



GUIDE TO CAPTURING MOTION IN **LOW LIGHT** SITUATIONS



One of the hardest aspects of photography is figuring out how to capture photos in low light situations.

The truth of the matter is that if you can master low light shooting, other light settings become less daunting. Think about that for a second: you will not only be able to capture solid images in low light situations, but also in pretty much any other situation you can think of.

I am going to explain the fundamentals of capturing images in low light situations no matter if you have a DSLR (digital single lens reflect) or a mirrorless camera. Keep in mind, it's not the camera that makes the images, it's you. You are smarter than your camera.

Are you ready?

ABOVE:

Gavin Degraw at Madison Square Garden 8/7/2014

Manual Settings: 1/320th of a second at F3.2 ISO 2500 with the Nikon 14-24mm 2.8; shot RAW; not Cropped edited in Adobe Lightroom.

As you can see, the stage lighting is all over the place. You have two bright spotlights right on Gavin, as well as other stage lights that could mess with the exposure. Because I manually set the exposure triangle, I was able to get a proper exposure. If I were to allow the camera to do the work, it's likely that the spot lights would have caused the exposure to be completely wrong, leaving me with a dark image.

POSSIBLE SITUATIONS

As far as difficult low light situations go, concerts pose some of the biggest challenges. Often, lighting is unpredictable. Concerts tend to either have really poor lighting, lights that are constantly changing, subjects that are moving around quickly, or all of the above.

If you don't shoot concerts, don't worry--I am going to walk you through some other scenarios like shooting ice hockey indoors or low light candid that you may find at a wedding or other indoor events. These situations will help you figure out not only how to capture motion in low light but how to quickly tweak your settings for when the subjects are standing still.



ABOVE: Kickboxing

1/500th of a second at F4 ISO 12,800
Nikon D4s Nikon 24-70 2.8 at 32mm

As you can tell, I was in a dimly lit gym. There are only a few lights above and my goal was to freeze Maria in air. I knew I needed a fast shutter speed so I bumped my ISO pretty high. I decided to use Single Focus mode because she would pretty much be in one place which would allow me to lock my focus for her movement.

The combination of the exposure triangle and the focus mode allowed me to capture this image where Maria is at the top of her jump. As a rule of thumb, you want to look for that peak action, a.k.a. when the subject hits the highest point right before they come down.

CAMERA SETTINGS

I am a big proponent of shooting in manual. I know manual sounds scary but it's what will allow you to take full control of your camera and the images you are capturing. In fact, I even created a three-hour video guide to "Getting Out Of Auto" for those who are looking to take full control of their image making (check out a free preview [right here](#)).

For those of you who are more comfortable shooting in auto modes, I will also explain how to capture great photos in low light situations using priority modes (Aperture / Shutter Priority).

One major component of my teaching revolves around understanding the "Cause and Effect" of the exposure triangle. You need to always ask yourself, if I change this, how will it affect my photo? Keep that in the back of your mind from now until, well, forever.

FILE FORMAT

Before we get down to the nitty-gritty, we need to talk about shooting RAW. A RAW file is your best friend. "I SHOOT RAW" is not only a saying; it's a way of life.

The RAW file format takes all of the "raw" data that the image sensor captures and sends it right to your memory card without making edits or compressing your file. This is important as the RAW file gives you more ability to tweak your final images exposure, contrast, vibrancy, clarity and more help create a better all around image.

For example: if your captured image is underexposed (looks dark) but the subject and motion appear the way you hoped, you can tweak the RAW file to change your exposure settings after the fact, offering you a better chance at a usable image. I call this "cheating the system" where you deliberately underexpose the image knowing that you will be able to "bring it back" with the flexibility that the RAW file offers.

If you're not quite sure why you would use RAW files, I suggest you shoot RAW+JPEG so you have both options. If you just shoot JPEG, you will never be able to go back to the original RAW file for tweaking in post-processing. You will thank me in the future when you realize how much better your final images will look because you have the RAW files.

