

Introduction to Depth of Field

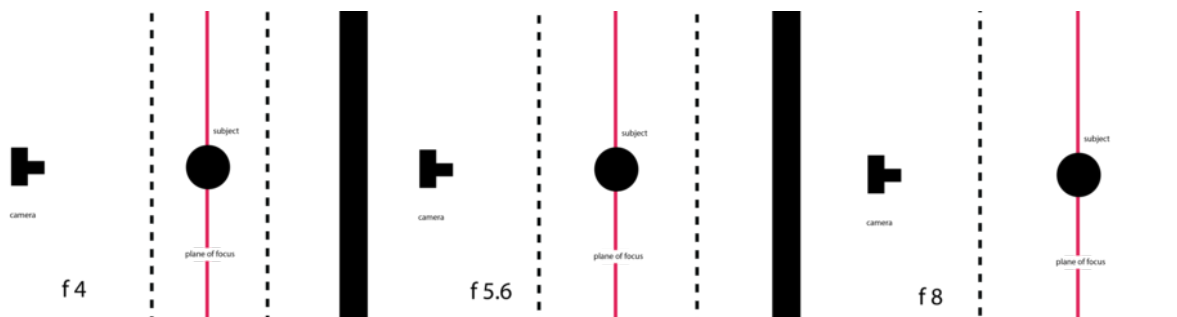
Understanding your fundamentals is, well, fundamental to photography just like it is in anything else. I want to address one of the key elements of aperture which is depth of field. All variables in photography have a give and take, and with your aperture as we gain light we also lose depth of field. But aperture is not the only variable that affects depth of field, and in this article we will take a look at those other variables.

First things first, aperture does affect depth of field and in a normal shooting scenario aperture is your first consideration (if not only for most) when considering your depth of field. But there are times when what you think should be happening doesn't, and also there are times where you may not have the option to shoot at $f/1.4$ and still want a shallow depth of field. Before we look at those other variables that affect depth of field, let's establish what depth of field is.

What Is Depth of Field?

When you focus your camera on a subject, your camera will establish a plane of focus — basically an imaginary plane is set and the things on that plane are “in focus” (more specifically they are at the point of critical focus). I put that in quotes because around the plane of focus (in front and behind) there is still an area of acceptable focus. How long this area of acceptable focus is (or how deep, meaning area from front to back) is your Depth of Focus or Depth of Field.

As you increase your aperture number (close down to a smaller opening, or a larger number), say go from $f/2.8$ to $f/4$ or from $f/4$ to $f/5.6$, the invisible area in front and behind the plane of focus will get larger. Every time you move up in your aperture setting that area of focus in front and behind the PoF (Plane of Focus) get deeper as to include more in that area. So you focus on a person you are setting your critical focus area on them and as you move your aperture setting to larger numbers, you then start to increase how much in front and behind them will also be in focus, you are increasing the depth of what is in focus or in other words the Depth of Field.



The above graphic is meant to be a simple visual representation of depth of field and how it increases along with your aperture setting and not an exact mathematical representation.

Side note: when focusing on subjects relatively close to the camera the plane of focus tends to be about 50% percent in front of the subject and 50% behind. As subject get further away from the camera, the plane of focus will shift so that is it closer to about 1/3rd in front of the subject and 2/3rds behind the subject.

What Else Affects Depth of Field?

The main element, other than the aperture setting, that affect depth of field is distance. More specifically, the distance from the camera to the subject. As you move closer to your subject, the area of the image that is in focus gets smaller. Most students begin with kit lenses that have variable apertures which makes choosing f/2.8 or wider impossible and makes the "widest" aperture to be somewhere between f/3.5 to f/5.6 with most students shooting at f/5.6.

We will do a project that requires them to create shallow depth of field. Students are still able to successfully create shallow depth of field images mainly by using the principle that getting close to your subject will create that shallow depth of field look that everyone loves.

The set of four images in this articles header illustrate how the same aperture setting (all of them at f/2.8) can create a different depth of field. The closer the camera is to the subject, the less is in focus behind the subject. As we pull back you start to see that more and more of the playground rings are in focus.



These images above were both shot at f/5.6. The can is about two feet in front of the camera, so by keeping the subject relatively close to the camera and by keeping the background elements further away, we can achieve the shallow depth of field look even at mid-range aperture settings, like f/5.6.

There really isn't one set formula, just because you are at f/4 doesn't mean your area of focus will be a certain depth and just because you are one foot away from your subject also doesn't mean your area of focus will be a certain depth. Your aperture setting in conjunction with your

distance from the camera to the subject affects how much of your image is in focus — it affects how deep from front to back the plane of focus is. Also the area of in focus and the area of out of focus are two different elements, in my opinion. Distance from camera to subject affects the area of in focus, but distance of foreground and background elements affects the areas out of focus. Really the test images with the Check soda can are more about the out of focus elements rather than the in-focus elements. This separation of what determines the plane of focus and what determines the qualities of the out-of-focus areas leads me to my next point.

Let's Have A Debate

One of the most unsettled facts in photography is if focal length affects depth of field. Different textbooks give completely contradictory information that are presented as clear fact. Different blogs and books will tell you different things. So, what do you think? Does focal length affect depth of field?



My answer in short: No! But, it's really not that simple. The possible reason for why you may find different answers to this question is that when you test the theory, the in-focus objects look the same, but the out-of-focus areas of the image look different. Keep in mind that when you zoom in, the out-of-focus elements that are nearer to the lens may be eliminated from the frame, but also I think at times the out-of-focus areas with longer focal lengths appear a bit softer as well — this may be where many will disagree. Do your own tests and post the results!