

The Alchemist's Handbook to Digital Colour

A foundational journey from first principles to creative mastery of Photoshop's blend modes.



Instead of memorising 27 effects, we will learn the system. This guide deconstructs blend modes into their core principles, empowering you to move beyond trial-and-error and apply them with intention and confidence.

The Fundamental Equation of Blending



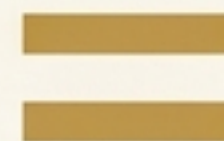
BASE

... The original colour in the image.



BLEND

... The colour applied to the Base layer.



RESULT

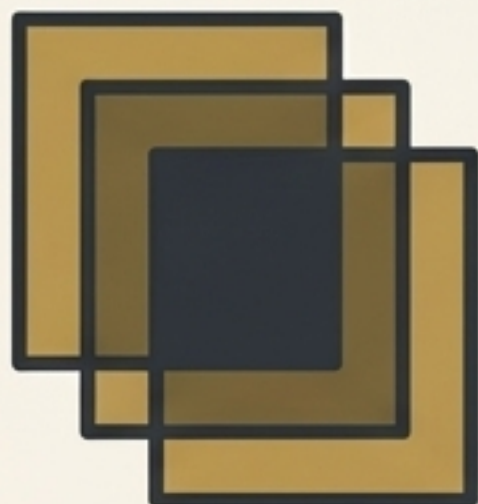
... The colour resulting from the interaction.

Every blend mode is a mathematical equation that takes a pixel from the **Base** layer, combines it with the corresponding pixel from the **Blend** layer, and outputs a **Result**. The chosen blend mode

The chosen blend mode determines the specific algorithm used for this calculation.

The Two Pillars: The Duality of Darkening and Lightening

MULTIPLY (To Darken)



Before

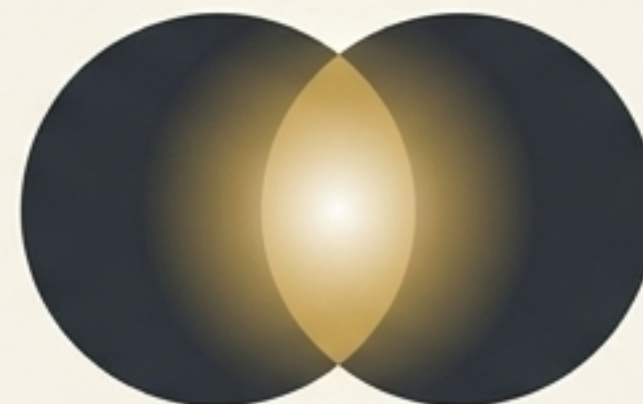


After

Neutral Colour: White

White pixels on the blend layer become transparent, having no darkening effect.

SCREEN (To Lighten)



