

Cornsweet illusion

An optical illusion by Kenneth Craik and Vivian O'Brien,
described in detail by Tom Cornsweet

This illusion occurs when one side of the object appears to be darker than the other because of the gradient within it. This false perception occurs because our brain perceives the details of a shape using the information from its edges.



For example, the square on the left appears to be darker than that on the right.



By covering the gradient on the center, it is evident that both the squares are similar in brightness. The central section creates a false perception that the square with the lighter gradient is lighter in color than the square with the darker gradient.

This is because the gradients on the edges of the squares towards the center make us perceive the entire squares to be lighter or darker than they actually are. Our brain applies the overall brightness of the gradients to their respective squares.

Which row of green diamonds is the darkest?



Is the top row of diamonds the darkest?
It does look darker than the bottom row, doesn't it?

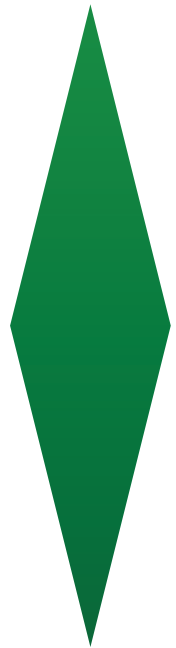
But in fact, each of these diamonds is exactly the same! They just look different due to the cumulative cornsweet effect.

What causes the illusion?

Each of these green diamonds has a subtle gradient of light to dark green from top to bottom. The diamonds adjoining the darker part of the gradient appear to be lighter and the diamonds besides the lighter part appear to be darker.

Because of this cumulative cornsweet effect, the top row of diamonds looks the darkest and the bottom-most row looks lighter than the others. This leads our brain to believe that the diamonds get darker as they move to the top i.e., in the direction opposite to the direction of the gradient inside each diamond.

The gradient is subtle, to make us not recognize it immediately but just enough to create the illusion.



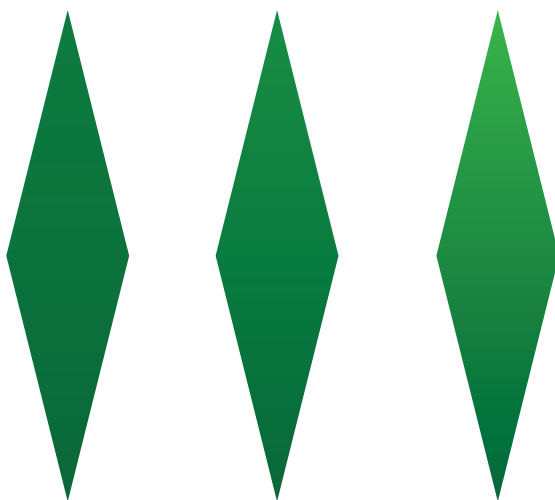
What enhances/diminishes the illusion?



