

The Case Against Reality

*Why Evolution Hid
the Truth from Our Eyes*

DONALD
HOFFMAN

Figures from the book

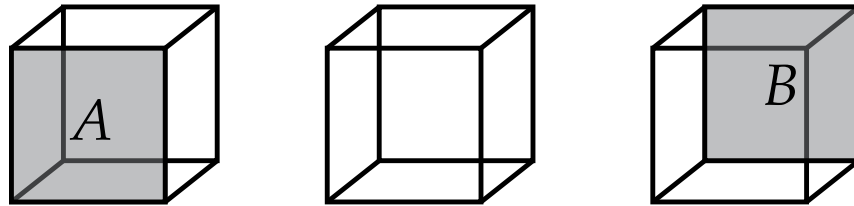


Fig. 1: The Necker cube. When we view the cube in the middle, we sometimes see face A in front, but at other times we see face B in front. © DONALD HOFFMAN

	Hawk	Dove
Hawk	-30	20
Dove	0	10

Fig. 2: Expected payoffs in a hawk-dove game. A hawk, for instance, loses 30 points if it meets another hawk, but gains 20 points if it meets a dove. © DONALD HOFFMAN

	Hawk	Dove
Hawk	-10	40
Dove	0	20

Fig. 3: Expected payoffs in a second hawk-dove game. A hawk now loses 10 points if it meets another hawk, but gains 40 points if it meets a dove. © DONALD HOFFMAN

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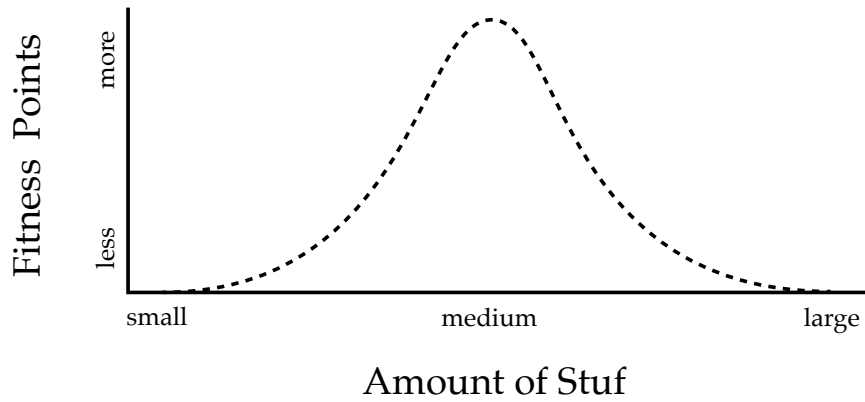


Fig. 4: A fitness function. In this example, small or large amounts of a resource are bad for fitness. Intermediate amounts are best for fitness. © DONALD HOFFMAN

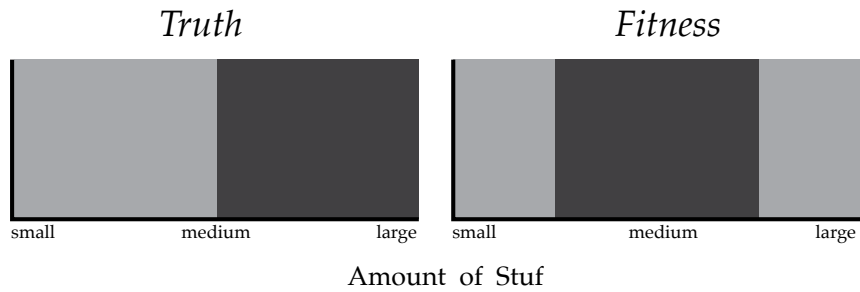


Fig. 5: Seeing truth versus seeing fitness. The shades of gray seen by *Truth* report the amount of a resource but not the fitness payoffs. The shades of gray seen by *Fitness* report the fitness payoffs. © DONALD HOFFMAN

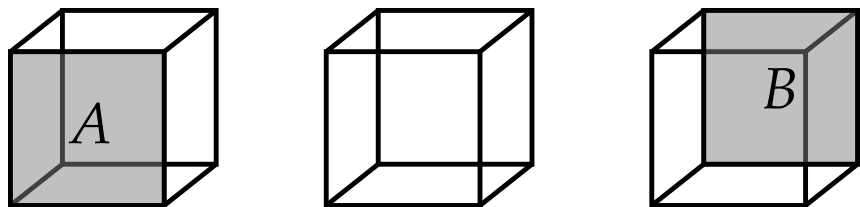


Fig. 6: The Necker cube. Which cube is there when you don't look? The cube with face A in front, or the cube with face B in front? © DONALD HOFFMAN

