**Color Wagon Wheel**

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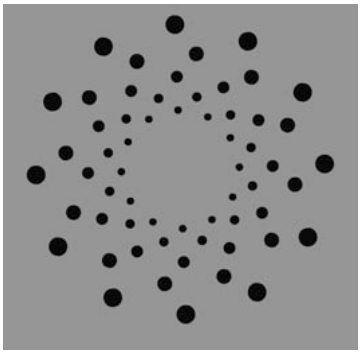
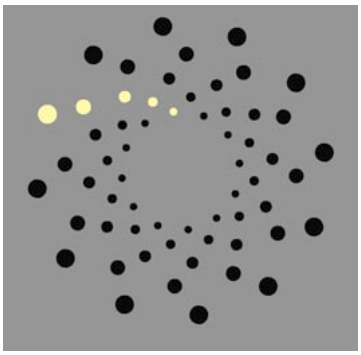
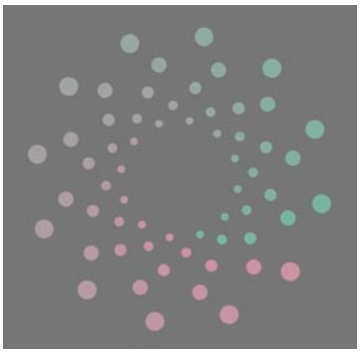
We show a series of illusions that arise when colors are added to the wagon wheel illusion.



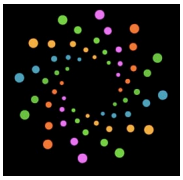
**Demo 1: Standard wagon wheel:** A spiral ring is made up of black disks, each separated by 30 deg. On each frame, the ring rotates clockwise by 25 deg but appears to rotate counterclockwise. This is the standard wagon wheel effect. This effect occurs because with each step of the wheel, counterclockwise motion information is generated.

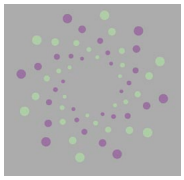


**Demo 2: Basic wagon wheel with color:** If some of the disks are colored, then the "true" direction of motion is revealed. An observer can track the colored disk and see that the ring is actually moving clockwise. It is as if there are two motion responses: one that follows the motion energy signal and goes counterclockwise, and another motion signal that follows the features and goes clockwise.



**Demo 3: Equiluminant wagon wheel:** The disks are shaded along the L-M equiluminant line in MacLeod-Boynton color space. The user can adjust the luminance of the background. When the background is bright or dark, motion can be seen in both the counterclockwise and clockwise directions. However, if the background has the same luminance as the disks (roughly a value of 128), then only clockwise motion is observable--it is as if at equiluminance, the motion energy signal disappears, and only the feature motion remains.





**Demos 4 and 5: Alternating and Multicolor disks:** In both of these demos, the disks are multiple colors and have different brightness levels. By adjusting the luminance of the background, it is possible to make different motion signals predominate. Curiously, the effect depends critically on viewing distance, indicating that the different sources of motion information operate at different spatial scales.

**Why is this important?** Last year, Shapiro and Caplovitz showed how features in objects can be exchanged but the result depends on the contrast information. Here we are exploring many of the same ideas. The color wagon wheel demonstrates methods for separating different motion responses, and how these responses depend on the contrast between objects, and objects and background. The displays presented here primarily show a separation two different motion responses, but the effect can also be created with textures, objects, and faces instead of just colored dots.