

Ennis Camera Club

Introduction to Focus, Exposure and Depth-of-Field Beginner & Intermediate Level

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Compact vs. Bridge vs. SLR



Compact

- Easy to use
- Less control
- Shutter Lag
- Slim & portable
- Fixed lens

Bridge

- Still easy to use
- More manual features
- Range of each setting more limited than with SLR
- Shutter Lag
- Less portable
- Fixed Lens (with ext. ring?)

SLR

- May have auto settings to ease you in and therefore still easy to use
- More control (manual settings)
- No shutter lag
- Less portable
- Interchangeable specialist lenses
- Noticeably better @ high ISO, especially full-frame SLRs

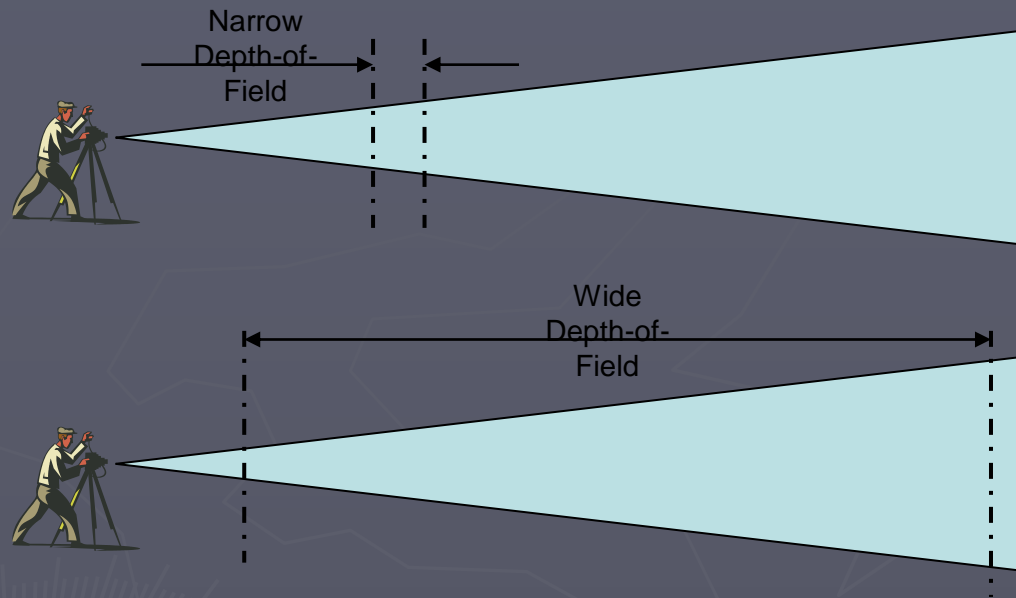
SLR Lens Quality

- An SLR camera is only as good as the lens you use with it.
- Picture on the left taken by an EOS5D using a lens made out of a pringles can with tinfoil and a pinhole on the end of it.
- Pinhole Camera



- ▶ Let's concentrate on two aspects of photography today
 - FOCUS / Depth-of-Field
 - EXPOSURE
- ▶ Problems with focus and exposure probably cover 70% of photography 'problems'.
- ▶ Other problems such as composition are more difficult to teach/resolve. Can be part-taught, but it's also partly having an eye for a photograph and being artistic.
- ▶ Focus is easy to get right
- ▶ Exposure can be more difficult to fix
- ▶ Remember There are certain things a camera simply can't do!

Depth-of-Field



The physics of lenses is such that there is only ever one distance into a photograph that is in perfect focus. The rest is out-of-focus varying from marginally out-of-focus to in some cases visibly out-of-focus.

When we view a photograph, it often **appears** to us as if there is a distance range that is in focus rather than just one distance. This is referred to as the **depth-of-field** of the image (see examples of a narrow and wide depth-of-field above).

The reason a distance range seems to be in focus is simply that the human eye cannot detect elements of a photograph that are out of focus unless they are noticeably out of focus. Such elements are however still out of focus and if the image had enough resolution or detail and was magnified sufficiently, the lack of focus would then be visible.

You can get away with a lot (including poor focus) in a small photo that you can't get away with in an enlargement ... because the flaws (including focus flaws) often only become visible as you magnify or enlarge the image.