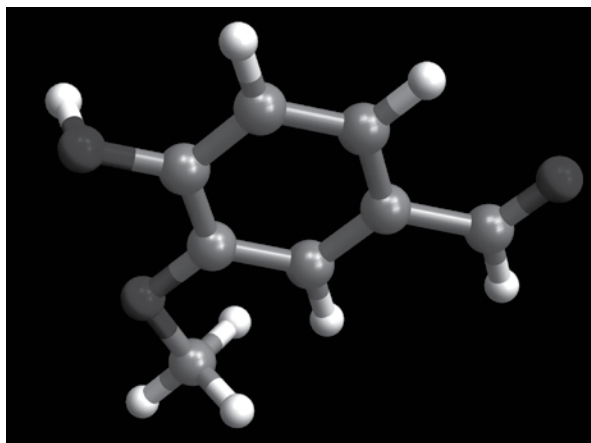


Fig. 7: A molecule with a special taste. © DONALD HOFFMAN



Fig. 8: Image of Twin Quasar QSO 0957+561 taken by the Hubble Space Telescope. Credit: ESA/NASA

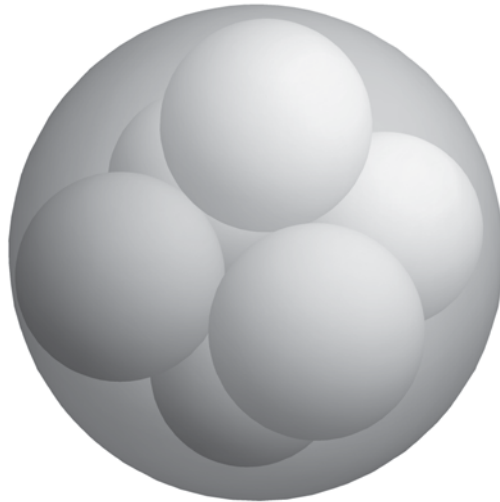


Fig. 9: Six spheres packed inside a larger sphere. The six smaller spheres can hold more information than the larger sphere that surrounds them. © DONALD HOFFMAN

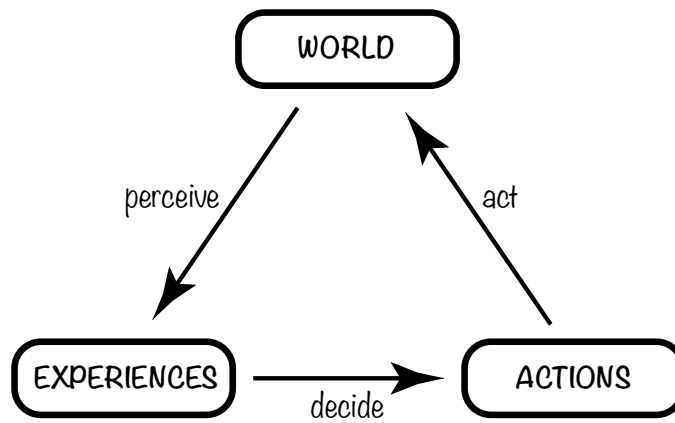


Fig. 10: The "perceive-decide-act" (PDA) loop. Natural selection shapes this loop so that experiences guide actions that enhance fitness. © DONALD HOFFMAN

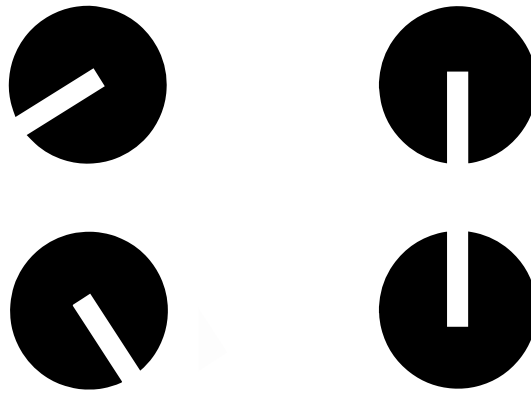


Fig. 11: Correcting an erased line. The visual system creates a line between the two disks on the right to correct an erasure error. © DONALD HOFFMAN

