

Topic – 4 - Optics – Focal Length & Perspective

Learning Outcomes

In this lesson, we will go beyond what we studied when we looked at zoom and prime lenses, to understand what focal length means and how perspective can impact your work. By the end of this lesson, you will have a much better understanding of what each of these concepts are, in relation to digital photography.

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Focal Length and Perspective

Focal length can be easily confused for perspective. However, this isn't necessarily true. When we talk about perspective, we might say that this is how things appear to us in a photograph. Just to give you a simple example, let us look at this photograph of the young boy. Here, the painted wall in the background looks as though it is very close to him. This is a matter of perspective.

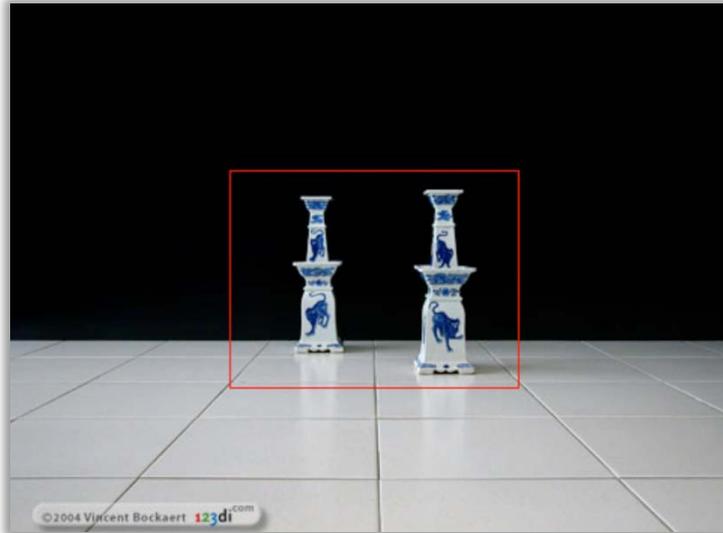


In earlier topics, we looked at the correlation between lens sizes and lens types, such as telephoto and wide-angle lenses. When we think about the link between focal length and size, you can imagine that longer focal lengths are actually going to result in lenses that are much bigger because there must be this physical distance between the lens, that performs the focusing, and the sensor itself.

When we are talking about lenses, we need to mention perspective. We must highlight the difference between moving closer to a subject and taking a photograph, and staying in the same position, zooming in, so that you are at the same focal length, and taking the same photograph. How are the pictures different? Let's take this first image, which is basically a salt and pepper shaker, sitting at the end of a table, with a black backdrop.



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Let's say that we want to zoom into this red frame around the image, which is approximately twice the focal length, and we take another photograph. The camera remains in the same position, but the picture is taken at 80mm instead of 33mm and we get this image instead.



Picture taken at 80mm focal length



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This next image, assumes that we took the same picture, but we cropped into where that red frame encloses the salt and pepper shakers, and we enlarged the picture using software such as Photoshop.



Image enlarged using software

Is there a difference between these two pictures? Essentially, it is the same, apart from some small variations in the pixels. That is what a zoom lens does, and because it does it optically, rather than digitally, it does it at a higher quality.



Picture taken at 80mm focal length



Image enlarged using software



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Let's now say that we keep the 33mm lens and we move the camera closer, keeping the shakers in the same positions. The only thing we change is the distance between the camera and the objects. The result is this image here.



Moving the camera closer

This is, in fact, the change in perspective. It's not the fact that we changed the focal length, it's the fact that we've changed the distance to these objects.



Zoom in on the objects



Physically move closer to the objects



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What can you notice about this? The obvious thing to note is the apparent distance between the two shakers. There isn't very much distance between the two shakers in this photograph. On the other hand, as soon as you change distance, it suddenly looks different in terms of perspective. Every photograph has perspective so the photographer must use his or her understanding of it to make images more attractive to the viewer.



We've looked at how perspective, in a photographic context, refers to the dimension of objects and the spatial relationship between them. It also relates to the position of the human eye in relation to the objects in an image. Perspective can also impact the appearance of straight lines in a photograph.



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Any lines in an image will appear to converge the farther away from the viewer's eye they are, or as they approach the horizon in the distance. As you might expect, eye level also determines what a viewer is able to see in a given scene. If you crouch down, you will have a different perspective of a scene than you would if you were standing up straight.



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Lines would appear to converge, or not, and objects would seem smaller or larger depending on their relationship to the rest of the scene. Remember, perspective is determined not by focal length, but by the relative distance between objects.