Before



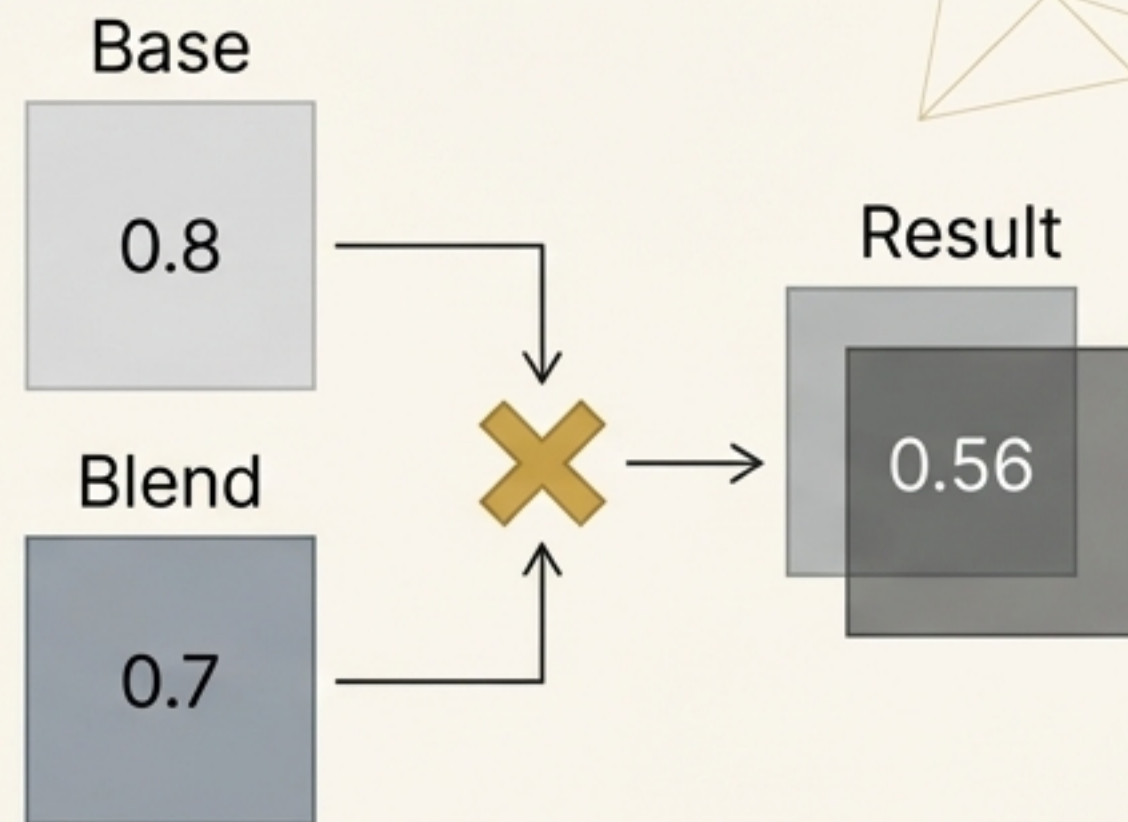
After

Neutral Colour: Black

Black pixels on the blend layer become transparent, having no lightening effect.

The Multiply Mode: Stacking Transparencies

Think of Multiply as stacking photographic transparencies on a light table. The resulting image is always darker, as less light passes through. Any colour multiplied by white remains unchanged; any colour multiplied by black becomes black.



$$\text{Result} = \text{Base} \times \text{Blend}$$

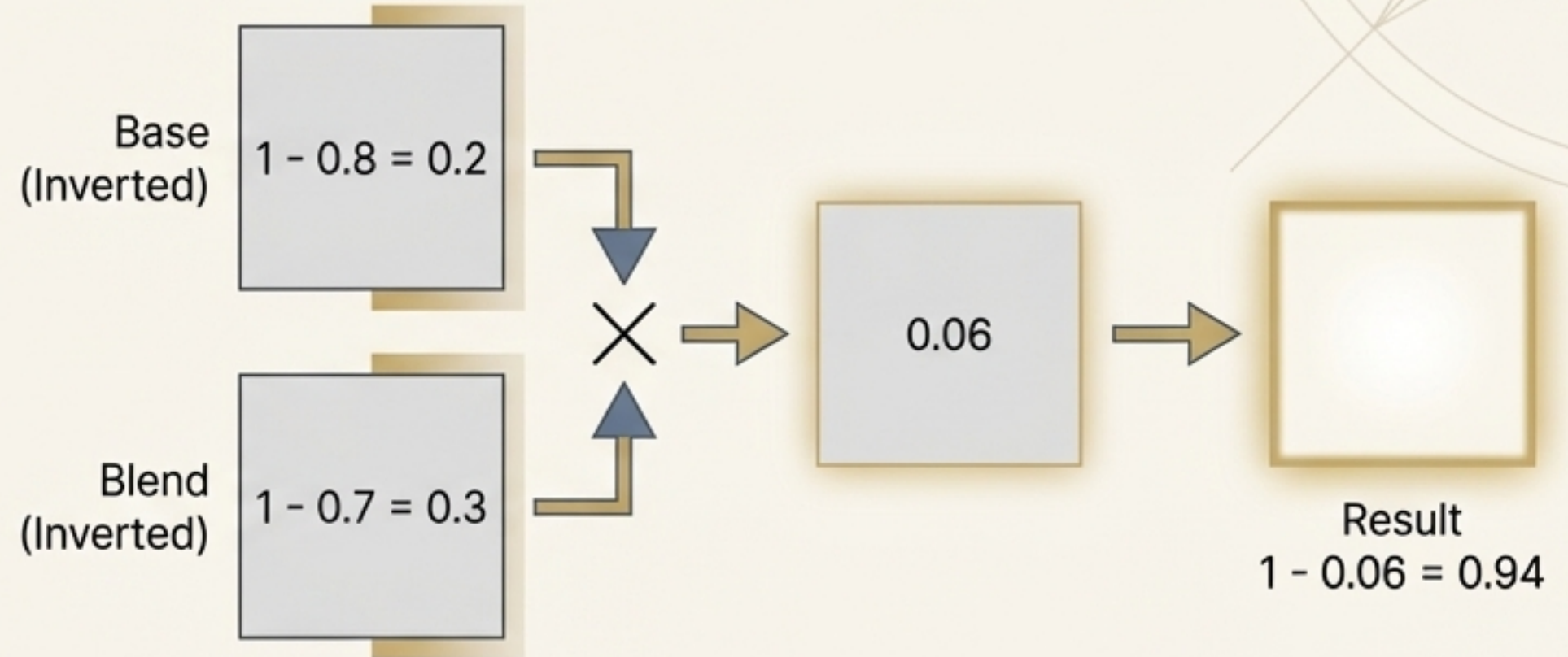
(Assuming normalised values where 0.0 is black and 1.0 is white).