THE BUILDING BLOCKS OF YOUR WINNING IMAGE: THE EXPOSURE TRIANGLE



THE EXPOSURE TRIANGLE

Your exposure is comprised of three things: Shutter Speed, Aperture and ISO. These three settings determine if your exposure is going to be proper for the situation you're in. Every time you change one of these settings it directly affects your overall exposure. Remember: cause and effect.

I know it may sound daunting to understand how each one directly affects the image, but I'm going to take the fear out of it as we go. Prepare to be fearless.

ABOVE:

Perry Farrell 9/9/2007

Manual exposure settings: 1/40th of a second at F2.8 ISO 1250; Nikon 10.5mm DX Fisheye; shot RAW; not cropped; edited in Adobe Lightroom.

This image is a perfect explanation of what "cheating the system" really does. The idea is you underexpose your photo in order to keep a shutter speed that is hopefully fast enough to allow for a frozen image. In Lightroom, you then open the exposure up to bring the image back from the dark side.

The image on the right is what the photo would have looked like if I hadn't cheated the system. The reason I needed to cheat the system was I couldn't bump the ISO higher than 1250 and get a usable image (Nikon D2Xs). I was at F2.8, the widest aperture of the lens, and finally, if I dropped my shutter speed two stops, I would have been at 1/10th of a second which would have risked blur. The only way I could get two stops was to "cheat the system" and bring it back in post.

ISO

The ISO is your film speed. You can determine the proper ISO based on how much light is available in your shooting environment. ISO settings will directly affect your shutter speed and aperture settings. The rule of thumb is that as your ISO goes higher, your shutter speed will follow. For example, if you have a proper exposure at ISO 1600 and a shutter speed set at 250th and increased your ISO to 3200, your shutter speed would be 1/500th, which is a 1 stop change to give you the same exact exposure. Making the one change caused the other change to need to be made.

In most concert situations, you are faced with dimly lit stages and rooms; therefore a good starting point would be an ISO between **3200-6400** depending on your camera (the same applies for indoor sports, weddings and other low light situations). Since you are in a darker environment, you know right off the bat to select a higher ISO. You also know that a higher ISO will allow you to have a faster shutter speed thus allowing you a better chance of capturing motion (Higher ISO could also lead to a more grainy image which I will discuss in future articles).

Keep in mind, your ISO's reach is dependent upon your camera. Today, most consumer cameras can push their ISO to 6400 and higher, but pro cameras have the ability to shoot at ISO's of 12,800 to 52,400 and beyond.

It's pretty insane how far some of today's cameras can go in terms of ISO. But remember, if you don't understand the fundamentals of the exposure triangle, the best pro camera in the world may not help you get any better pictures than an inexpensive consumer camera.

The same ISOs tend to apply in most low light situations; the less light you



ABOVE:

Ed Sheeran 2/5/2015

Manual Settings: 1/1250th of a second at F4.5 ISO 4000

have, the higher you may want your ISO. Keep in mind, though, that no ISO, regardless of how high you push it, will compensate for a lack of actual light.

For those who are letting their camera set the ISO automatically, you may run into some issues. Sure, the camera

can do a great job of selecting what it thinks is the proper ISO, but why rely on it when you can make that call yourself? Also, the camera may change the ISO from picture to picture even if you're in a situation where the light is not changing.

If you're in a situation where the light is constant, simply select your ISO manually and lock it in. You can always push it higher if you need the effect of more light or lower if you need less. Say it with me, "I am smarter than my camera."



ABOVE:

Local Hockey Rink

Manual Settings: 1/800th of a second
at F3.5 ISO 5000

SHUTTER SPEED

Understanding the role shutter speed plays in capturing motion directly translates to capturing low light images in which subjects don't move.

For example, if you are shooting indoor ice hockey where the subjects are moving quickly, you will most likely want to have your shutter speed higher than 1/250th of a second. If I were you, I would prefer my shutter speed to be 1/500th of a second or higher to make sure I am actually freezing the motion.

This is where understanding your

exposure triangle comes into play. It's all about "cause and effect"—if I do this, this will happen; if I do that, that will happen.

If you're shooting a bride walking down the aisle towards you in a lower light situation you will not want to set your shutter speed below 1/125th of a second. Even at that shutter speed, it is still possible that you may get some movement in your image you may not be looking for. On the flip side, if the bride is standing still at the altar, you can drop your shutter speed lower than 1/125th and possibly get a still image.