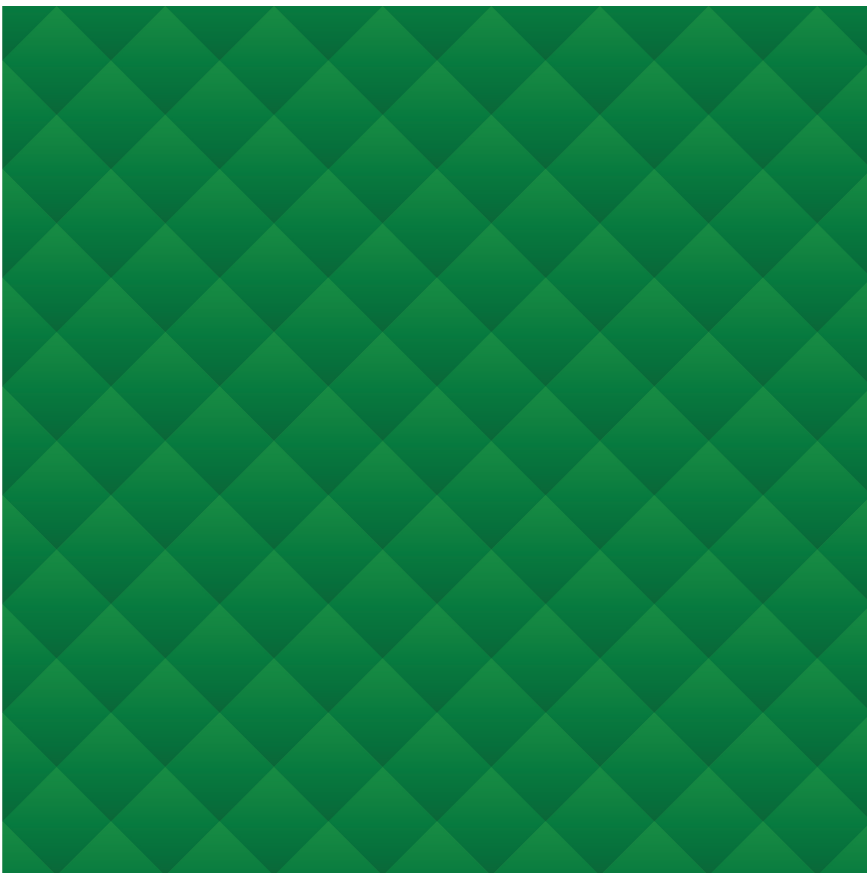
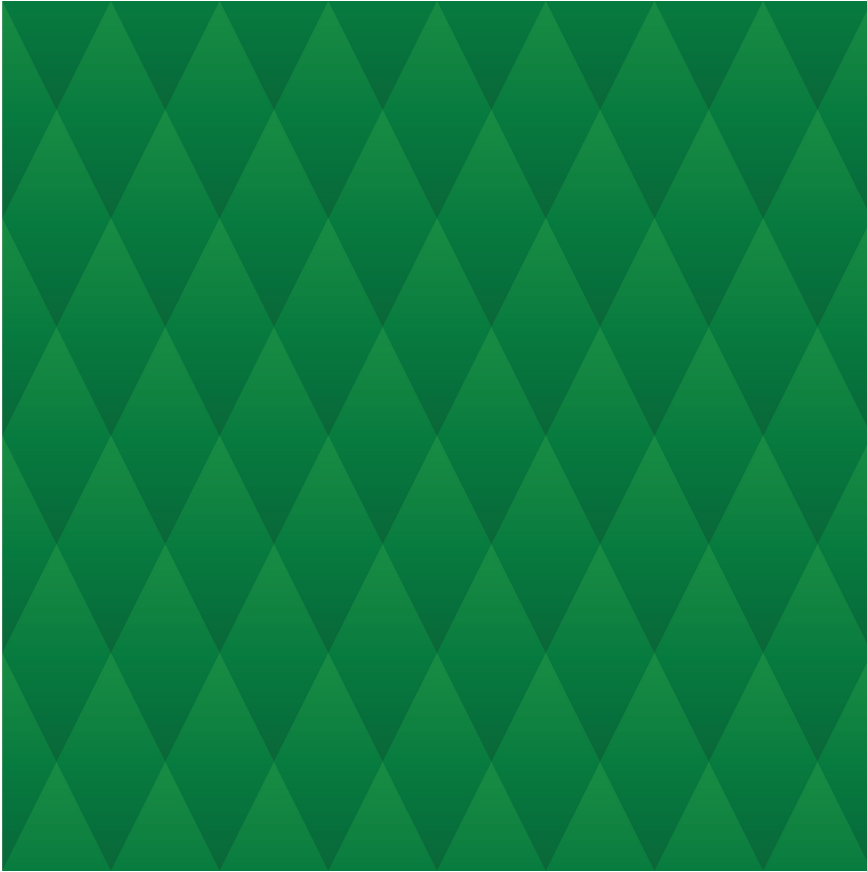
Making the gradient too subtle decreases the cornsweet effect since the difference between the dark and light greens are too low to be perceived.



Making the gradient too pronounced decreases the cornsweet effect since it becomes easier for our brain to perceive the obvious gradient in the individual diamonds.



The gradient needs to be just enough to cause the illusion, without being too obvious.