Focus and Distance

Focus is all about distance. Only one distance into any photo is in true focus. Think of focusing binoculars on subjects at differing distances! Either the foreground or the background or somewhere in the middle is in focus but not all three!

This is particularly apparent in shallow depth-of-field photographs such as that shown on the right.

Shallow depth-of-field becomes very pronounced in any of the following cases:

- Use of a wide-aperture lens
- Positioning the lens close to the subject
- Optically zooming in on the subject



If you think you have seen photographs where everything or nearly everything is in focus from foreground to background, you haven't. It's not possible due to the physics of lenses. It's just that the human eye is not discriminating enough to tell the difference in many cases.

Auto vs. Manual Focus

Focus is all about distance. Only one distance into any photo is in true focus. Think of binoculars!

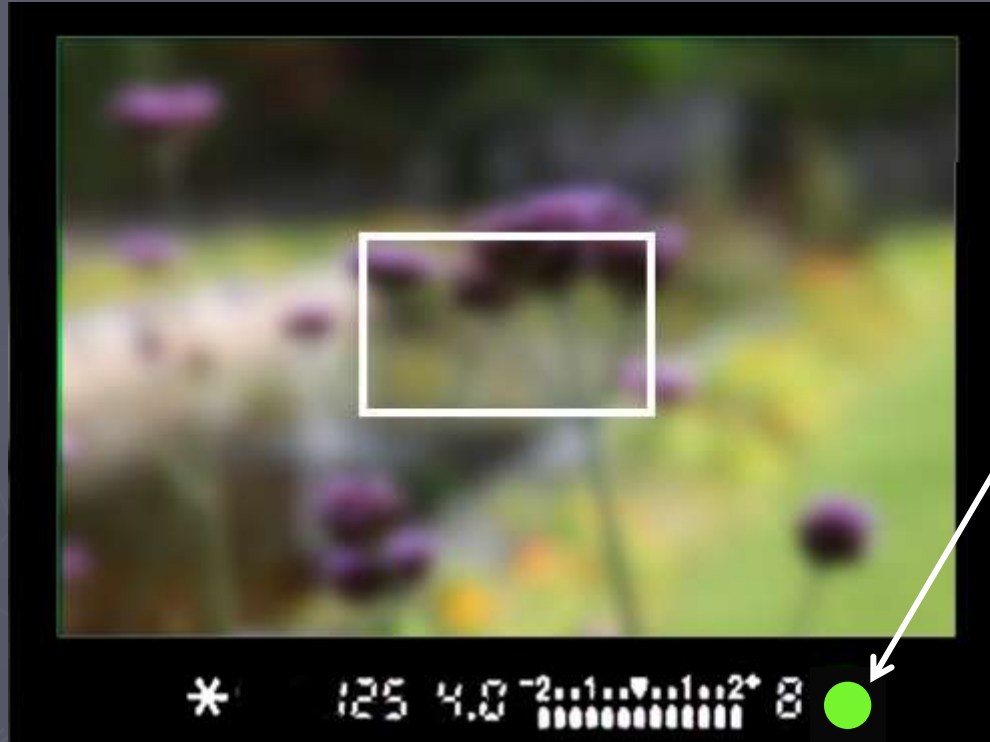
▶ Manual focus

- Usually only an option on SLR cameras
- Rotate ring (like binoculars) to achieve focus
- Slower than autofocus
- Easier to set focus distance in multiple-subject scenes – e.g. animal behind bars (). *problem with autofocus here is that the camera will tend to focus on the bars rather than the animal behind them*

▶ Auto focus

- Usually more accurate than manual focus on modern SLRs
- Pause shutter button halfway down to activate.
- Faster than manual focus
- Can be difficult to set focus distance in multiple-subject scenes e.g. camera will focus on bars (nearer subject) instead of lions behind bars in a zoo
- May have difficulty working in low light (... but so does your eye in the case of manual focus !)

Compact Camera Simple Auto-Focus Zone



Common Focus Indicators:

Focus indicator light flashes if camera can't focus. (e.g. not enough lighting contrast or too close to subject).

