Butterfly Lighting Variables

There are several independent variables which will affect the appearance of butterfly lighting making it one of the more versatile patterns for a full-face view:

Key Light Angle - Shadow Length

In a butterfly pattern the key light is placed directly above the center of the nose. The nose shadow is cast straight downward, under the nose. The shape of the shadow resembles a butterfly, which is the origin of the name. The downward angle of the light puts highlights on the forehead, tops of the cheekbones and chin, and an the same time casts shadows under cheekbones, defining a symmetrical "mask" of the face which is immediately recognizable.   The angle of the light, relative to the eye line, is the variable which controls how long the shadows are. When a shallow angle is used the nose shadow will be short. As the key light is raised higher relative to the eye line the nose shadow will become longer.

Shape of the Face - Shadow length and shape

The shape of the nose, cheekbones and brow are also a variable affecting the appearance of the shadows. A small upturned nose will cast a different shadow than a large one with a drooping tip. It is important to watch the eye sockets when positioning the key light because a prominent brow can shade the orbits as the key light is raised.

Key Light Distance - Diffusion and Rate of Fall Off

If key light is moved closer or further away from the face the relationship which creates the shadow shape would remain the same, but the character of the light would change. For any light source as it moves further away the part of the light which actually hits an object creating shadows becomes more parallel, which is why it creates harder-edged shadows. When a large modifier is moved close enough to completely surround the face its light will hit the face from many different directions creating softer-edged shadows. Size and distance of the modifier are variables, but the causative factor for why shadows are hard or soft is how parallel the light rays are when they hit the object casting the shadow. The more directions the light comes from - from a single or multiple sources - the softer the shadows will be.

Because light intensity falls of exponentially as distance increases the front-to-back transition from highlight-to-shadow on a face will also vary with the distance of the light. Moving the key light very close to the face will produce very rapid fall off with the front of the face normally highlighted but the sides and ears hidden in deep shadows. Moving the key light further back - along the same angle - will make the the front-to-back transition from highlight-to-shadow on a face more gradual.

Key Light Close to face: *Diffuse shadows with rapid fall-off front-to-back.*
Key Light Further from face: *More distinct shadows with more gradual fall-off front-to-back.*

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Fill Light

Digital Cameras and color film have a fixed recording range which will result in a loss of shadow detail when highlights are properly exposed with a single light placed at any angle to the face such that it creates shadows. It is necessary to use a reflector or second light to add enough light into the shadows created by the key light to record detail in the image. As with any lighting configuration fill intensity and position play a pivotal role in the overall appearance of of the lighting.

Intensity: The more fill that is added, the more detail there will be in the shadows of the photo. Fill can be increased in intensity to the point where it overpowers the key light and completely eliminates the shadows the key light casts, but at that point fill would change its role and become the "key" light. The amount of shadow detail in and image - the contrast between highlight and shadow - has more influence on perception that lighting on a face is "hard" or "soft" than the shadow transitions which are a function of light distance. Lighting with distinct but very light shadows will be perceived by most as   being "softer" than more diffuse light with very dark shadows.

Direction: Adding light from a second direction affects the character of the shadows cast by the key light. As noted above it is the number of directions the light comes from which is the actual causative factor for diffusion. Adding fill from a different direction than the key light has the same effect on shadow transitions as using a single larger modifier.

> *For example, take two identical medium softboxes and place them side-to-side (touching each other) at 45 degrees from the face to create single large "key" light. If moved one-foot apart the light would have the same character as if a one-foot larger softbox was used. Move them two-feet apart and the light will be similar to a two-foot larger softbox; more diffuse. As the two softboxes are moved further apart along an arc of equal distance the shadow transitions will become more gradual and the shadow detail lighter. The net effect of both is a perception on the part of the viewer that the lighting is "softer" because the shadows are more open and diffuse.*

> *When fill crosses over the camera axis and begins to come from the side opposite the key light several different things begin to occur. Instead of adding light front-to-back to help make the shadow transitions more gradual the fill, now coming from the opposite direction actually makes them more abrupt. The more fill is moved further to the opposite side from the key light the more it "fights" the modeling of the key light rather than assisting it. At the point where key and fill are both at 45 degrees to the face, either horizontally or vertically in a butterfly pattern the lighting becomes flat.*

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When fill is placed near the camera axis it will illuminate all parts of a face evenly with the key light overlapping it to create the lighting pattern the front-to-back fall-off of the fill will combine with the directional fall-off effect of the key light and result in the most gradual transitions from highlight to shadow.

Camera Position

Camera position is also a variable for butterfly lighting, more so that other sideways key light patterns, because it affects how much of the nose shadow is seen. The angle of the light to the nose and the shape of the nose will dictate the shape and length of the shadow hanging down under the nose. That shadow might appear to have the classic "butterfly" shape when the camera is at eye level or below, but if the camera position is raised up closer to the position if the key light with the angle of the face to the light remaining the same, the change in point of view will result in most of the shadow being hidden under the nose. The shadow is still exactly the same, but the camera doesn't see it because the nose is blocking it. That explains why some "butterfly" patterns don't have the characteristic nose shadow. Its there, but hidden from view by the top of the nose, which is actually the most flattering combination of variables because the very flattering modeling of the nose, cheekbones, chin and mouth are still seen but the undesirable distracting nose shadow is eliminated.

Creative control - No Rules, just cause and effect

The factors affecting the appearance - angle, size of modifier, distance to face, amount of fill, camera height - can be used in an infinite number of combinations to create infinite variations of what is generically called a "butterfly" lighting pattern. There are no rules, or "right" or "wrong" way to use butterfly lighting, only cause and effect. Hopefully the above explanations of the variables increase your understanding of what is actually causing the lighting you see on the face in ways you had not considered or understood before.