Perception Of Color

EXPLORE COLOR WITH A BENHAM'S DISK

1. Cut out the Benham's Disk Pattern and glue it to the top of a piece of thin cardboard. Be careful when cutting, It is important that the circle is as round as possible.
2. Place a small drop of glue at the center of the circle & on the metal part of the pushpin.
3. Before the glue dries, push the pushpin through the center of the circle & then into the eraser of the pencil.
4. In a well-lighted area, roll the pencil between the palms of your hands. As the card spins, look at the patterns & make note of any change in the pattern as well as color on the spinning disk. The colors are seen best at slow speeds (between 3-5 rotations/second)

ASK THIS:
What colors do you see? (People see different colors.)
What happens if you spin the top the opposite way?
What happens as the disk slows?
What happens if you draw on the disk or change the disk pattern?

The Sceince

The retina of the eye is composed of two types of receptors sensitive to light: cones and rods. Cones are important for color vision and for seeing in bright light. Rods are important for seeing in low light.

It is possible that the colors seen in spinning Benham disks are the result of changes that occur in the retina and other parts of the visual system. For example, the spinning disks may activate neighboring areas of the retina differently. In other words, the black and white areas of the disk stimulate different parts of the retina. This alternating response may cause some type of interaction within the nervous system that generates colors.

Another theory is that different types of cones take different times to respond and that they stay activated for different amounts of time. Therefore, when you spin the disk, the white color activates all three types of cones, but then the black deactivates them. The activation/deactivation sequence causes an imbalance because the different types of cones take different times to respond and stay on for different times. This imbalance in information going to the brain results in colors.

Neither of these theories explains the colors of Benham's disk completely and the reason behind the illusion remains unsolved.

The colors that you see when you spin Benham's disks have been called "subjective colors," "Fechner-Benham colors," "Prevost-Fechner-Benham colors," "polyphan colors," and "pattern-induced flicker colors

Taken in part from **Janice VanCleave's Big Book Of Science Experiments**

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