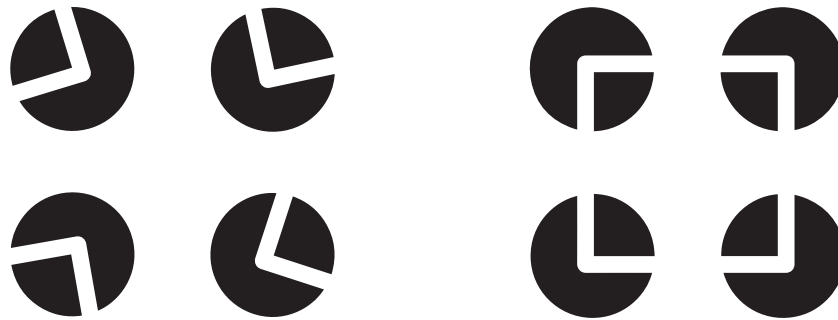


Fig. 12: Correcting an erased square. The visual system creates a square over the four disks on the right to correct an erasure error. © DONALD HOFFMAN

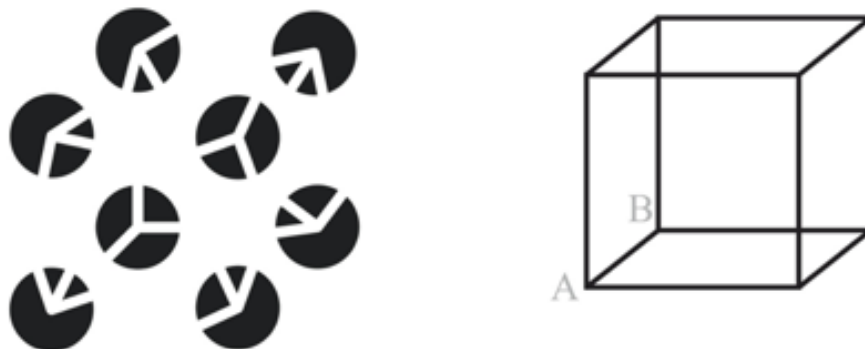


Fig. 13: Correcting an erased cube. The visual system creates a cube on the right to correct an erasure error. © DONALD HOFFMAN

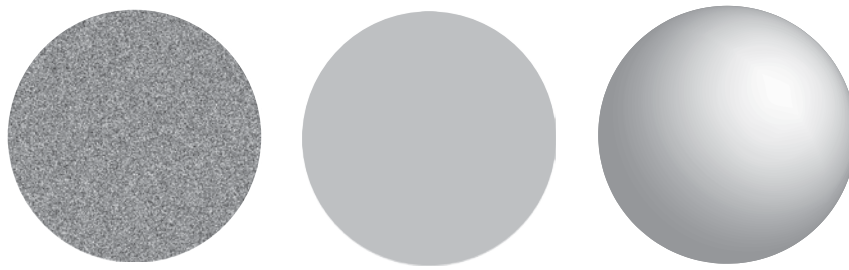


Fig. 14: Shaded disks. The random shading of the left disk and the uniform shading of the middle disk makes them look flat. The shading of the right disk makes it look like a sphere. © DONALD HOFFMAN

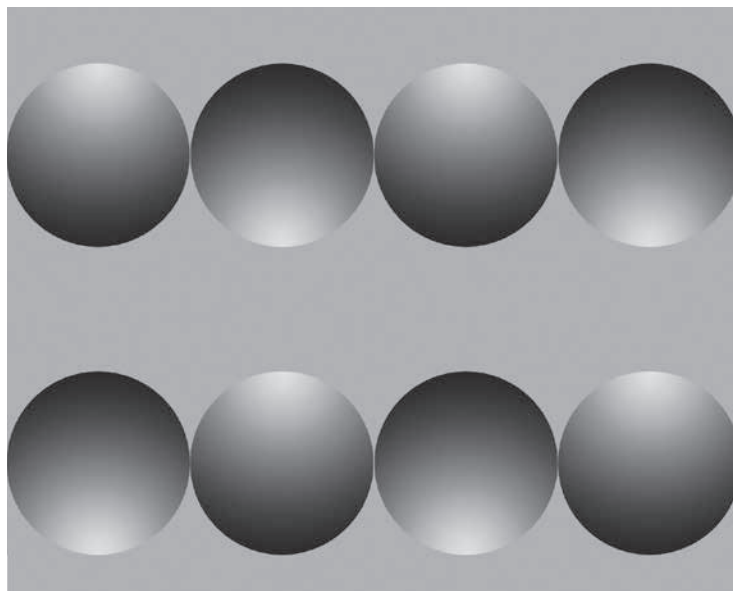


Fig. 15: Convex and concave disks. We assume that the light source is overhead. © DONALD HOFFMAN