Use Case: Ideal for creating shadows, removing white backgrounds, and darkening images.

The Screen Mode: Projecting Multiple Lights

Think of Screen as aiming two projectors at the same screen. The resulting image is always brighter.

Any colour screened with black remains unchanged; any colour screened with white becomes pure white.



$$\text{Result} = 1 - (1 - \text{Base}) \times (1 - \text{Blend})$$

(This inverts the layers, multiplies them, then inverts the result back).

Use Case: Perfect for creating highlights, removing black backgrounds, and adding light effects like flares or glows.

The Six Families of Blending



Normal

The default state. Blending is controlled by opacity.



Darken

Reduces luminosity. White is the neutral colour.



Lighten

Increases luminosity. Black is the neutral colour.



Contrast

Increases contrast by darkening darks and lightening lights. 50% grey is the neutral colour.



Inversion / Comparative

Creates effects based on the differences between layers.



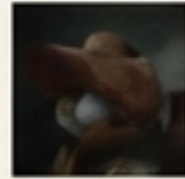
Component

Isolates and combines specific colour properties like Hue, Saturation, or Luminosity.

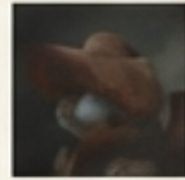
The Darken & Lighten Families: Variations on a Theme

↓ Darken Family

Darken: Compares pixels channel by channel and keeps the darkest value. It doesn't blend, it chooses.



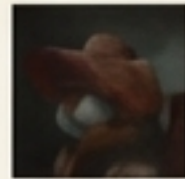
Multiply: Multiplies luminosity for smooth darkening.



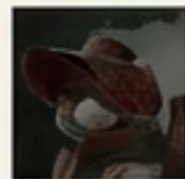
Color Burn: Darker and more saturated than Multiply, increases contrast.



Linear Burn: Darker than Multiply but less saturated than Color Burn.

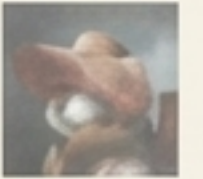


Darker Color: Compares the *composite* brightness and keeps the darkest pixel. Produces harder edges than Darken.

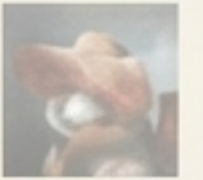


↑ Lighten Family

Lighten: Compares pixels channel by channel and keeps the lightest value.