NOTE - see focus modes later in this article for tips on which ones to use when and where.

I would rather bump my ISO higher and have more grain in my image than leave it lower and possibly end up with a blurry subject. Think about it: freeze

the subject, but have a little grain or have the subject blur but have less noise?

Another way to "cheat" the system is to underexpose your image. I do this in situations where I don't want to push my ISO any higher but need faster shutter speed to freeze the movement. Underexposing with the shutter speed means you are deliberately using a faster shutter speed, which in turn means your image may come out darker (due to not letting in the proper amount of light). The cheating comes into play is in post-production. Bring the image back by bumping up the exposure slider. It's a good idea to make sure you are shooting RAW when you try to cheat the system.

For those who are not in manual and want the camera to set your shutter speed automatically, use aperture priority mode. In this mode, the

camera will automatically set the shutter speed for you based on your ISO and Aperture settings. However, you'll still have to pay attention to where it's set. If you aren't getting a fast enough shutter speed, you're going to have to do one of two things to make it higher: 1) raise your ISO or 2) open your aperture to let more light in. Remember: change one setting

at a time, check the image, and then make further adjustments.

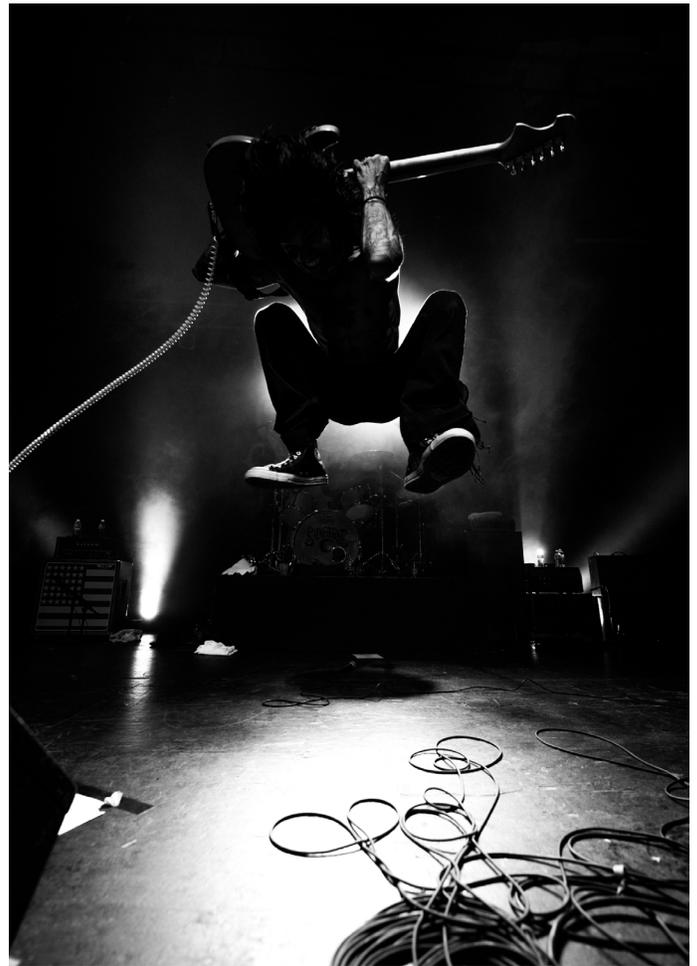
There are a few rules tied to setting your shutter speed. One is that your shutter speed should be higher than the focal length of your lens. For example, if your lens is zoomed to 300mm, your shutter speed should not drop below 1/320th of a second. If you are using

a 50mm your shutter speed should not drop below 1/50th of a second. The reason you have to set your shutter speeds higher than your focal length is because small movements can cause your images to blur as light travels to the image sensor. Again, this is a general rule of thumb but it can be broken in certain situations.



ABOVE:

Walking down the aisle 8/9/2009 Manual Exposure Mode 1/250th of a second at F3.2 ISO 3200; Continuous Focus Mode.



