

# **APERTURE PRIORITY VERSUS SHUTTER PRIORITY**

Quick Guide Written by Robin Nichols



Sometimes it's impossible to know what camera settings to use because you are experiencing something totally new. The mounted archer in the cover shot was riding past at about 65kph while stringing his bow before shooting at three targets. The first few shots that I took were hopelessly blurred, but then I decided to emphasize that speed by deliberately slowing the exposure rather than trying to 'freeze' the action (Canon EOS 5D MkIII, f10, 1/25s, ISO 400, Av mode).

In photography there seems to be a distinct rivalry between those that use **Aperture Priority** mode and those that prefer to use **Shutter Priority** mode.

To promote journalistic integrity, I must admit to being a fan of the former, and while I never discourage photography students to try all the shooting modes offered by their cameras, I find it hard to be 100% neutral when the subject of aperture versus shutter arises.

For beginners that may not understand the difference, let me explain.

All cameras feature several different **metering modes**. These include **Automatic**, **Program**, **Aperture Priority**, **Shutter Priority**, and **Manual**. **Key Lesson:** Don't confuse metering modes with **metering patterns**. The former is about to be explained, while the latter describes how the light meter 'weights' its meter readings around any given scene to produce a more reliable result in all manner of different lighting situations. Spot metering, for example, only takes a reading from the center 5% or 8% of the viewfinder (the percentage varies depending on the camera model), whereas 'average' metering patterns determine the exposure by averaging-out readings from the top, bottom, and sides of the viewfinder.

Exposure modes control how the camera's computer processes exposure information. One way to explain how this works is to look at what happens in **Manual Mode**. In this mode the camera reads the amount of light passing through the lens and onto the sensor. This in turn produces a certain exposure value that's required to make a 'perfect' exposure. To achieve this result, you have to adjust the **f-stop** (the aperture) or the shutter speed, or a combination of both, which allows the right amount of light to pass onto the sensor. If the photographer doesn't adjust one or both of these features by the correct amount (as dictated by a readout; one on the rear LCD and one in the eyepiece), the resulting picture will be over or underexposed.

#### WHAT YOU WILL LEARN IN THIS GUIDE:

- Which mode gives greater creative control over the operation of your camera?
- Which mode provides control over the image's depth of field?
- Which mode allows you to change from fast to slow shutter speeds quickly?
- Why in this mode, if you need a faster shutter speed, you need to raise the ISO.
- Which mode is useful when you need to balance shutter speed with the need for a good depth of field?
- Which mode is an excellent choice when shooting night scenes (on a tripod)?

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Different archer, same location, but this time I opened the shutter to the maximum, to f4 from f10, and increased the ISO from 400 to 3200 (i.e. about six stops faster than the earlier blurred result) to get this pin-sharp result in Av mode. I kind of prefer the blurred result because it conveys a strong sense of speed, while effectively obscuring some of the background distractions (the ugly temporary fencing). The skill involved in steering the horse while galloping down a pathway and hitting targets was absolutely thrilling to witness ('Yabusame' or mounted archery, Kyoto, Japan).

Auto and Program modes read the amount of light passing through the lens in exactly the same way, but rather than leaving the settings for the photographer to adjust, the on-board computer creates the 'perfect' exposure by adjusting both shutter and aperture to provide the optimum exposure balance.

Note that both these settings are **programmed** to **prioritize** shutter speed first. This is because most images suffer camera shake. Once the scene brightness reaches a sufficient level to power a preset, shake-free shutter speed, the prioritization switches from shutter to aperture so the f-stops then begin to change.

**Key Lesson:** If you check the metadata from images shot using these modes, rarely will you see a high aperture number (i.e. f11, f16, or f22) as most of the programming is weighted toward producing a fast shutter speed.



Here's a good example of where Aperture Priority mode is really creative. I used it to highlight the 'omikuji' (paper fortunes) that you see decorating shrines around Japan. In Av mode I simply opened the aperture to f5.6, just wide enough to defocus the background nicely thus highlighting one paper tie on its own (Canon EOS 5D MkIII, 1/2000s, f5.6, ISO 1250).

## SEMI-AUTO IS BEST

Both Aperture Priority and Shutter Priority modes are termed **semi-automatic**. Using these, the photographer chooses a specific aperture (in Aperture Priority mode) or shutter speed (in Shutter Priority mode). The camera then automatically adjusts the other half of the combination to match the given meter reading.

So, if you want absolute control over the **depth of field** (the amount of stuff that you get sharp in the frame), then Aperture Priority is incredibly useful because you dictate the f-stop and the camera selects the other half, the shutter speed. In this mode, the larger the f-stop number, the more stuff becomes sharp in front of and behind the point of focus (i.e. the subject).



A somewhat planned shot. I was standing waiting for a local train when I noticed, through this carriage window, people running for another departure. In Shutter Priority mode I set a slow shutter speed (1/50s), which is just too slow to freeze the motion of people running, but not so slow that I could not hand-hold it steady. I waited. Sure enough, more schoolkids appeared running for the train and I got this nicely framed shot (Canon EOS 5D MkIII, 1/50s, f5, ISO 1600).