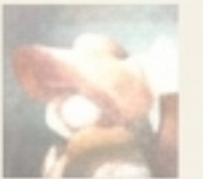
Screen: The inverse of Multiply for smooth brightening.



Color Dodge: Brighter and more saturated than Screen, decreases contrast.



Linear Dodge (Add): Simply adds pixel values for a very bright result.

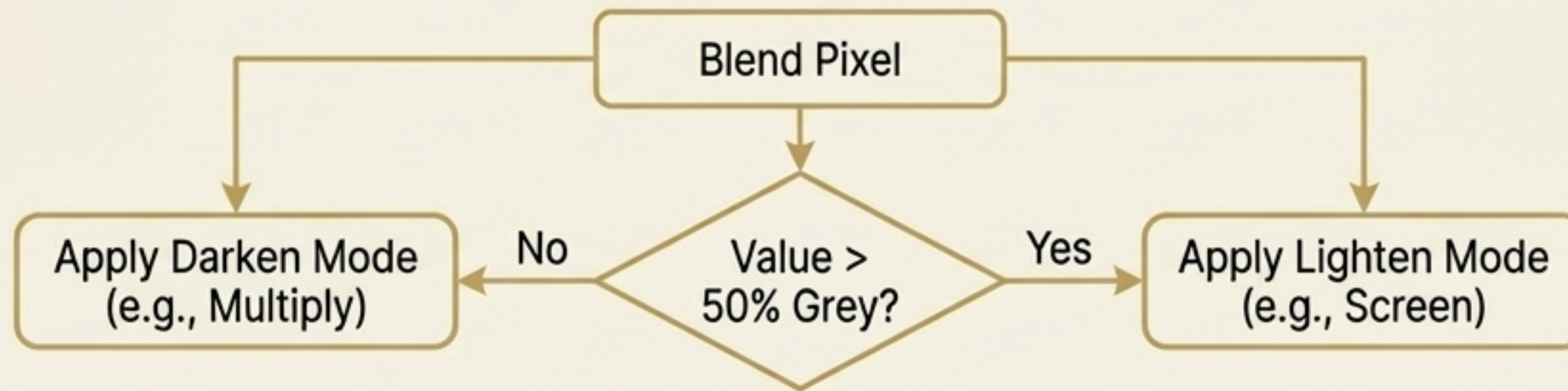


Lighter Color: Compares *composite* brightness and keeps the lightest pixel.

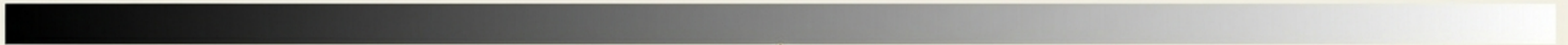


The Contrast Family: The Alchemy of Light and Dark

"The Contrast modes are hybrids. They ask a simple question of the pixels: 'Is this colour lighter or darker than 50% grey?' Based on the answer, they apply a lightening mode (like Screen) or a darkening mode (like Multiply)."



Neutral Colour



Neutral Colour: 50% Grey

Overlay: The classic. Applies Screen to light areas and Multiply to dark areas, based on the **Base** layer's tones. Preserves highlights and shadows while shifting mid-tones.

Soft Light: A more subtle, diffused version of Overlay.