ABOVE:

Nick Perri 3/9/2013

1/1000th of a second at F3.5 ISO 8000 shot RAW; not cropped Nikon 14-24mm 2.8

As you can see from the image on the right, I cheated the system. I knew in order to capture Nick's jump I would have to have a fast enough shutter speed. But I didn't want to push my ISO any further so I decided to "cheat the system" and bring it back in Lightroom.

APERTURE

What is your aperture and how does it affect your shooting in low light situations? Like shutter speed, your aperture controls the amount of light you're letting onto the image sensor as well as depth of field. For this guide,

my main focus is to explain aperture as it pertains to light gathering.

If you want to gather more light for your image, you will want to do what we call "opening up." Open up the aperture or, in other words, use a lower F setting. For example, going from F5.6 to F4 lets in one extra stop of light. Going from F4 to F2.8 also lets in one stop of light. The lower the F-number, the more light you're letting in. The higher the F number (16; 22; 32), the less light you're gathering.

On a side note, your aperture directly affects your depth of field, which is the portion of your image that will be in focus. I dive much deeper into this subject in the FroKnowsPhoto Guide To Getting Out Of Auto.

You may be saying, "But FRO, where should I set my Aperture if I am shooting X?" Before I can tell you that, you have

to know that not every lens will let you shoot at the widest aperture. Most consumer lenses tend to have a widest aperture setting up F3.5 or F4. But, if you have a consumer zoom lens, the more you zoom the more your aperture will close down thus cutting back on the amount of light you're letting in.

On the flip side, more expensive pro glass can open up to as wide as F1.2, F1.4, F1.8 and F2.8.

For those who are not shooting in manual, you can set their camera to aperture priority and select the widest aperture possible. The camera will do the rest of the work for you by setting your shutter speed and possibly your ISO. Keep in mind that just because the camera can make a decision for you, that doesn't mean it will make the proper exposure choice for the situation you're in.

METERING MODES



ABOVE:

Goalie 2/2/2012

Manual Settings: 1/250th of a second
at F3.5 ISO 4000

Many of today's cameras allow you to choose from three-dimensional metering to spot metering. 3D metering will survey the entire frame to get an average light reading, helping you determine the proper aperture and shutter speed.

For everyday, general shooting, 3D is

great for attaining your initial exposure.

Spot metering exclusively uses the center portion of the frame. This means that a smaller portion of the frame will be used for metering. Usually this will be done inside a very small circle inside the viewfinder. This is a great setting to use when trying to shoot a subject who may be backlit or surrounded by lights that may throw off your meter. This setting will give you a reading of exactly what you are trying to meter with less chance of the meter being tricked.

As you start to understand light better, you will see that all of these meter settings will give you a close reading. Your personal tweaks, however, will get an even better one.

If you are using a wide-angle lens and 3D metering, it is possible that random stage lights, ceiling lights, or spot lights will give you a false meter reading as the meter is most likely reading the brightest light source. If this is the case, your main subject might come out too dark. Switching to spot metering will allow you to meter for just your subject,

giving you a better chance of getting a correct reading. Conversely, when you use a telephoto lens, you are gathering light from a smaller area, so either spot metering or 3D metering should work.