Some cameras also display the letters **AF!** in red with an exclamation mark to indicate focusing difficulty (*A.F.* = *Autofocus*)

- Focus Zone typically indicated by a rectangle, square, or open brackets
- Normally centre focused (except in 'intelligent autofocus' modes)
- Press shutter button halfway down to activate camera's focus hunt
- Camera tries to focus on distance-to-subject **inside focus zone**
- To focus on non-centred subjects when 'centre focus' is active,

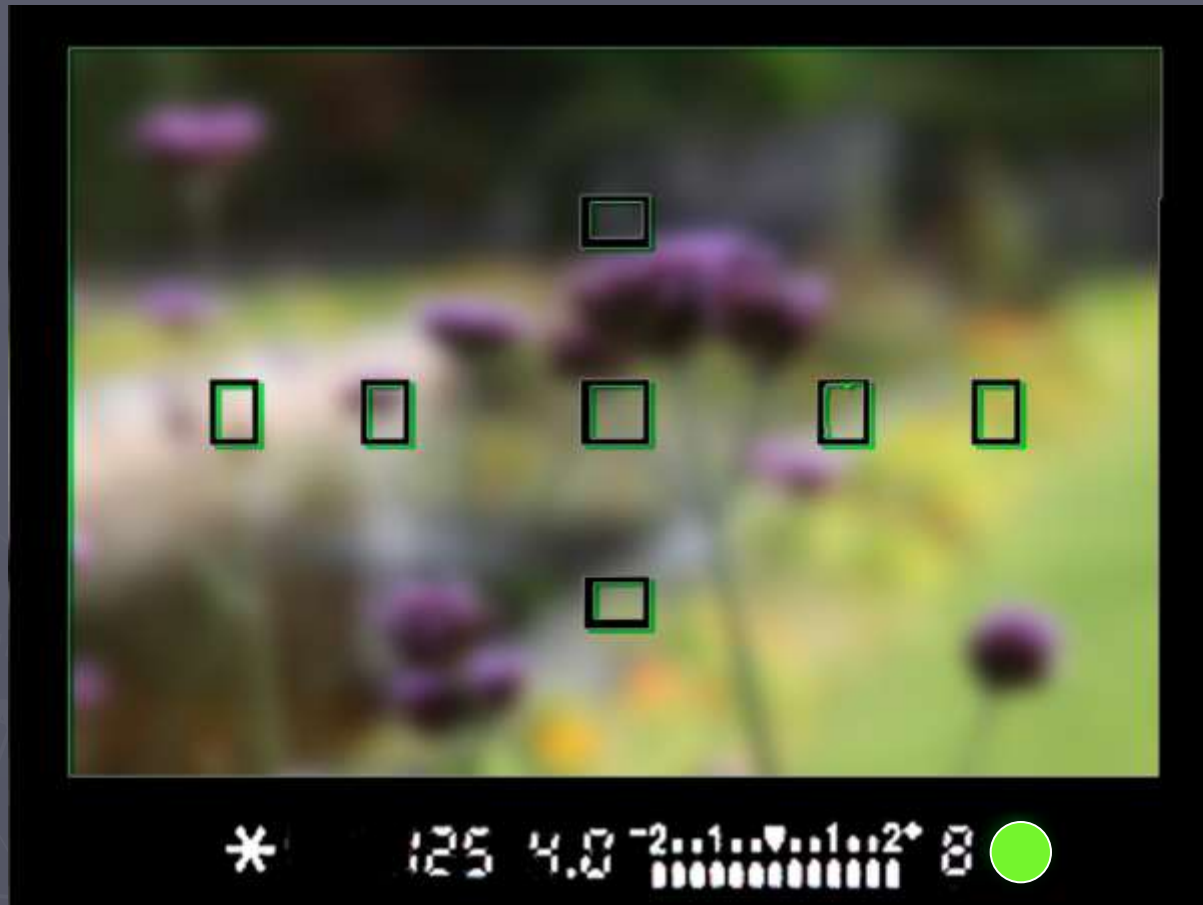
Compose (with most important subject in centre of image) → press shutter halfway down → recompose (with most important subject where you really want them) – press shutter rest of the way down