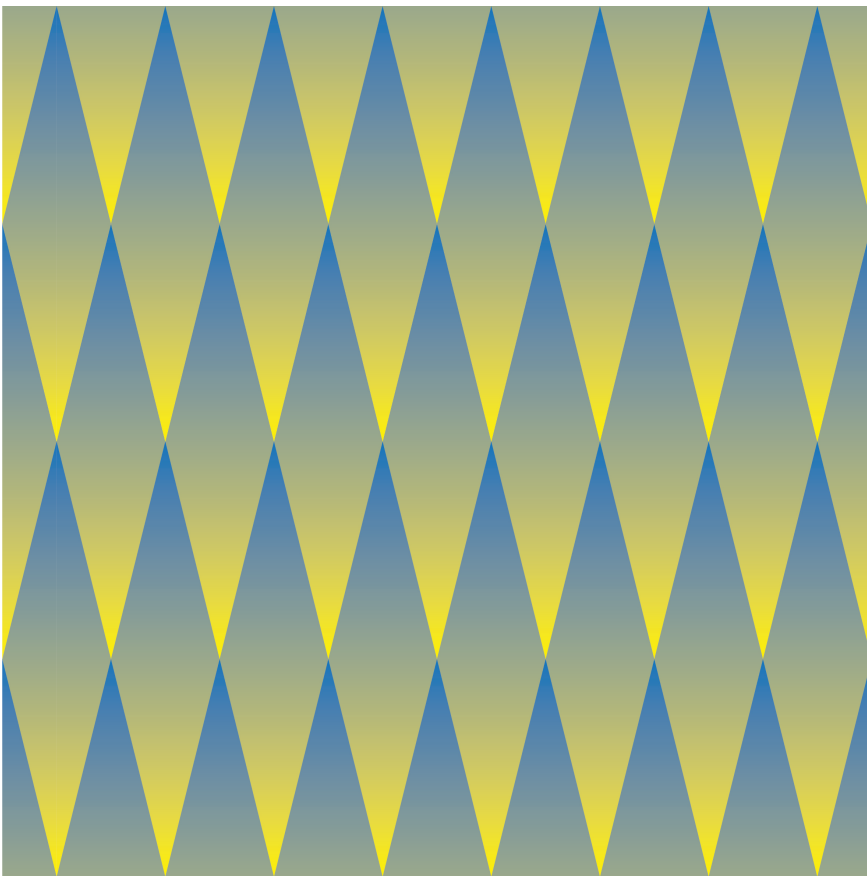
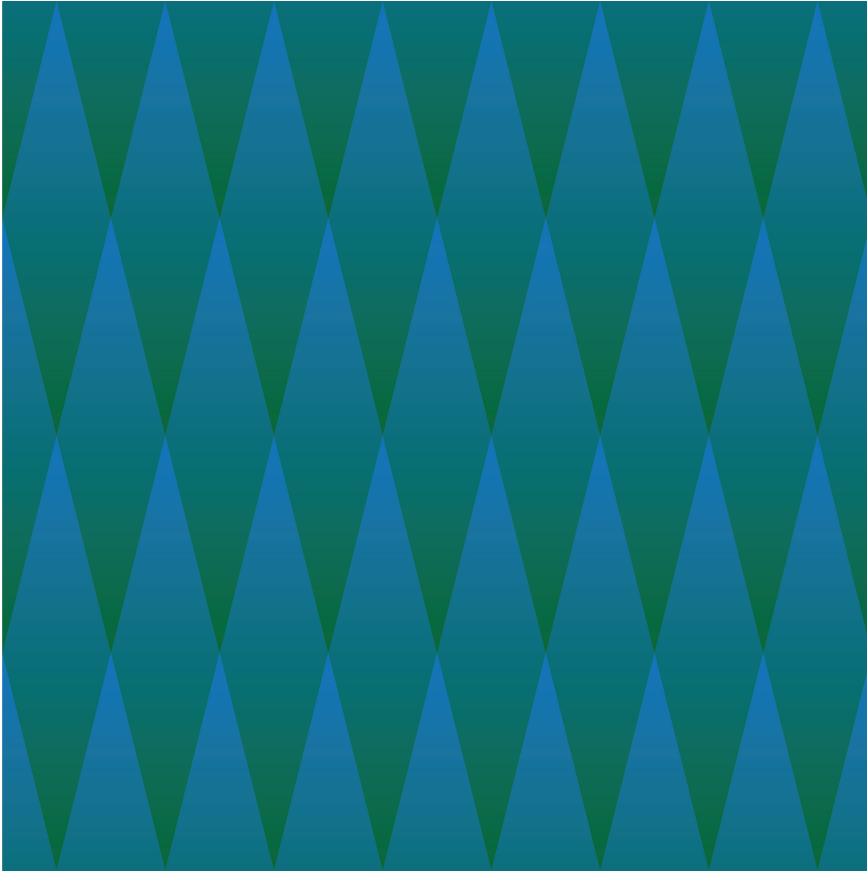
Reducing the height of the diamonds substantially decreases the cornsweet effect, since the gradient can easily be perceived here.



