Exposure Mythology

EXPOSURE MYTHOLOGY

PHOTOGRAPHY: TRICKS OF THE TRADE

Welcome and introductions
Overview of general problems in photography
Components of exposure
Review of the histogram as an exposure tool
Consider exposure “rules
What the rules are
When to break the rules
Difficult exposure issues
Using camera exposure modes
Wrap-up by 8 PM

Camera Characteristics
- Type (phone, Point-and-shoot, super-zoom, mirrorless (MILC), Single lens reflex (dSLR)
- Brand
- Shooting modes – Auto, Program, A, S, Manual, Bulb
- Image capture - RAW or JPEG
- Sensor – size, pixels, resolution, sensitivity, digital noise
- ISO range
- Shutter speed range
- Burst rate
- Other bells and whistles

What ruins a photo?
- Unintentionally blurred image
  - Out of focus
  - Subject moves
  - Camera shake
  - Improper exposure
  - Over-exposure
  - Under-exposure (sometimes fixable in PP)
- Poor composition
  - Lack of subject, foreground, background
  - Complicating / distracting components
Learning Objectives
At the end of this session, you will be able to:
• Explain the role of the histogram in photography
• Identify complex or difficult light situations
• Use the exposure triangle to optimize capture
• Discuss exposure rules and when to break them
• Use the camera as a light meter / use exposure modes
• Use exposure compensation to alter camera settings
• Identify solutions for high, low, and mixed light conditions

The Histogram
• Key to exposure and contrast
• Myth? - Shoot to the right
• Key: Don’t blow-out the whites

Luminosity
• Degrees of brightness (8 bit; $2^8$; 256 levels)
• 0 = pure black
• 255 = pure white

Chimming in the field
• Make sure image was captured
• Check the general composition
• Check the focus
• Determine the best exposure for your image
• The histogram!
The myth of a bell-shaped curve

- A statistically ‘normal’ distribution is a bell-shaped curve
  - Mean, median, and mode are equal
  - About 68% of values are within 1 standard deviation
  - About 95% of values are within 2 standard deviations
  - About 99% of values are within 3 standard deviations
- The bell-shaped curve describes a ‘normal’ population
- Photographs are not ‘normal’ so a bell-shaped curve is not a goal
- There is no ideal photographic histogram

In Camera and Post-processing

- Histograms are everywhere!
- Luminosity and RGB graphs in camera
- Basic image control in Lightroom and Cameraw
- Grid and Loupe views in Library module in Lightroom
- Develop module in Lightroom
- Tone curve in Lightroom / Photoshop

Exposure Control Triangle

- Three elements control exposure
  - ISO sets sensor sensitivity
  - Aperture controls amount of light
  - Shutter speed controls duration of exposure

Any change in one factor requires an equal and opposite sum change in the other two factors.

One “stop” or EV (exposure value) implies a doubling or halving of exposure.
**Stops or Exposure Values (EV)**
- A 1-stop increase doubles the effective exposure
- A 1-stop decrease halves the effective exposure
- Effective exposure is influenced by ISO
  - Doubling ISO doubles effective exposure
- Shutter speed influences exposure
  - Doubling shutter speed doubles effective exposure
  - Remember shutter speed is usually a fraction of a second
  - 1/100 sec is half as long exposure as 1/50 sec
- Aperture size influences exposure
  - A 1-stop increase doubles effective exposure
  - A 1-stop decrease halves the effective exposure
  - Remember f/2.8 is large and f/22 is small

**Exposure Control**
- Shutter speed – How long is the exposure?
  - Motion blur
- Aperture – How much light gets to the sensor?
  - Depth of field
- ISO – How sensitive is the sensor?
  - Digital noise (grain)

**Aperture Influences Exposure**
- Aperture is measured in f-stops
  - A larger aperture has a lower f-number
  - A smaller aperture has a higher f-number
- f-stop is a fraction comparing the minimum diameter of the lens to its focal length
  \[ f = \frac{f\text{-number}}{f\text{-number}} \]
  - A “fast” lens has a smaller f-number
    - f/2.8 is twice as “fast” as f/4
    - f/2.8 is 4x as “fast” as f/5.6
Aperture is measured in \( f \)-stops.

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Mode Selection
- Auto: (Green zone)
  - Camera metering determines optimal ISO, shutter speed, aperture, and flash.
- Professional
  - Set the ISO and camera metering determines optimal combinations of shutter speed and aperture; photographer chooses the combination.
- Time / shutter speed priority*
  - Set the ISO and shutter speed and camera metering determines the optimal aperture.
- Aperture priority**
  - Set the ISO and aperture and camera metering determines the optimal shutter speed.
- Manual
  - Set the ISO, shutter speed, and aperture using the through the lens or remote light meter.
- Bulb
  - Set ISO and aperture and depress the shutter for the time estimated to produce proper exposure.

* = S (Nikon) or Tv (Canon)
** = A (Nikon) or Av (Canon)

The myth of Auto Mode
- Auto mode
  - Based upon camera light meter.
  - Assumes 18% (middle gray) scene.
  - Camera determines aperture, shutter speed, and ISO.
  - Camera may activate internal flash (unless set to always off).
  - No exposure compensation for variation in subject light.
  - No creative control of camera.