If you want absolute control over the shutter speed (and therefore **image sharpness**), then Shutter Priority is the setting to go for because the photographer chooses an appropriate shutter speed to freeze (or blur) the subject, and the camera automatically matches that with an aperture to create the ideal exposure combination. It's worth noting that this scenario only works seamlessly if the ISO is left set to **Auto**.

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### HOW IMPORTANT IS ISO?

For several years I have been teaching newcomers the art of digital photography. Despite the technology packed into new cameras, getting the exposure right can still be something of a mystery to many students. As already mentioned, although Auto and Program modes do the settings for you, the results can often be somewhat bland. By this I mean that, although the image is exposed correctly, the aperture used tends to be neither wide nor fully closed. It just sits somewhere in the middle of the scale (i.e. f5.6 or 6.7) and the shutter settings, although good enough to produce reasonable results, do not always look 100% sharp simply because the camera doesn't take into account the subject speed, lens magnification, and your camera handling.

Therefore, Auto ISO is helpful, but it certainly doesn't always get it right.

However, by setting the ISO to Auto, photographers can often skip past the limitations imposed by lenses that have poor maximum apertures, but this can also lead to lower image quality.

For example, let's say you are out shooting on an early morning game drive in a wildlife park somewhere. At that time of the day an average light reading might indicate 1/4s at f5.6 (ISO 100). This is all good and well if you and the subject are both stationary, but wildlife has a habit of running from humans so you have to be quick and use a fast shutter speed.

Let's say you set the camera to Shutter Priority and choose 1/1000s to 'freeze' the motion of a herd of zebra galloping across the road in front of your vehicle. But the lens might only open as wide as f5.6 or even f6.3, so in my experience, in a lighting situation such as this, setting the camera to 1/1000s will need the ISO to be raised more than seven stops (i.e. above ISO 12,500) to produce a bright enough result. This will produce a very **noisy result**.

ISO							100	200	400	800	1600	32	00	640	0				
Aperture		f2.8	f4	f5.6	f8	f11	f16	f22											
Shutter speed	1/8000	1/4000	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1s	2s	4s	8s	15s	30s
ISO	800	1600 320	00 6400	12500															
Aperture		f2.8	f4	f5.6	f8	f11	f16	f22											
Shutter speed	1/8000	1/4000	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1s	2s	4s	8s	15s	30s

#### Illustration by Robin Nichols

This illustration should highlight the sort of exposure problems we all have to deal with in our day-to-day shooting. The top scale illustrates the exposure settings possible on a bright, blue-sky sunny day. It's called the 'Sunny 16 Rule' (at ISO 100, the exposure settings will be f16 @ 1/125s). But in low light, as shown by the bottom scale, things are very different. This illustrates three things: 1) Aperture and Shutter Priority modes end up with very similar results, 2) the high ISO settings in new cameras will often save the day, and 3) having a lens that opens wider than f5.6 will also make a huge difference to the quality of the end result.

If you chose to use Aperture Priority the result might be similar. Select the smallest number f-stop for that focal length (i.e. f5.6) and the camera works out the shutter speed needed for a bright exposure. If you decide it's not fast enough, the solution is to raise the ISO one 'step' at a time until you get the desired shutter speed.

To get total focus throughout a scene requires a small lens aperture (typically f22); although, to be fair, most lenses produce the sharpest details at an aperture of f11 or f16. This was shot in Aperture Priority mode using f16, and at an ISO setting of 1600 (it was heavily overcast on the day), which produced a shutter speed of 1/100s, perfect for careful hand-holding.



The difference between these two scenarios is interesting.

In the example where you use the Shutter Priority, because the speed chosen is way too fast for the amount of light available, and the lens cannot open its aperture any wider, you could compromise by reducing the shutter speed about two steps (i.e. 1/250s) so the ISO only needs to be pushed to 3200 to brighten the frame effectively.

Using Aperture Priority mode is slightly different because once the f-stop is set, the shutter speed can still change to match varying brightness levels in the scene. It can usually do this because there are many more shutter speeds than apertures to choose from. If the actual shutter speed chosen by the camera isn't fast enough (remember, it's not factoring-in your movement, the subject movement, or lens magnification), it can be increased by taking the ISO up a notch or two.



Another fun blurred shot as I panned right to left following the taxi's motion. Shibuya in Tokyo is known for having one of the busiest intersections in Japan, so to try and emphasize some of that energy I set the camera to shoot at 1/10s at ISO 1600. It then chose f8 in Tv mode (Canon's shutter priority mode). Admittedly, this is a bit of a hitand-miss technique, but when you get it right (i.e. the panned subject looks sharper than the background), it's a great look for conveying a sense of speed, energy, and motion. Personally, I find Aperture Priority mode to be slightly more flexible. To set the fastest possible shutter speed with the light available, all you do is open the aperture to the maximum. If it needs to go higher, increase the ISO. If I need to **pan** a subject with a slow shutter speed, I simply close the aperture until it reaches a shutter speed that's going to produce the correct amount of blur. Sure, you can do this using Shutter Priority, but I feel that using that process is a slightly clumsier option. You decide.



