certainly matters. Definitely, the direction matters. And clearly, the color matters.

But distance may be one of the most powerful controls available to us because it changes far more than brightness. It can bring tone, contrast and mystery or calmness and clarity with simple, free adjustments.

Using distance, you can choose what is exposed . . . or not.