* = S (Nikon) or Tv (Canon)
** = A (Nikon) or Av (Canon)
The myth of Program Mode

- Program mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set best combination of aperture and shutter speed
  - Camera sets ISO
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
  - Very limited creative control of camera

The myth of Shutter-priority Mode

- Shutter-priority (Tv) mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set shutter speed; camera sets aperture
  - ISO is pre-set (unless in auto-ISO mode)
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
  - You control motion blur

The myth of Aperture-priority Mode

- Aperture-priority (Av) mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture; camera sets shutter speed
  - ISO is pre-set (unless in auto-ISO mode)
  - (Usually) internal flash is set to off
  - Exposure compensation using in-camera light meter
  - You control depth of field

* ~80% of “advanced” photographers

The myth of Manual Mode

- Manual mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture, shutter speed, and ISO
  - Exposure compensation using in-camera light meter
  - You have complete creative control of camera
  - You see the light meter in your camera
  - You gotta make lots of decisions quickly
The myth of Auto-ISO Mode

- Auto-ISO mode
  - Based upon camera light meter
  - Assumes 18% (middle gray) scene
  - You set aperture and/or shutter speed according to your mode dial selection
  - Camera adjusts ISO – you may set highest ISO and longest shutter speed
  - Exposure compensation using in-camera light meter
  - You choose best shutter speed or aperture
  - Camera ‘helps’ with highly variable lighting

Myths of Aperture Selection “Rules”

- f/8 and be there
  - Bryan Peterson’s critical f-stops
    - f/2.8 to f/5.6 – shallow depth of field to simplify background
    - f/16 to f/22 – wide depth of field for landscapes
    - f/8 to f/11 – who cares?
  - Sunny f/16 rule
    - On a bright day shoot f/16 at a shutter speed = 1/ISO
    - Not important as a rule but very helpful when adjusting exposure
    - Example: What shutter speed do I use at f/22? At f/4?

f-stop Pro and Con

<table>
<thead>
<tr>
<th>High f-stop</th>
<th>Low f-stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small aperture</td>
<td>Large aperture</td>
</tr>
<tr>
<td>Wide depth of field</td>
<td>Narrow depth of field</td>
</tr>
<tr>
<td>Slow shutter speed</td>
<td>Fast shutter speed</td>
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<tr>
<td>Star-effect in bright light</td>
<td>Freeze action</td>
</tr>
<tr>
<td>Motion effects</td>
<td>Minimize camera shake</td>
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<tr>
<td>Diffraction softening</td>
<td>Corner softening</td>
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</tbody>
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Use your camera histogram

“Shoot to the right”

- No blown-out whites
  - Watch for ‘blinkies’
- May have some clipped blacks
  - Handle in post-production editing
- Negative EC for “blown” whites
- Positive EC for blacks
Myths of Post-processing / Editing

- Exposure / luminosity – intensity of light
- Contrast / tonality – range of luminosities
- White & black points, highlights, shadows
- Blown whites are gone forever
- Can recover highlight and shadow detail
- May recover blacks
- Digital noise reduction

This is where the histogram helps.

Camera Exposure Modes

- Auto / Program
- Aperture priority (A, Av)
- Shutter priority (S, Tv)
- Exposure compensation
- Manual

Difficult Lighting

Camera Metering Modes

- Evaluative / Matrix
- Partial (Canon)
- Spot
- Center-weighted

Each assumes 18% middle gray in its region of metering.

Filter Considerations

- UV or Haze filter
  - Controversial – lens protection / light effect
- Circular Polarizing Filter (CPL)
  - Only effect that cannot be done in post-processing!
- Graduated Neutral Density (Grad)
  - Soft or hard edge transition
  - Usually 2-3 stops reduction
- Neutral Density
  - Fixed 2 or 3 stops reduction
  - Variable 1-8 stops reduction
- Color correction – not needed with post-production
**Difficult exposure situations**

- Bright sky – either clear blue or overcast
- Harsh mid-day light
- Back-lighted subject
- Shooting into the sun (sunrise/set, silhouette)
- Shooting into the sky
- Dark conditions (interior, dense shade)
- Harsh shadows (variable light)

**Difficult Exposure Summary**

- If reflections (minimizing them) and colors are most important, control the incoming light by using a filter.
- If motion effects are a priority, set your shutter speed first.
- If low noise is vital, set a low ISO and balance the other factors from there.
- If depth of field is critical, give preference to aperture.

**Exposure Key Points**

- Histogram is your primary exposure guide in-camera
- Expose to the right but don’t blow-out the whites
- Histogram is your primary guide to exposure, white point, black point, highlights and shadows control
- Choose you camera mode for your subject
- Use the most effective metering mode for your image
- Remember the limitations of post-processing

**Good to Great Photographs**

- Good photographs
  - Proper exposure
  - Sharp focus
  - Nice composition
  - Good subject
- Great photographs
  - Emotional impact / visual tension
  - Creativity and style
  - Feeling and emphasis
  - Seeing and understanding
  - Unique perspective / lighting
Summary

- The Teton Photography Group and Art Association of Jackson Hole thank you for joining us today and invite you to future presentations
- Enjoy your photographic opportunities
- Understand your photography gear
- Critically review and share your images
- Experiment with new techniques and perspectives
- Learn composition techniques
- Practice, practice, practice but most of all enjoy making photographs

Thank you for joining us!