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Working With Perspective

You often hear photographers talking about 'correcting' perspective but it is not always a negative thing in photography. In fact, photographers use perspective every day to add to the aesthetics of a photograph to try to make it more engaging for the viewer. Having a good control of perspective, is a key factor when talking about the great photographers.



Their work stands out from the others, because they have practiced using perspective time after time, and, crucially, they understand how the relationship of objects can impact the viewer and the sense of atmosphere in a given scene.

Lenses Can Control Perspective

Wide-angles lenses are said to exaggerate perspective while telephoto lenses are believed to compresses it. This isn't entirely true.

- A wide-angle lens simply creates the illusion of exaggerated perspective. This occurs due to the fact that there is a greater distance between objects in a wide-angle photograph and the closest object to the camera will always appear bigger.



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- On the other hand, with a telephoto lens, the distance between objects is reduced and this results in the difference in the size of the objects to decrease.



These differences are very useful from a photographer's point of view and he/she can use these to their advantage. For example, a landscape photograph becomes much more interesting when photographed with an object in the foreground.



While this object will look larger in a wide-angle lens, it also adds depth and scale to the image and allows the viewer to get a real sense of space within the landscape. With a telephoto lens, the photographer can intrigue the viewer by making two objects that are known to be different sizes appear closer to the same size.



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For example, by standing a decent distance away from a two-story building and placing a person in the correct position between the camera and the building, the photographer can give the illusion that the person is as tall as the building.



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Perspective from a Different Angle

Another way that photographers can use perspective to their advantage is by giving viewers a different view of an object they are familiar with. By photographing from a lower or higher angle, you can give the viewer a new perspective that is unlike their normal eye-level view. These different angles will automatically change the relationship between the scene's subjects and add more interest to the photograph. This is what photographers describe as transforming the ordinary, into the extraordinary. For example, one could shoot a coffee cup as if you were sitting at the table and it will look like a relatively nice image.



However, by looking at the same coffee cup from a lower angle, perhaps equal with the table itself, the relationship between the cup and the table have an entirely new appearance. The table now leads you to the cup, making it look larger and more impressive.



This is unusual for us to see the scene in this way and that adds to the allure of the image. Film directors often utilise this approach when framing subjects in a certain way to give a specific feeling or attitude towards their characters.



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Correcting Perspective

We've mentioned that it can be nice to experiment and play around with perspective. With that being said, there are times when you need to correct perspective. This becomes a factor when you need to capture a subject as accurately as possible without distortion or illusion.



This comes back to that fundamental idea that we usually try to capture a scene as we initially saw it. Perspective can cause particular problems for photographers when shooting buildings, as these will appear to shrink to a point at their top. To battle this issue, photographers use special "tilt and shift" lenses, which include a flexible bellows that allows the lens to be tilted gradually to correct for the effects of perspective.

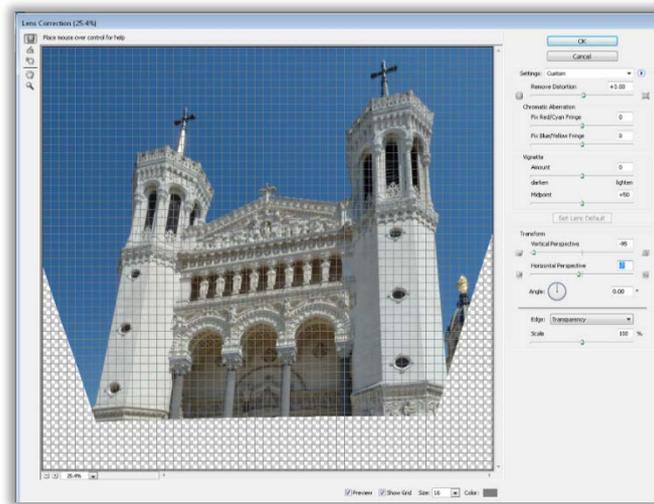


As the lens is tilted parallel to the building, the lines will move apart from one another and the dimension of the building will appear more correct. When not looking



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through the camera, our eyes will still see converging lines, but the camera will not. This lens type is very useful among architectural photographers as their craft depends upon the delicate balancing of these lines and symmetry between buildings or structures. Adobe Photoshop, which we've already looked at, also has the capability to correct some of these perspective issues that we come across.



However, it's better to get it right, when at the shooting location, and it will leave less work and stress on you during post-processing.



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What have we learned in this lesson? A Summary

We have learned about the important role of focal length and perspective in digital photography, and how it relates to optics. This will give you the freedom to creatively explore alternative ways to shoot your photographs, now that you are aware of what is happening when we adjust perspective and the effect it can have on a particular scene.