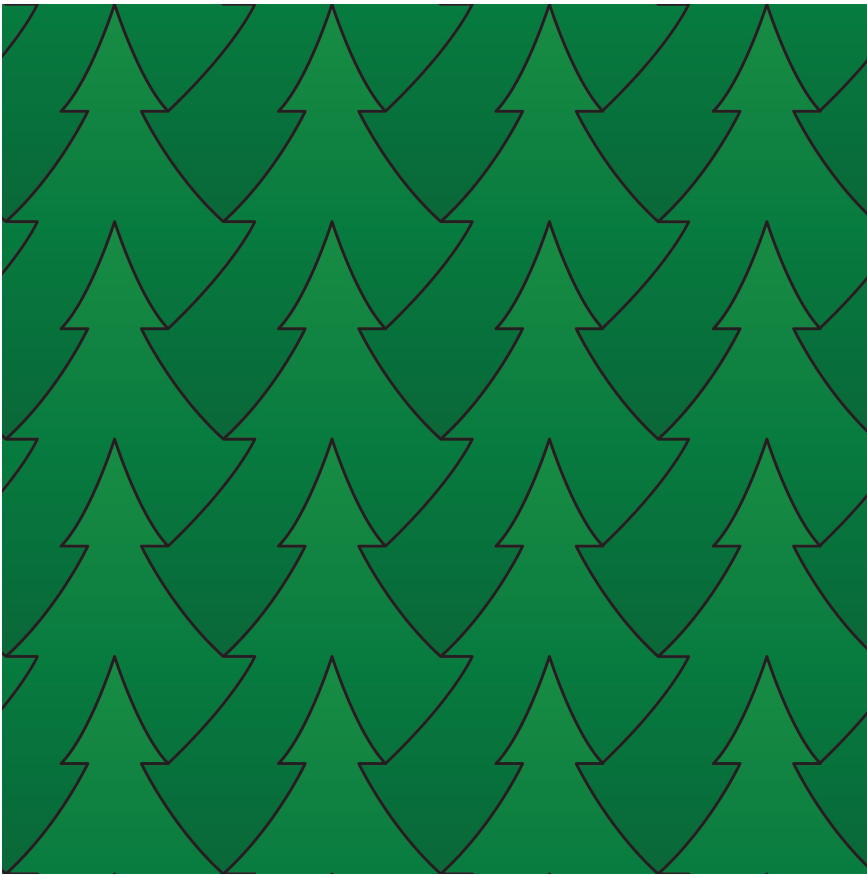
The effect is not observed if the shapes are not adjacent.



It can occur in various repeating shapes, as long as they are adjoining.



Cornsweet effect can not be observed in multiple color gradients. Keeping it monochromatic is the key.



Borders around the shapes decrease the effectiveness of Cornsweet illusion by enhancing the gradient within individual objects.

How can cornsweet illusion be used in design?

Graphic design:

To create visual effects in illustrations, posters, etc.

Photography:

By playing with light and shadows, cornsweet illusion can be used to obtain desired results in photographs.

References:

Bach, M. (2002, June 13). *Craik-O'Brien-Cornsweet illusion*. Michael Bach.

<https://michaelbach.de/ot/lum-cobc/index.html>

Cornsweet illusion. (2021, November 4). In *Wikipedia*.

https://en.wikipedia.org/wiki/Cornsweet_illusion#cite_ref-1

Dean, J. (2011, May 1). *Blue Diamonds Optical Illusion*. Mighty Optical Illusions.

<https://www.moillusions.com/blue-diamonds-optical-illusion/>