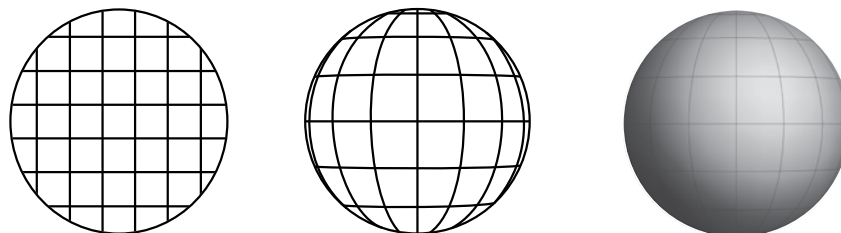


Fig. 16: Inflating the third dimension. We sometimes interpret curving contours as a shape with depth in three dimensions. © DONALD HOFFMAN



Fig. 17: Enhancing the body with jeans. The left side looks flat. The right side looks firm and toned. The difference is due to careful use of visual cues for depth. © DONALD HOFFMAN

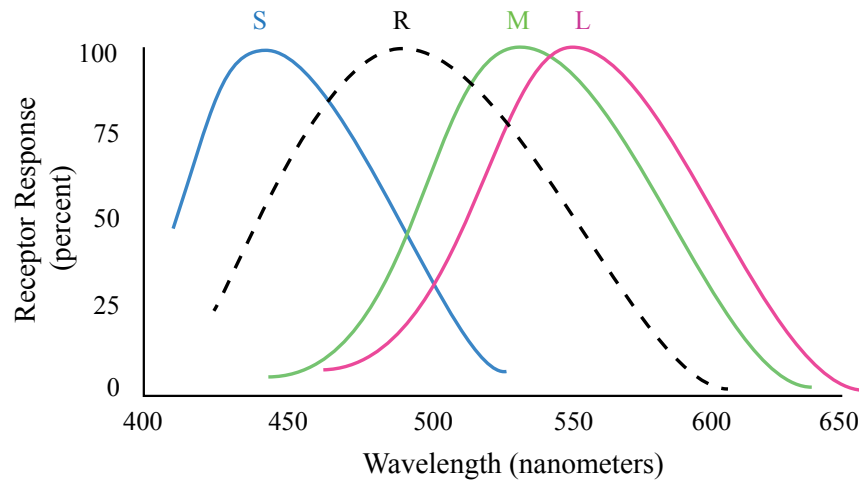


Fig. 18: Sensitivity curves for the three types of cones in the retina of the eye (L, M, and S). The sensitivity of rods, which mediate vision in low light, is given by the "R" curve. © DONALD HOFFMAN

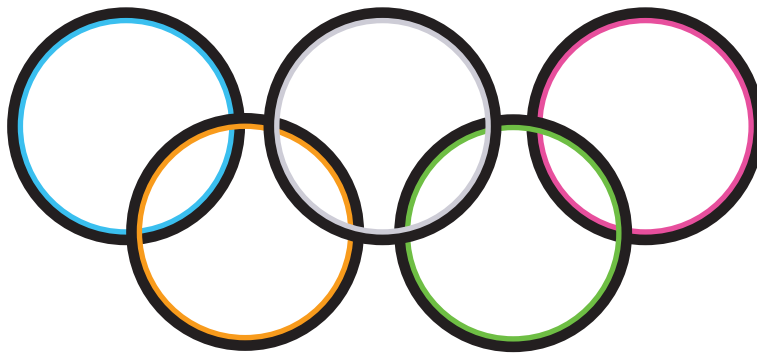


Fig. 19: The Olympic rings illusion. The colors that fill each ring are illusory. The visual system creates them to correct an erasure error. © DONALD HOFFMAN