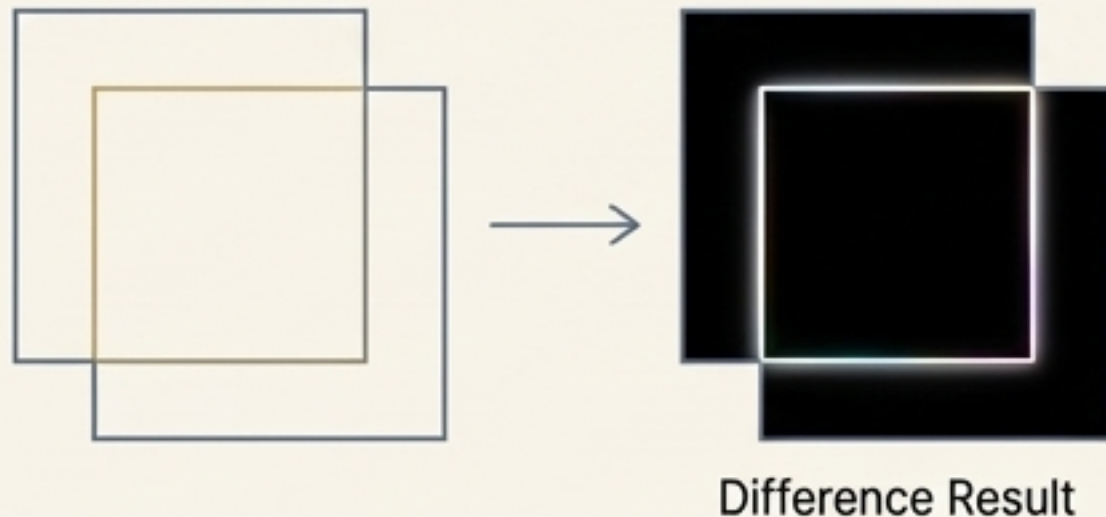
Hard Light: Like Overlay, but bases its decision on the **Blend** layer's tones, resulting in a harsher, more intense effect.

The Specialist Families: Inversion & Component

Inversion / Comparative Modes

These modes are used for technical alignment and creative colour effects by analysing the variations between layers.

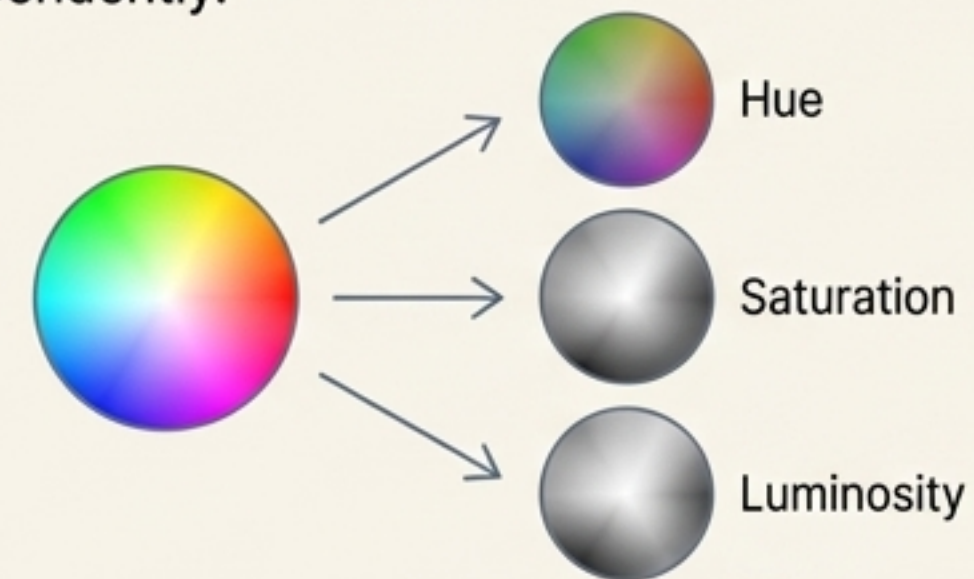
- **Difference:** Subtracts the smaller value from the larger. Identical pixels result in black. Essential for checking layer alignment.



- **Exclusion:** Similar to Difference, but with lower contrast.
- **Subtract / Divide:** Utility modes for drastic darkening or brightening.

Component Modes

These modes deconstruct colour into its core components: Hue, Saturation, and Luminosity (HSL), allowing you to blend them independently.



- **Hue:** Applies the blend layer's colour tint, keeping the base layer's tone and saturation.
- **Saturation:** Applies the blend layer's colour intensity.
- **Color:** Applies the blend layer's hue and saturation, keeping the base layer's luminosity. Perfect for colourising monochrome images.
- **Luminosity:** The inverse of **Color**. Applies the blend layer's tonal structure, keeping the base layer's colour. Ideal for sharpening without affecting colour.

