The Ghostly Gaze Illusion

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The face below stares in opposite directions (extreme left vs extreme right), depending on viewing distance. At close range (up to about 40-50 cm), the eyes appear to be gazing to the left. However, from further away (beyond about 3-4 m), the same eyes appear to be looking to the right.

The figure was constructed by combining spatial frequency information from two whole-face images that differed only in their gaze direction. A low-pass filter was applied to the right gaze version of the image, and a high-pass filter was applied to the left gaze version. The filtered images were then merged to produce the final figure.

The illusion sheds new light on the role of luminance cues in computing eye direction. Previous findings have led to the proposal that gaze direction judgments follow a simple heuristic that assigns the iris to the dark part of the eye. In the present figure, each eye is physically darker on the right side than on the left. Despite this, the eyes appear to be looking to the left when viewed at close range. This observation demonstrates that gaze estimation is not always dominated by gross luminance distribution across the eye. Other cues to iris position are present in the image, notably the faintly visible pupil and the convex outline of the iris. Apparently these cues can override competing luminance cues when they become visible at close range. The somewhat spooky result is a striking reversal of perceived gaze direction in the context of a fixed physical image.

Jenkins, R. (2007). The lighter side of gaze perception. *Perception, 36*, 1266 – 1268.

http://www.michaelbach.de/ot/fcs_ghostlyGaze/index.html

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Step forward, she stares to the left,
Step back, she stares to the right.