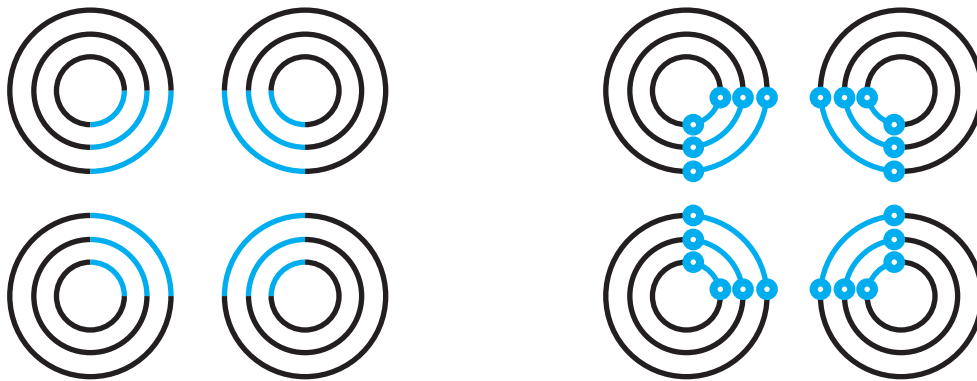


Fig. 20: The neon square illusion. The glowing blue square is illusory. The visual system creates it to correct an erasure error. © DONALD HOFFMAN

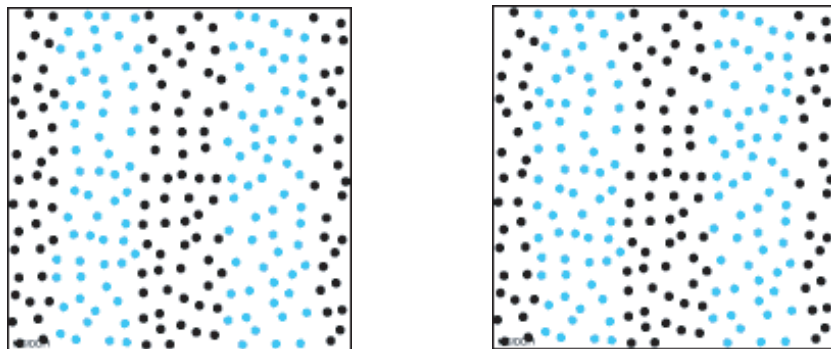


Fig. 21: Two frames of dots from a movie. When the frames are displayed as a movie, the visual system creates blue bars that move, glow, and have sharp edges. © DONALD HOFFMAN

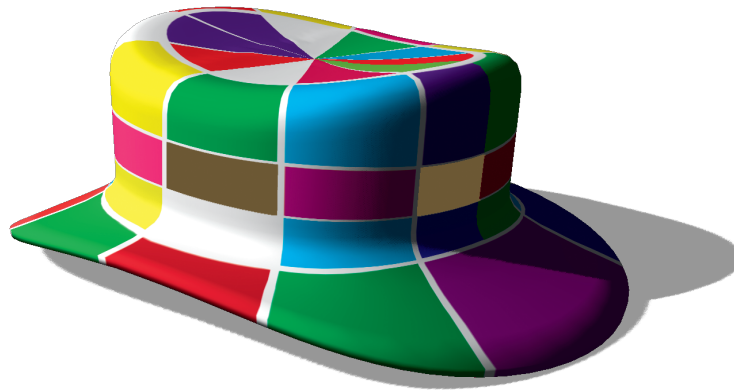


Fig. 22: Joseph's hat illusion. The brown rectangle on the left side of the hat is printed in the same color ink as the yellow rectangle on the front of the hat. © DONALD HOFFMAN

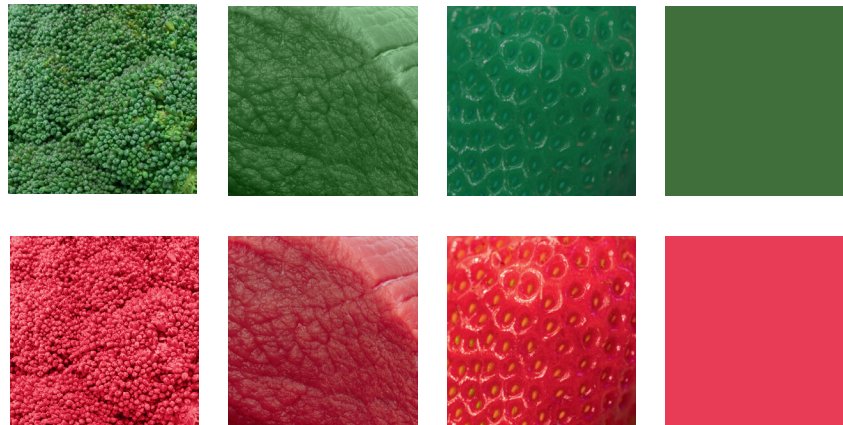


Fig. 23: Eight chromatures. Chromatures are more versatile than uniform color patches at triggering specific emotions. © DONALD HOFFMAN



Fig. 24: Four red chromatures. Red only triggers hunger if the texture is appropriate. © DONALD HOFFMAN