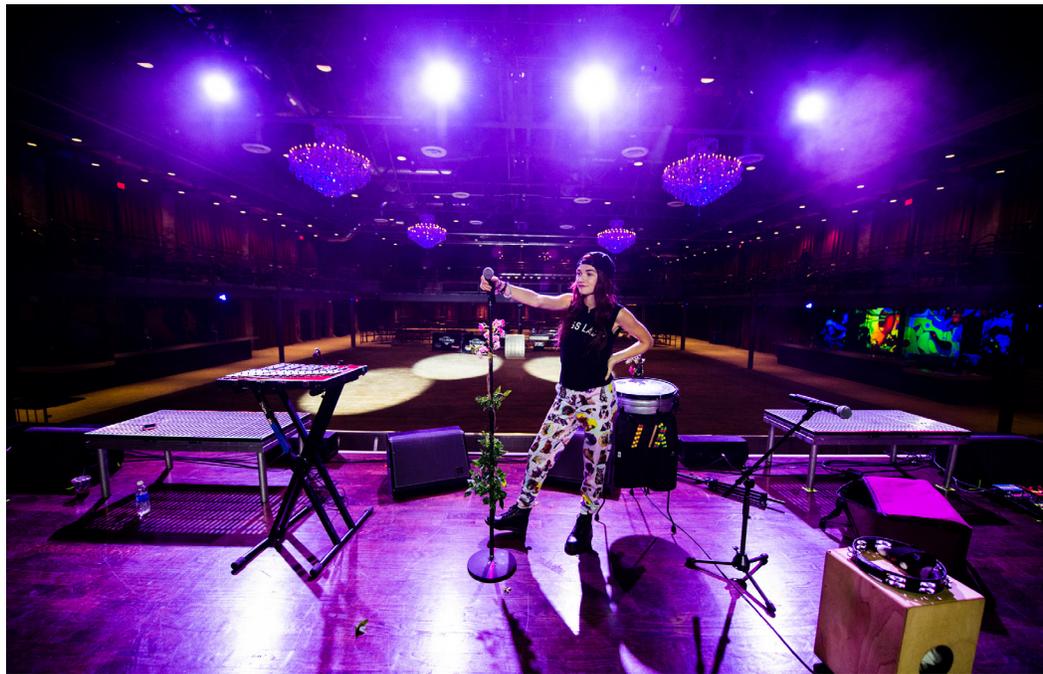
For those who are shooting in manual, the meter will not affect your final image because you have “manually” locked in the exposure yourself. To determine whether or not your exposure is in good shape, simply look at one of your images on the back of your screen. The screen is a good way to make sure you are on the right path. It’s not perfect but it’s a nice tool to use since you have it at your disposal.

PHOTOS:

Misterwives 1/4/2015

Manual Settings Image on the right: 1/200th of a second F3.2 ISO 4000; Shot RAW; not cropped.

The image on the bottom was shot in manual exposure. The image on the top shows you what would have happened if I allowed the camera to select all the settings. What would have happened is the strong backlight would have told the meter that it was actually brighter than it really was thus telling your camera to raise it’s shutter speed and leaving you with a darker image. This is why you are smarter than your camera.



FOCUS MODES

What good is capturing a WINNING image in low light if it's not in focus in the first place? You're going to encounter four main types of focusing options (some cameras allow you to tweak multiple focusing modes beyond three):

- 1. Full AUTO:** The camera selects between counties or single focus modes. This mode is selecting what the camera thinks you should be using. This is not a mode I ever venture into. We just spend all this time getting our settings situated only to allow the camera to select the wrong focus mode that may lead to missing your focus.
- 2. Continuous Focus:** You will find yourself in this mode when you're shooting moving subjects. This mode lets you better track your subjects. As they move, your focus should continue to focus and refocus. This is great when you're shooting sports, concerts, and even weddings where you're trying to capture the bride walking down the aisle. This primarily is the mode you want to be in when it comes to shooting unpredictable subjects. Generally speaking, this means that when you're holding the shutter button halfway down, the camera will focus continuously as you track the subject.
- 3. Single Focus:** Switch to focus mode when you know your subject won't be moving or for when you have more time to attain focus: the bride standing at the altar, the hockey player sitting on the bench watching, the musician that is static, or inanimate objects that aren't going anywhere.
- 4. Manual Focus:** This is not a mode I find myself in very often.

I personally would not be able to keep up with fast moving subjects and simultaneously manually focus the lens. The few times you will find yourself manually focusing may be if you are shooting macro images and you need to get a more precise focus than the camera is

giving you. Or when your camera is "hunting" for focus. Hunting means the auto-focus keeps racking back and forth and not locking in. At that point, you may need to switch into manual to try and get the proper focus.



PHOTOS:

Quarterback

1/800th at F3.2 ISO 8000

Nikon D750 Nikon 70-200 VR II at 200mm

A low light situation you may find yourself in is at a high school football stadium. The lights tend not to be very bright, which means you have to push your ISO a little further than normal. In turn, you have to remember how raising your ISO affects your shutter speed as well as what focus mode you will use.