Photograph by Robin Nichols This is another good example of where I think Aperture Priority is so useful. In a temple known for its magnificent displays of wisteria (Kameido in Tokyo), I really wanted a shot with an obvious shallow depth of field to highlight the foreground and blur out the background (Canon EOS 5D MkIII, f4 @ 1/800s, ISO 1250).

# APERTURE STEPS VERSUS SHUTTER SPEED STEPS

A question to ask is how many 'steps' of light do either the shutter or the aperture offer the photographer?

In general, the answer is that shutter speeds offer up to 20 or 30 steps of exposure metering (i.e. 1/8000s to 30 seconds), while aperture only offers seven or eight steps (i.e. f2.8 to f22). These figures do vary slightly depending on the camera and lens model, but the difference illustrates how the two scales differ in the scope they offer.

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Photograph by Robin Nichols

## LENS MAXIMUM APERTURE CHARACTERISTICS

The situation where you might have to compromise by setting a high ISO number can change significantly if you can afford a lens with a '**fast'** maximum aperture. This might typically be a professional lens with a continuous f2.8 maximum aperture which gives you between a two and three (exposure) steps advantage over a kit lens. Note that there are lenses on the market that are even 'faster' than this, with maximum apertures of f2, f1.8, f1.4, and even f1.2, if you have the cash. In the same low-light safari scenario, using an f2.8 lens would mean shooting at only ISO 800, thus producing a significantly cleaner-looking image. But of course, faster lenses are very expensive, bulky, and heavy.

Photographers who travel armed with fast maximum aperture lenses will therefore have a huge advantage in either of these two excellent exposure modes simply because having a lens that opens two, three, or even four f-stops wider than a typical kit lens ensures that they can always use a faster shutter speed and/or a lower ISO setting, both of which go toward making better pictures.

#### WHEN SHOULD I USE APERTURE PRIORITY?

- Try this mode if you want greater creative control over the operation of your camera.
- Use this mode for complete control over the image's **depth of field.**
- This mode is also good if you need to change from fast to slow shutter speeds quickly.
- In this mode, if you need a faster shutter speed, raise the ISO.
- This mode is useful when you need to balance shutter speed with the need for a good depth of field.

#### WHEN SHOULD I USE SHUTTER PRIORITY?

- Try this mode if you want greater creative control over the operation of your camera.
- Use this mode to override any situation where the camera doesn't provide a fast-enough shutter speed for the subject.
- This mode is an excellent choice when shooting night scenes (on a tripod).



I honestly find that – in the subjects that I prefer to shoot at least – Aperture Priority seems to be the most useful exposure mode. In this example I wanted everything to be as sharp and as clear as possible, such was the degree of centuries-old detail in this Japanese shrine (Canon EOS 5D MkIII, f11 @ 1/125s, ISO 1250, Av mode) (Engyo-ji temple, Mt Shosa, Himeji, Japan). Key Lesson: Did you know that every camera that has an interchangeable lens (as well as some that don't) have both Aperture Priority and a Shutter Priority exposure mode, denoted on the top **mode dial** by the letter **A** and **S**? Except for Canon cameras, which use the moniker **Av** and **Tv** (Aperture value and Time value).

## Self-Check Quiz:

- What do 'Auto' and 'Program' modes do that is different from Aperture Priority and the Shutter Priority modes?
- 2) Which mode places more emphasis on the shutter speed, also known as Time value?
- 3) Which two modes are semi-auto?
- 4) In Shutter Priority, if the camera meter will not allow you a fast enough shutter speed to freeze your subject, what do you need to do?
- 5) At which apertures do most lenses provide their sharpest image?
- 6) What does 'fast maximum aperture' mean?
- 7) Which camera manufacturer is the only one that uses a different acronym to identify aperture priority and shutter priority?

### Assignment:

- Photograph a non-moving object using both the Aperture Priority and Shutter Priority modes. Take notes as to the various characteristics discussed in this guide. Which of the two modes was easier to work with?
- 2) Photograph a moving object using both the Aperture Priority and Shutter Priority modes. Take notes as to the various characteristics discussed in this guide. Which of the two modes was easier to work with?

### **ABOUT THE AUTHOR**



Robin Nichols is a UK-born photographer. He has spent the past 30 years in Sydney, Australia, where he began work as a cameraman, then as a freelance photographer.

He worked as a freelance writer and then as a magazine editor for several photography publications for more than eight years. He also ran his own publishing business, producing two specialist magazines - Better Photoshop Techniques and Better Digital Camera magazine.

Aside from conducting photo tours and workshops, Robin teaches photography, video, and post-processing classes through the Centre for Continuing Education at Sydney University.

His work can be seen online at

Blog: <u>www.robinnicholsworkshops.blogspot.com</u> Facebook: <u>https://www.facebook.com/robinnicholsworkshops/</u> 500px: <u>https://500px.com/betterdigitalmag</u>

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