Fig. 25: Change blindness. There are three differences between these two images.
© DONALD HOFFMAN

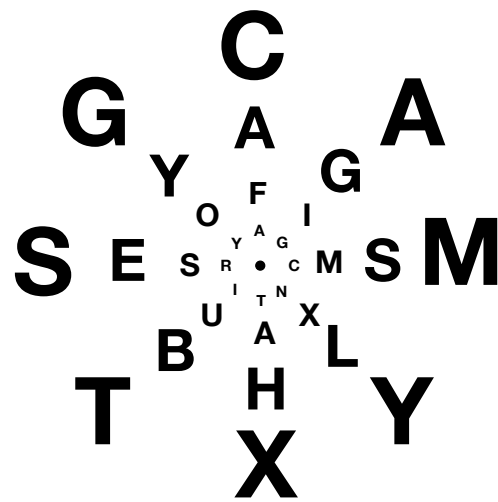


Fig. 26: Visual acuity. If you stare at the middle dot, the big letters are as clear as the smaller. © DONALD HOFFMAN

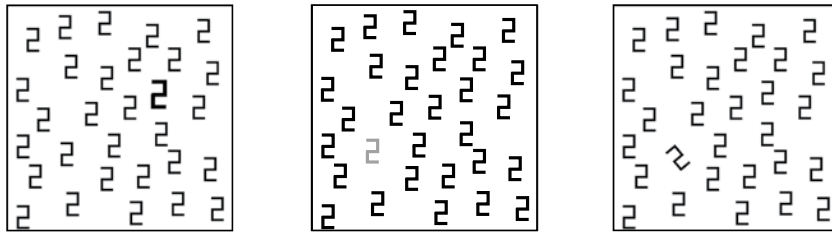


Fig. 27: Pop out. We easily see the large 2 in the left box, the lighter 2 in the middle box, and the tilted 2 in the right box. © DONALD HOFFMAN

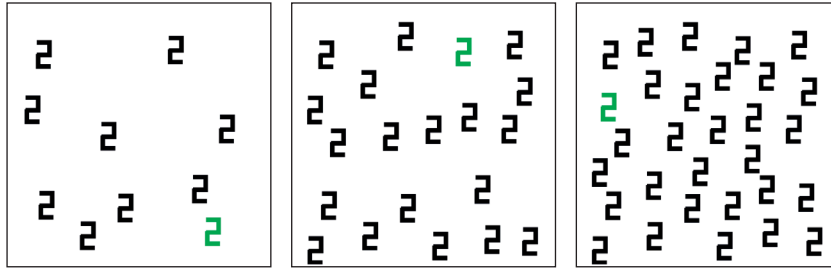


Fig. 28: Color pop out. The green 2 is easily seen even when surrounded by many black 2s. © DONALD HOFFMAN

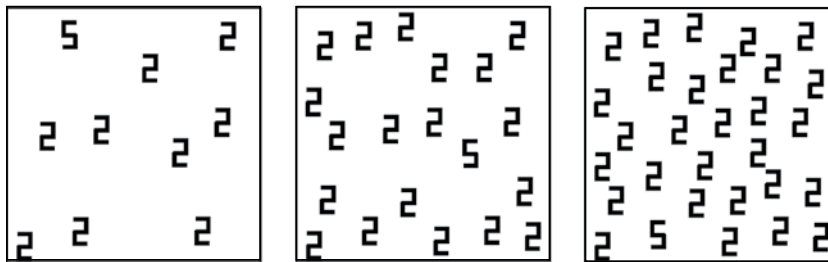


Fig. 29: Difficult search. The 5 in each box does not pop out. One must search for it. © DONALD HOFFMAN

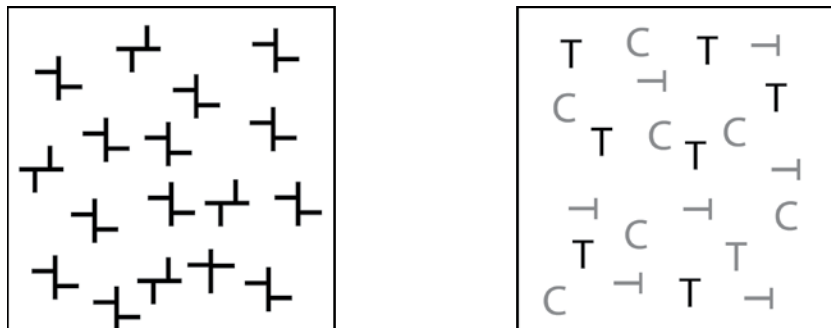


Fig. 30: Difficult search. The cross in the left box and the gray upright T in the right box do not pop out. © DONALD HOFFMAN