Compact Camera Simple Auto-Focus Zone



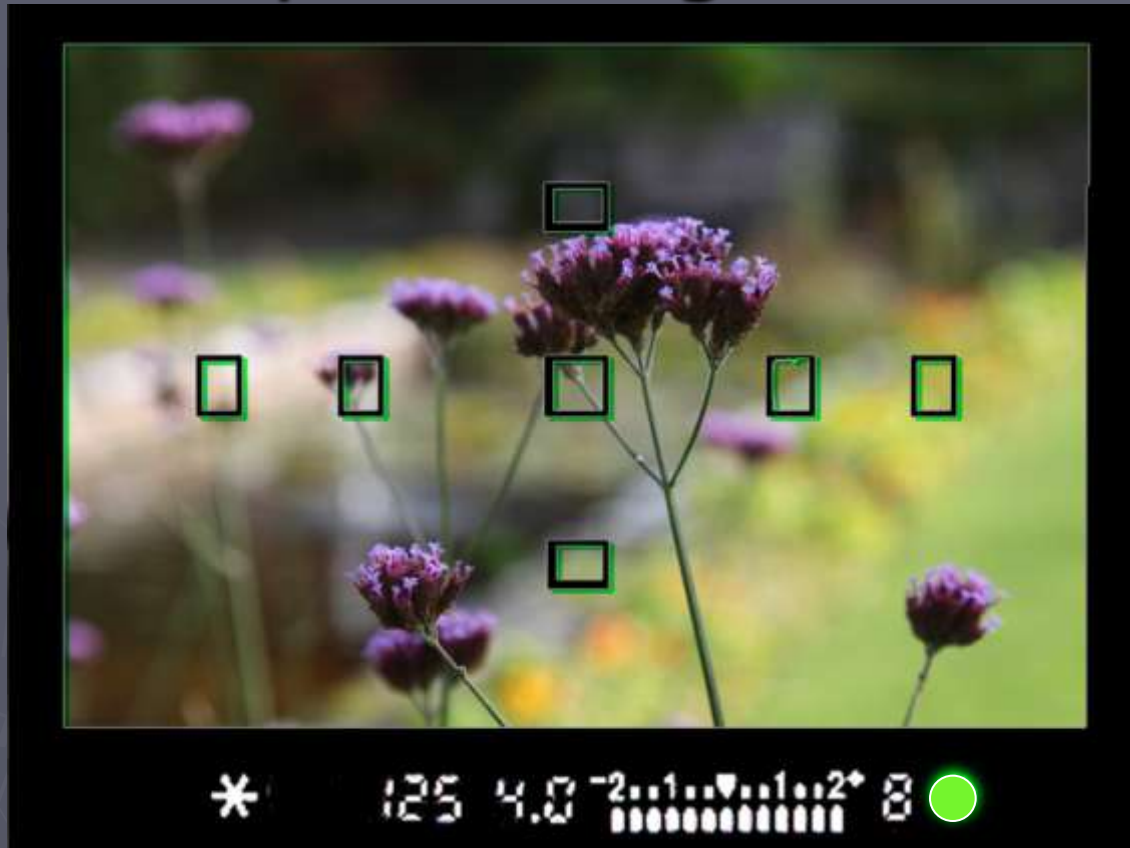
- Typically a rectangle, square, or open brackets
- Normally centre focused (except in 'intelligent autofocus modes')
- Press shutter button halfway down to activate
- Camera tries to focus on distance-to-subject **inside focus zone**
- To focus on non-centred subjects when 'centre focus' is active,
Compose (with most important subject in centre of image) → press shutter halfway down → recompose (with most important subject where you really want them) – press shutter rest of the way down.

Multi Selectable Autofocus Zones



Some cameras allow you to select (highlight) the focus zone of your choice from one of several possible screen positions. (e.g. see example above where the camera allows you to select from one of 7 possible focus zones. This is usually done with a multi-way selector switch on the camera body).

LED stops flashing when focus achieved



When you press the shutter halfway down, the camera moves the lens motors to try to achieve focus on the most dominant subject inside the focus zone you selected. Some compact cameras (notably many Canon models) have a default AiAf mode where you can't select the focus zone of your choice and instead the camera selects it for you. With cameras operating in this mode, you will sometimes see 2 or 3 of the focus zone outlines highlighted in green simultaneously (instead of just one). *To avoid confusion please note the image above is not trying to illustrate this.* This means the dominant subject in each of the zones is simultaneously in focus ... which in turn simply means that the dominant subject inside each of the highlighted zones is the same distance from the camera. Remember: focus is all about distance.

Exposure

► Controlled by ...