The Alchemist's Secret: Fill vs. Opacity

For 19 blend modes, Fill and Opacity are identical. But for eight 'Special' modes, they produce dramatically different results. This is one of the most powerful and least understood concepts in blending.

The Special 8

- Color Burn
- Linear Burn
- Color Dodge
- Linear Dodge (Add)
- Vivid Light
- Linear Light
- Hard Mix
- Difference

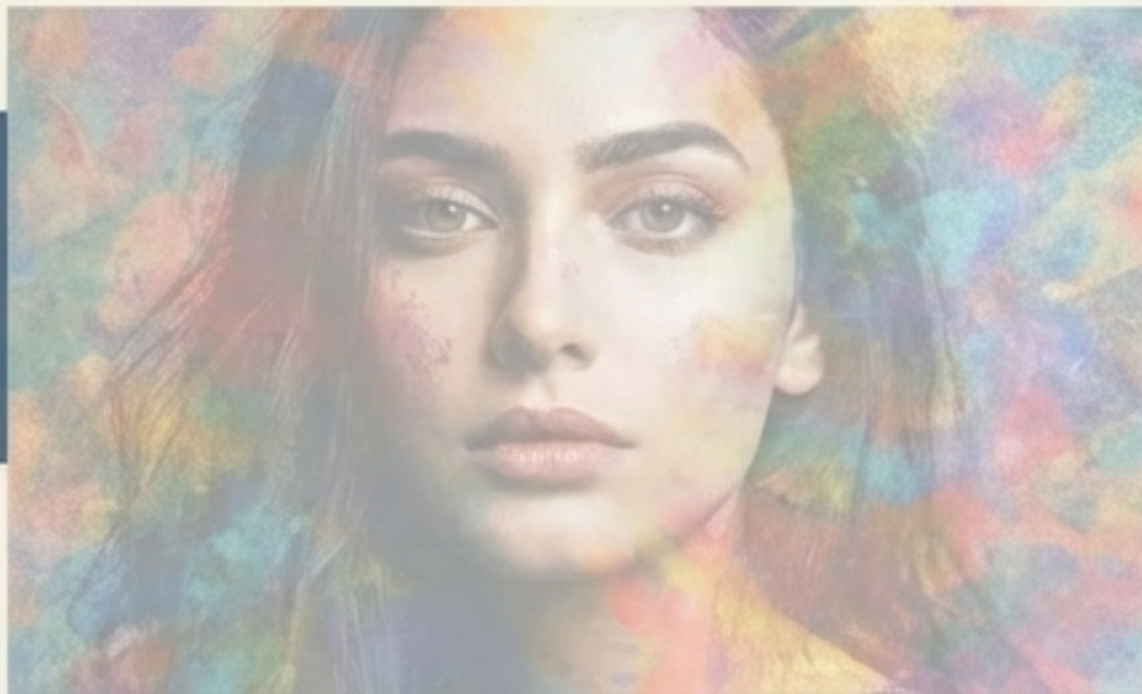
Opacity

Affects the entire layer *after* the blend calculation is complete. It makes the final result translucent.

Fill

Affects the layer's original pixel values *before* they are used in the blend calculation. For the Special 8, reducing Fill scales the *intensity of the blend effect itself*, not just its transparency.