In this case, I was using the continuous focus mode and making sure my focus point was on the quarterback. I had to bump my ISO to allow me to have a 1/800th of a second shutter speed to help freeze the motion. Yes, I could have dropped my shutter speed one stop to 1/400th of a second, which would have allowed me to drop my ISO one stop to 4,000. However, I did not want to risk showing motion in the image so I left my shutter speed at 8000.

REAL WORLD SHOOTING



ABOVE:

The Hooters 11/27/2009

Manual Settings: 1/400th of a second at F3.2 ISO 3200; shot RAW; not cropped.

The image on the left is the manually exposed image whereas the image on the right is what would have happened if I left the camera meter the scene. The camera's meter would have told you that the scene was really bright and caused your shutter speed to be around 1/2000th of a second which would have left you with a totally underexposed dark image.

REAL WORLD SHOOTING

What I want to do right now is break down three different, potential low light scenarios. Keep in mind the information, I am giving you is meant to help you get as close as possible to the proper settings. The reason I can't give you exact setting is every situation is going to be different.

Yes, these are three specific scenarios but the same rules apply to capturing motion in low situations no matter what you're shooting. You also need to ask yourself the basic questions; they never change and can be used in any situation:

1. Is my subject moving fast or slow?
2. How high can I put my ISO before I run into noise?
3. What focus mode should I be using?
4. If the light changes which part of my triangle should I move first?



ABOVE:

Grouplove 6/11/2012

Manual Settings: 1/640th of a second at F3.5 ISO 10,000; shot RAW; not cropped.

For an image like this one where the subjects are moving a ton I would be in continuous focus so I can track the subject. A combination of proper exposure and focusing mode allowed me to capture this image.

SCENARIO #1: LOW LIGHT CONCERT

Introduction:

Before a concert, I ask myself a bunch of different questions. Will the subject be moving quickly or more static? And, at all times, what are the most important parts of the triangle for what I am about to shoot? If I know the

subject is going to be moving, I know that my shutter speed will need to be fast. In order to make it faster, I could raise my ISO, making the sensor more sensitive to light, or I could open my aperture to let more light in. Everything is cause and effect; what is most important and why?

During the show, the lights are going to change. But what settings should you tweak first? I'm a big fan of riding my back right thumb on the dial. Just about all DSLR's and mirrorless cameras will have some kind of control dial on the back right hand side. I have mine set to control shutter speed.

Shutter Speed:

For a moving subject: no less than **1/250th of a second**. I try to live in the 1/500th to **1/1000th of a second range** but a lot depends on the lenses you use, the ISO capability of your

camera and last, but not least, the amount of light at the concert.

For a still subject: shutter speeds of **1/250th and slower**, depending on the focal length you're using. See rule of thumb for the focal length vs. shutter speed settings in "Shutter Speed" section.

Aperture and ISO:

If I see that my shutter speed is getting to a point where I may not be able to freeze the motion, I have to decide what should I do next. This is when you look at your aperture and ask if you can open it up to let more light in, thus **keeping my shutter speed higher**. Or whether or not you have room to bump the ISO to keep that faster shutter speed. These are the kinds of cause and effect scenarios that are constantly running through my head.

Don't get overwhelmed by all of this; the more you do it, the easier it gets.

Focus Modes for Concerts:

For a moving subject: use **continuous focus** as it allows for the camera to track the subject as they move from focus point to focus point. All of today's DSLR's and mirrorless cameras do a fantastic job of tracking your subjects or allow you to tell the camera where to focus.

For a still subject: you can switch to single focus mode which means when you press the shutter button halfway down and the focus locks in it will not shift unless you lift your finger. So if you lock in a subject then they move, you will have to lift your finger and refocus.