- **Aperture** (wider aperture lets in more light ... but shallow depth-of-field)
- **Shutter speed** (slower shutter speed lets available light penetrate sensor more → brighter image but risk of motion blur)
- **ISO** (higher ISO amplifies the available light signal at expense of image quality)

Advanced Modes

- ▶ P, A, S/T, M settings on an SLR camera
 - P = programme shift
 - ▶ user can cycle ('shift') through series of correct shutter-speed/aperture combinations
 - ▶ flash does not auto-popup !!
 - A = Aperture priority
 - ▶ user picks aperture
 - ▶ camera picks corresponding shutter speed
 - S/T = Shutter /Time Priority
 - ▶ user picks shutter speed
 - ▶ camera picks corresponding aperture
 - M = Manual
 - ▶ user picks shutter speed and aperture
 - ▶ Need a light meter or use built-in light-meter bar in viewfinder

Aperture Settings

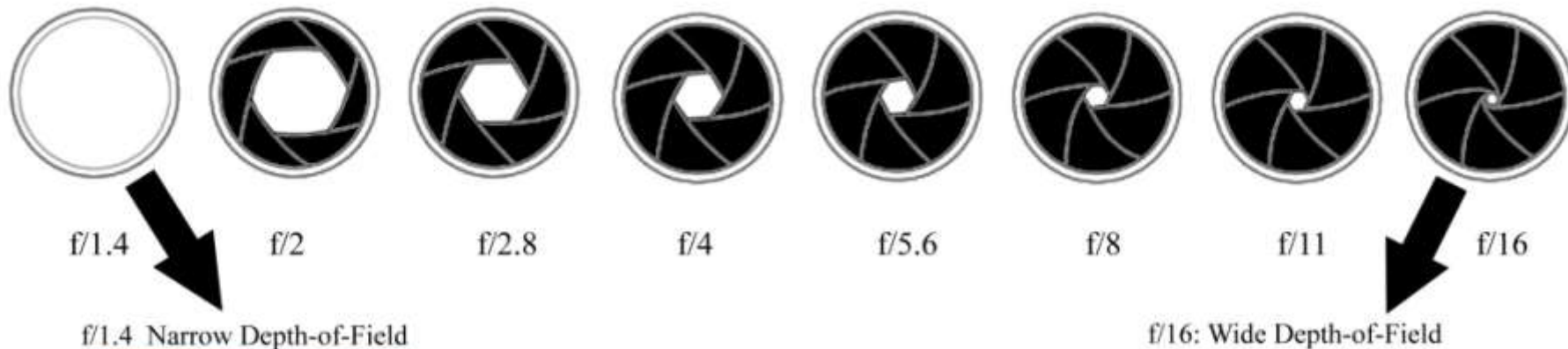
- ▶ Large aperture (small F number e.g. F/2.0)
 - Shallow depth-of-field (subject jumps out more)
 - Allows more light in → Faster shutter speed possible
 - Can be good for portraits and sports photography
 - Not good for landscapes
- ▶ Small aperture (large F number e.g. F/16)
 - Wide depth-of-field everything appears in focus
 - Used in landscape photography – typically F/8 or smaller
 - Small aperture means less light → need slower shutter speeds → need tripod in low light conditions
- ▶ Note: For a given aperture, the larger the camera's sensor (and consequently the larger the camera itself), the larger the depth-of-field that will result. E.g. Compact cameras will have wider depth-of-field than entry level SLRs when photographing an identical scene. Equally full-frame SLRs will achieve larger depth-of-field than entry level SLRs.



Aperture control of depth-of-field



Aperture & Depth of Field



Wide Aperture Example

Wide Aperture

- F/1.4
- 1/4000th sec shutter speed
- @ ISO 100

Note how the background grass and path become heavily out-of-focus immediately behind the subject with such a wide aperture. Even the subject's right shoulder (*right from our viewpoint*) has gone totally out of focus.

This makes the subject 'jump out' of the photo compared to the general background blur and this is characteristic of many wide aperture shots.

Note also that the average zoom lens has an aperture that opens no wider than f/3.5 or f/4 and you won't therefore get such a pronounced effect as shown in this sample photo. A good wide aperture lens that opens as wide as f/1.4 will cost from approx. €400 upwards. That said, both Canon and Nikon do a reasonably popular lightweight f/1.8 lens for approx. €100 which is not too far away from f/1.4.