Fig. 31: A store window display. This display makes it difficult to find brand or product information. © DONALD HOFFMAN

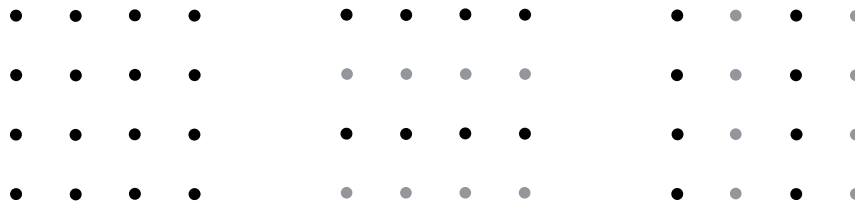


Fig. 32: Grouping by brightness contrast. We see horizontal groups in the middle figure and vertical groups in the figure on the right. © DONALD HOFFMAN

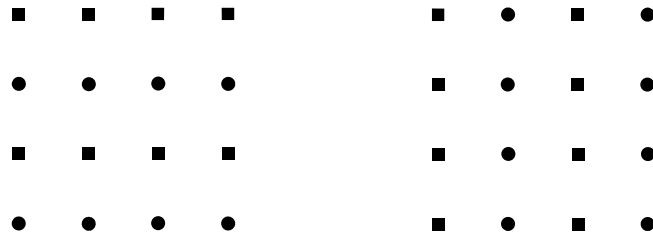


Fig. 33: Grouping by shape. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

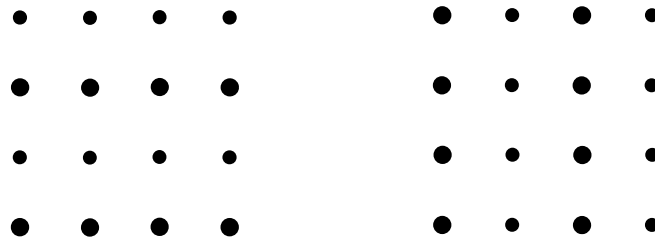


Fig. 34: Grouping by size. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

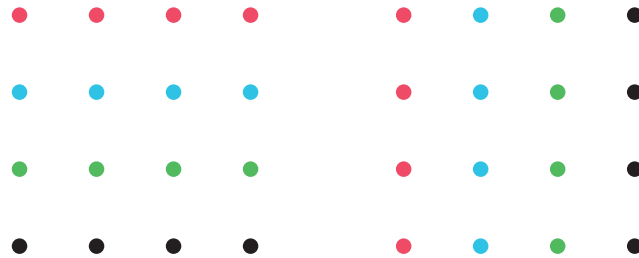


Fig 35: Grouping by color. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

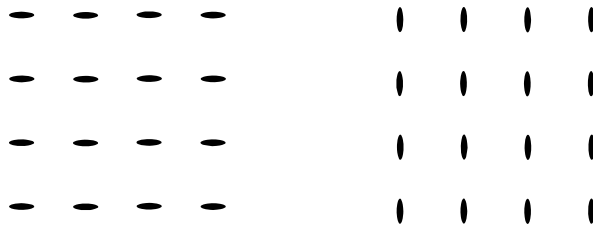


Fig. 36: Grouping by orientation. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

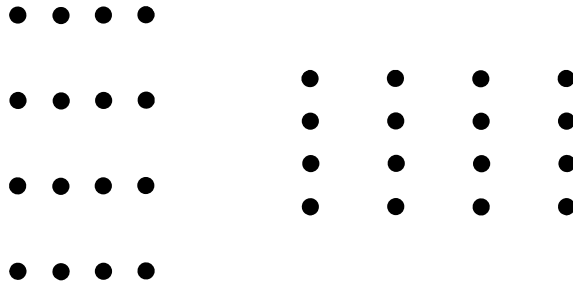


Fig. 37: Grouping by proximity. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

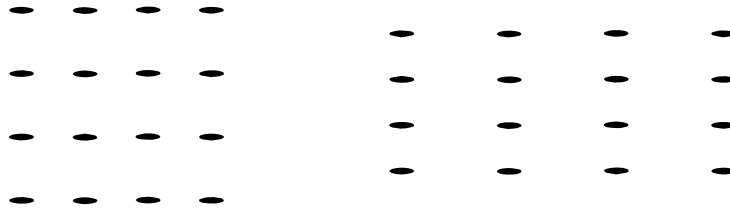


Fig. 38: Grouping by orientation and proximity. We see horizontal groups on the left and vertical groups on the right. © DONALD HOFFMAN