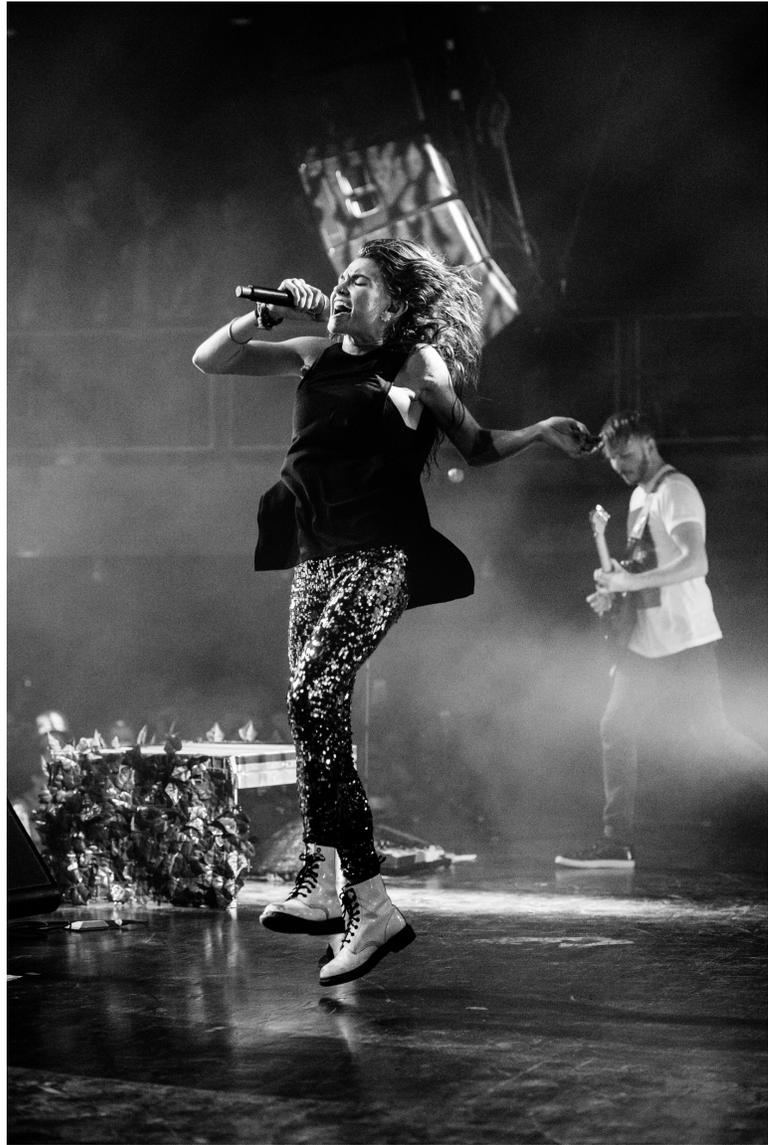
Metering Mode for Concerts:

9 out of 10 times I am leaving my cameras metering mode on matrix metering, as it takes the brightest and darkest parts of the photo and giving me the average reading.

Post-script:

Keep in mind when you have a lot of lights moving around at a concert you're going to see your meter dancing around quite a bit. That's why I suggested being in manual exposure above. You are smarter than your camera; you understand that all the flashing light will affect the meter but not cause you to need to change your settings.

I love concerts, I love the challenge of shooting in them but please don't over-complicate things. Don't try and change three settings if you're having trouble getting the proper exposure. Just ask yourself the questions I laid out one at a time and build/tweak your exposure from there.



ABOVE:

Frozen on Stage

1/640th of a sec at F3.5 ISO 3200

Nikon D4s Nikon 70-200 2.8 VR II at 95mm

The difference between capturing the motion and missing the shot is very slim especially when you have a subject who's constantly moving. In a situation like this one, I want to determine a few things: 1) that my shutter speed is high enough to freeze any action and 2) that my focus mode is on continuous to track the subject. With these two things combined, I was able to capture this moment in time.

The fast shutter speed and the continuous focus made this a winning image. You will notice my ISO was only 3200 and my f stop was at 3.5. Most consumer lenses and bodies will be able to use these same settings and hopefully get similar results. Even if your lens is a 5.6, you can simply do the math to figure out what your settings should be. In this case, that's roughly a stop different from 3.5, which we can call F4. From F4 to 5.6 is one stop, from 3200 to 6400 is one stop. Remember: cause and effect-- if I change one thing, this happens; if I change another, that happens.