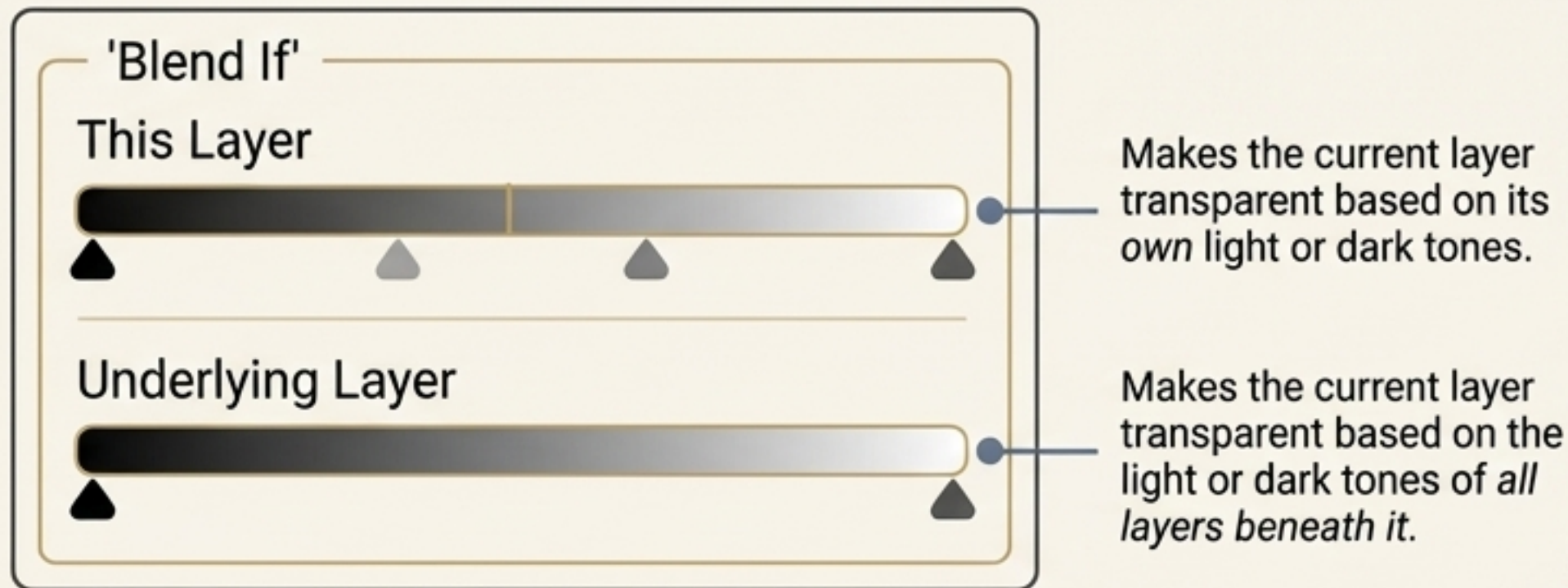
50%
Opacity



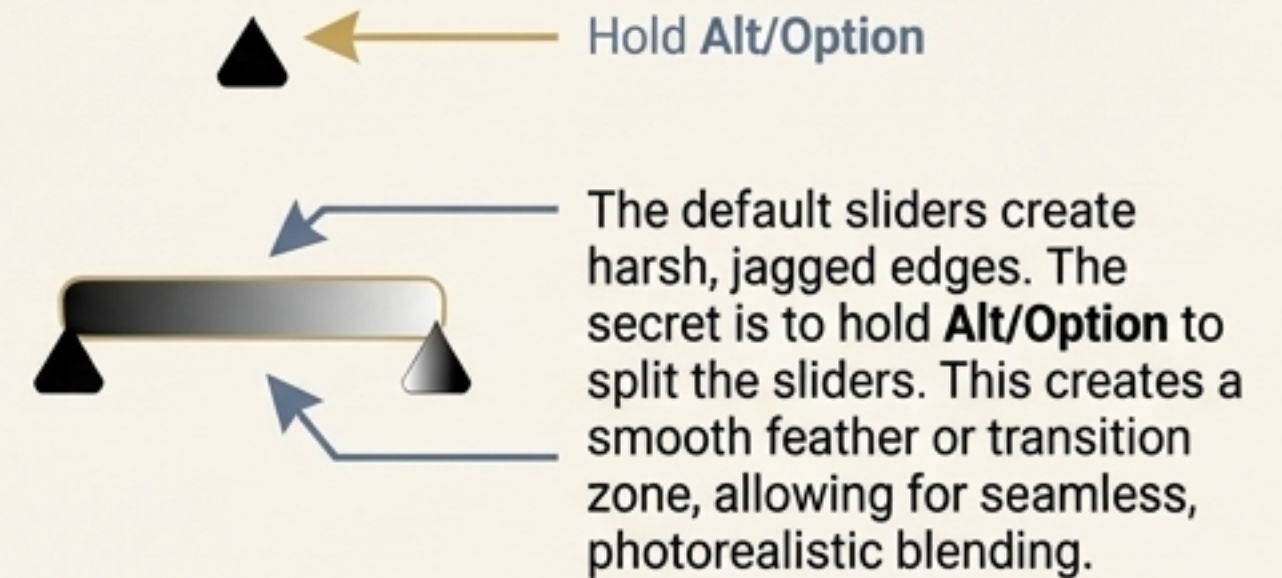
50%
Fill

Precision Control: Tonal Masking with 'Blend If'

"Blend If" is not a blend mode, but a powerful rule set that makes a layer's effect transparent based on luminosity. Think of it as "Make see-through if..."



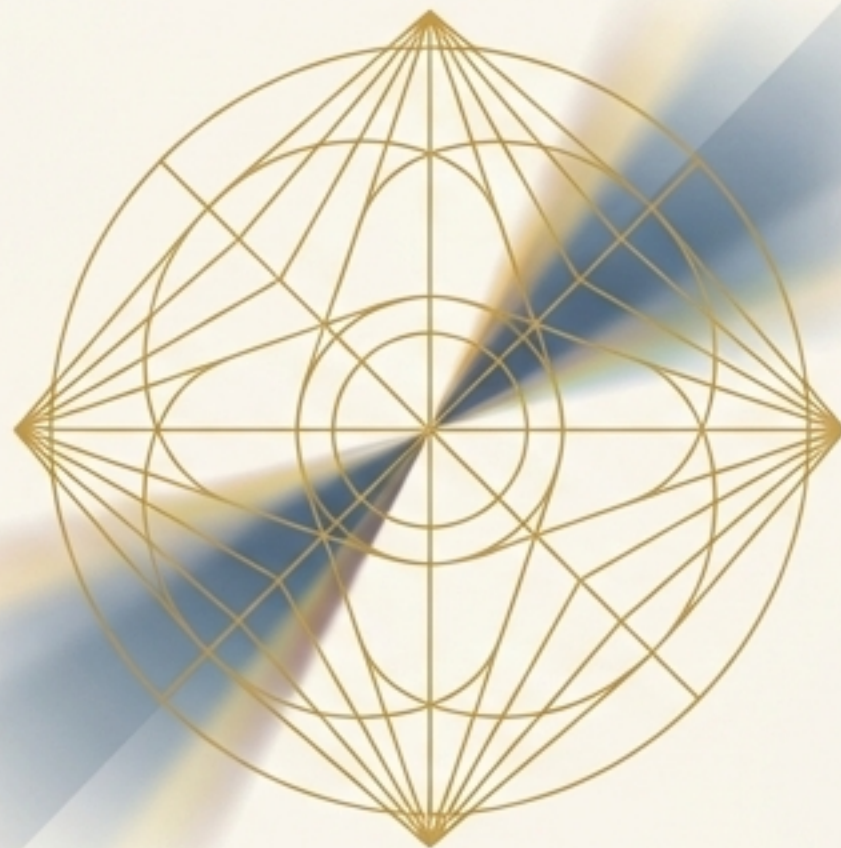
The Pro Technique



Key Advantage

Unlike a static Luminosity Mask, Blend If is dynamic. It constantly re-evaluates the image, and its selection changes automatically if the underlying layers are edited.

Beyond Experimentation: Blending with Intention



You no longer need to cycle randomly through a list. By understanding the six families, the duality of Multiply and Screen, and the precision tools of Fill and Blend If, you possess the foundational knowledge to solve visual problems and achieve creative effects with purpose.

The Alchemist's goal was not to test every combination, but to understand the principles of transformation. Your journey to mastery begins now. Experiment with intention.