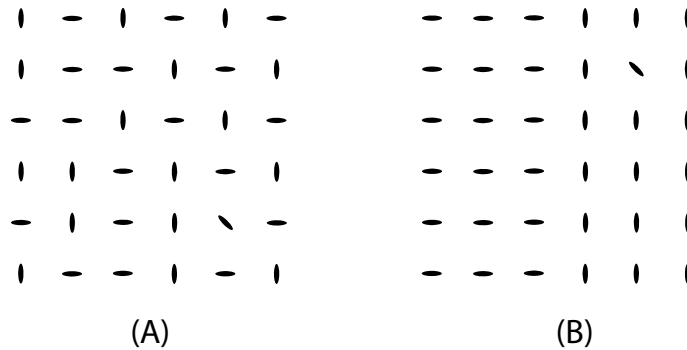


Fig. 39: Grouping and search. It is easier to find the tilted line on the right than on the left. © DONALD HOFFMAN

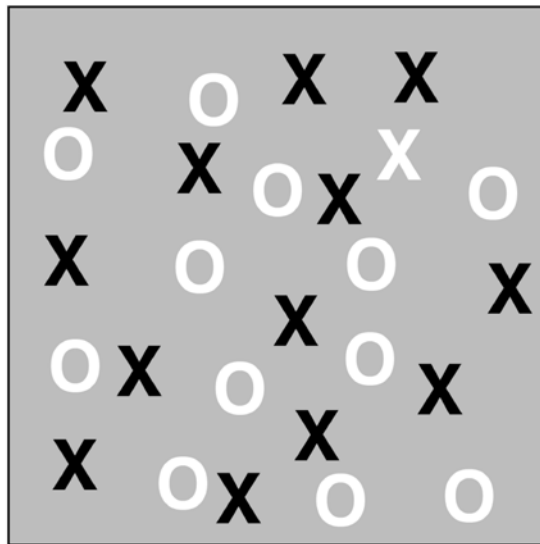


Fig. 40: Endogenous attention and search. Attending to white makes the white X pop out. © DONALD HOFFMAN

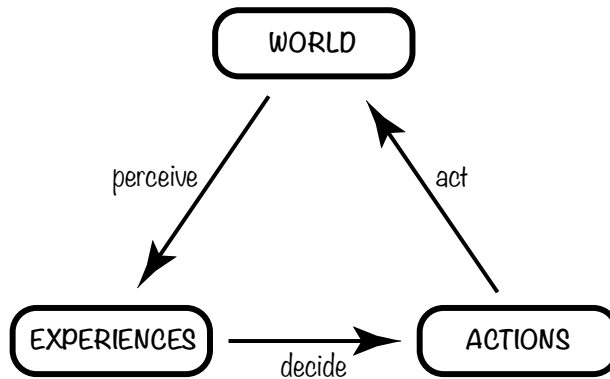


Fig. 41: The "perceive-decide-act" (PDA) loop. © DONALD HOFFMAN

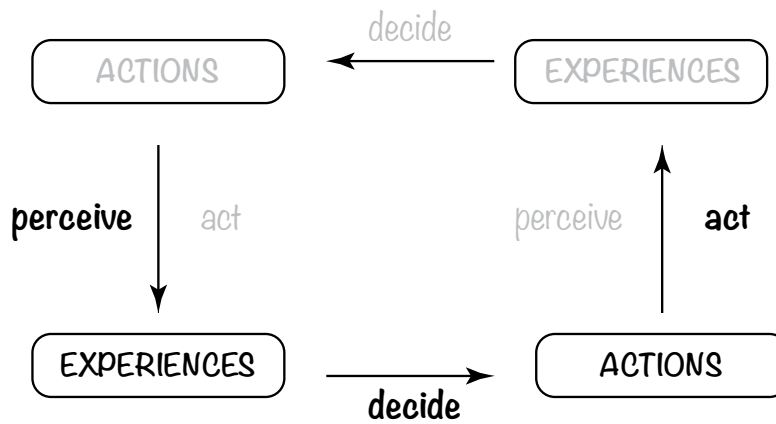


Fig. 42: Two interacting agents. © DONALD HOFFMAN