SCENARIO #2: INDOOR SPORTS (ICE HOCKEY AND SCHOOL GYM)

Generally speaking, when you're at a hockey rink the lighting should be even across the ice. Of course there's always those older rinks that have the terrible sodium vapor lights that buzz and give off a pinkish color, which really messes with your white balance. But for this scenario, let's say the light is evenly spread across the rink. In my opinion hockey may be one of the hardest things to photograph because you never know where the action is going to happen. But once you practice finding the proper action, the settings pretty much become set it and forget it.

Shutter Speed:

For a moving subject: set shutter speed of 1/400th of a second or higher to freeze the motion.

For a still subject: perhaps you want to photograph a player on the bench. The bench tends to have less light available. Simply lower your shutter speed to let more light in and compensate for the darker area. Always remember to bump it back up when you start to focus on the rink again.

Aperture and Focal Length:

As a rule of thumb, you will want to shoot your lens on the wider side. For example, if you have a 2.8 lens you will want to shoot at F-2.8. If you have a kit lens, then simply shoot at its widest aperture. For those with faster lenses like 1.2 or 1.4, I suggest setting it to around F-2.8.

ISO:

In terms of your ISO, you will probably find yourself somewhere between 3200 and 6400 in order to get similar settings to above.

Post-script:

Before we shoot, we know the following things: the subjects will be moving quickly; the light is even across the ice; it isn't going to get brighter or



darker, it's fixed. This means once you lock in your exposure you can focus on capturing the moment and not worrying about your settings.

Remember when I recommended shooting in manual exposure, and not one of the auto modes? If you attempt to shoot in shutter or aperture priority mode, your meter will be totally thrown off by the ice and cause you to overexpose your images. This is why taking control of your settings is vital to becoming a competent photographer.

BONUS SCENARIO: PHOTOGRAPHING A SCHOOL GYM

Unlike the hockey rink where you have

a bright white surface reflecting light back into the player's face, the gym is going to look darker because of the wood floors. Your settings will not be that far off from the rink but you may need to bump your ISO higher to compensate for the lack of light reflection coming off the white ice.

Again, once you get your exposure locked in, you are free to focus on the action in front of you.

In both scenarios you will want to be in continuous focus to allow for the best chance at getting a tack-sharp in focus image.

SCENARIO #3: WALKING DOWN THE AISLE

One of the most important shots to get at a wedding is the bride or groom walking down the aisle. Unlike hockey, they will not be moving super fast, but they will be moving and you will need the right settings.

Shutter Speed:

For this scenario, you are using whatever natural light you have--no flash. As a general rule of thumb you won't want your shutter speed to drop much lower than **1/250th of a second**. In some situations you may be able to get away with **1/125th** since the bride or groom shouldn't be

moving super fast down the aisle.

ISO and Aperture:

Like the other scenarios above, you simply have to build your exposure knowing that you're trying to freeze the action. Where does your ISO need to be to help you get the proper shutter speed? Where does your aperture need to be to allow you to get the depth of field you're looking for?

Post-script:

This scenario is one where the lighting will be different from location to location. I suggest that you use the time before the wedding to do test shots. Photography guests arriving

and walking down the aisle to their seats. Shoot a photo of an assistant walking down the aisle to you can test the lighting. Do what you need to do to help you get the shot you're being paid to capture.

Closing:

Remember these are three scenarios plus one as a bonus. This doesn't mean these concepts only work with the situations above. These concepts and tips transcend from scenario to scenario. Ask yourself the right questions, build the exposure, think about what your trying to capture and you will have a better chance and getting it right.



ABOVE:

Wedding Kiss 8/22/2008

Manual Settings: 1/250th of a second at F2.8 ISO 3200; shot RAW; not cropped.

The Focus mode was set to single focus for this shot. The reason being is the subjects are not going to move from where they are at that moment. The focus was locked on for the kiss. Right after the kiss, I would switch to continuous focus to get them walking back down the aisle.

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**ARE YOU INTERESTED IN LEARNING THE STEP-BY-STEP
PROCESS I USED TO CAPTURE THE IMAGES IN THIS BOOK?**

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If so please [CLICK HERE](#) to check out the FroKnowsPhoto Guide To Getting Out Of Auto.

