



## All About Aperture

by Barry Baker

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### Aperture Selection and Creative Control

There is a pleasing and more creative alternative to taking your photographs in the automatic or program mode, and that is to use the Aperture Priority mode. This mode is basically a semi-automatic mode that allows you to manually select the aperture while the camera still automatically selects the shutter speed for you. The aperture priority mode is marked as either AV, AP or A on your camera.

### What is Aperture and what does it do?

The aperture is the opening in the lens through which light passes to reach the imaging sensor. This opening is of variable size and can be reduced to allow less light to enter or enlarged allow for more light. The size of the Aperture also controls the "depth of field" of a photograph. Simply put, the depth of field is the precise area where focus begins and ends. Apertures are referred to as f/stops and are actually written as fractions. For example, "f/4" means the focal length divided by opening. A 50mm lens with a front lens opening of 25mm in diameter would have a maximum aperture of f/2 ( $50\text{mm}/25\text{mm}=2$ ). If the aperture setting on the lens was stopped down to f/4, it would mean that only a 12.5mm diameter area of the front lens would be used. Typically, the aperture values on a camera are expressed in a type of short hand where the "f/" is deleted. So f/2.8 would actually be designated as "2.8".

The typical aperture scale is listed below, but there are many apertures in between. I am leaving off the "f/" part so you may see them as they will be marked on your camera.

The list is as follows: 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, 22, 32

In terms of exposure, what happens is 1.4 allows twice as much light as 2, and 2 allows twice as much light as 2.8, and so forth. Each aperture to the right lets in half as much light as the one on the left and each aperture to the left lets in twice as much light as the one to the right. Changing f/stops is also commonly referred to as opening up a stop or closing down a stop. For example, changing from 5.6 to 4 would be known as opening up one stop. Likewise, changing from 5.6 to 2 would be known as opening up 3 stops. Going from 8 to 11 would be referred to as stopping down 1 stop. The following list is what I refer to as the half stop list: 1.7, 2.4, 3.5, 4.5, 6.7, 9.5, 13, 19, 27

The half stop list would be displayed in your camera in between the whole stop list like this example: 1.4, 1.7, 2, 2.4, 2.8, 3.5, 4, 4.5, and so forth. Going from 3.5 to 2.8 would be opening up a half a stop and increasing the light by 50%. Within the same context, going from 3.5 to 4 would be stopping down a half stop and decreasing the light by 50%.

### Taking Creative Control

By now you realize that there are lots of apertures to choose from! Why would you select a particular one? The answer brings us back to the depth of field which will determine how deep or shallow you want your focus area to be. Your decision will also affect how deep you want the photo to be and how much of the background you want to clearly see. The aperture that you select will control all of these variables.

Larger apertures such as f/1.4 through f/5.6 result in a more shallow depth of field than smaller apertures like f/16 or f/32, which produce much deeper focus. If you want to leave the background out of focus you should start by selecting a larger aperture. In the aperture priority mode the camera will then select the aperture. However, in the manual mode you would need to use the camera's light meter to arrive at the proper shutter speed.

**Example 1:** An aperture of f/16 was used and consequently the background completely out of focus.



**F/16**

**Example 2:** An aperture of f/2.8 was used which allowed the background to be in much sharper focus.



**F/2.8**

**Example 3:** In this set of three photographs, the first picture is photographed at f/2.8, the second is photographed at f/8, and the third is photographed at f/32. Take notice how simply changing the aperture has pushed the focus deeper.



**F/2.8**



**F/8**



**F/32**

The method I use to teach this process in my classes at UTA is to instruct the students to first select an aperture and then ask yourself if you want the background to have detail or be blurred. At times you may also need to create an area of medium focus depth, as when you photograph a group of people. You can accomplish this by starting around 5.6, and then continue to try smaller apertures until you've extended the focus to just the correct depth. One of the many advantages of digital cameras is free trial and error with no wasted film!

### **Controlling Motion With Aperture**

In the above paragraph we learned how to select aperture based on the type of composition you desire. Now let's explore how to select the aperture based on motion of the subject.

When the subject of a picture is in motion, there are two possible results for your photograph. One, you can stop or freeze the action, and Two; you can allow a blur or flow of motion in the photo.

First, to stop the action you'll need to use a larger aperture such as f/2.8 through f/5.6. By selecting a larger aperture you will force the camera to choose a faster shutter speed which allows for a much better chance of successfully stopping the action. Second, to allow the subject to blur simply select a smaller aperture such as f/32 and this will force the camera to choose a slower shutter speed. You could also change your camera's ISO setting to get a faster or slower shutter speed.

For example: If you have selected the largest aperture that your lens allows, say f/5.6, and you're still not getting enough shutter speed to freeze the action you must try the following approach: Increase your ISO setting. By doubling your ISO from 100 to 200 you will also double your shutter speed with the same aperture that you've set. Then, if you doubled it a second time you would double your shutter speed again as well. To freeze the image of an average person running in a photograph would require a shutter speed of 1/250th of a second. So just keep increasing your ISO until your shutter speed is fast enough for the job.

**Example 1:** I increased the ISO to 1600 and used an aperture of f/5.6 to get the fastest shutter speed possible. The goal was to freeze the water into droplets.



**ISO 1600**

**Example 2:** I decreased the ISO to 100 and selected an aperture of f/32 to get the slowest shutter speed as possible. The goal was to allow the water to flow or blur as much as possible.

Note: You can use the hand held method for Example 1, but for Example 2 you must use a tripod!





**ISO 100**